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ABSTRACT BOOK
ORAL PAPERS

Date: 2011-09-06

Session: Fractures Around the Knee

Time: 13:30 - 15:00

Room: Forum Hall

Abstract no.: 30297

**EXPERIENCE WITH 95° ANGLED BLADE PLATE IN THE TREATMENT OF
DISTAL FEMORAL FRACTURES**

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The 95° blade plate was one of the best implants designed by AO/ASIF. However, in recent years this implant was to a significant extent replaced by distal femoral locking plates or distal femoral nails and the young generation of surgeons consider it an “implant out of fashion”. The presentation focuses on the author’s 25-year experience in the use of this implant for treatment of acute distal femoral fractures, periprosthetic fractures and failed previous ORIF of distal femoral fractures or distal femoral osteotomies.

Date: 2011-09-06
Session: Hip - THA Outcome
Time: 13:30 - 15:00
Room: Meeting Hall I

Abstract no.: 28865

FOLLOW-UP PROGRAMME FOR MEASURING PATIENT-REPORTED OUTCOMES IN THE SWEDISH TOTAL HIP ARTHROPLASTY POPULATION

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This study sought to present the development and results of a nationwide, prospective, observational follow-up programme including patient-reported outcome measures (PROMs) following total hip arthroplasty (THA). The programme started in 2002 and has gradually expanded to include all units performing THA surgery in Sweden. The self-administered PROM protocol comprises the EQ-5D instrument, the Charnley categorization and visual analogue scales (VAS) for pain and satisfaction. These current analyses include 34 960 THAs with complete pre- and one-year postoperative questionnaires. Patients eligible for THA generally report low health-related quality of life (HRQoL) and considerable pain. One year post-operatively the mean EQ-5D index increased to above the level of an age- and gender-matched population, with a significant reduction of pain ($p < 0.001$). Females, younger patients and those with Charnley category C reported lower EQ-5D index pre-operatively than males, older patients and Charnley A or B, respectively, did (all $p < 0.001$). In a multivariable regression analysis Charnley category A, female gender and younger age were associated with greater improvement in HRQoL ($p < 0,001$). Nationwide implementation of a PROM programme requires a structured organization and effective IT solutions. Patients' response rates to the follow-up programme are good. The continuous collection of PROs permits local and national improvement work and allows for further health-economic evaluation.

Date: 2011-09-06
Session: Hip - THA Outcome
Time: 13:30 - 15:00
Room: Meeting Hall I

Abstract no.: 28560

CLINICAL AND RADIOGRAPHICAL RESULTS OF 179 THRUST PLATE HIP PROSTHESES – 5-14 YEARS FOLLOW-UP STUDY

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The thrust plate hip prosthesis (TPP) is a bone-reserving prosthesis for cementless fixation at the metaphysis of the proximal femur. We retrospectively evaluated the results of 162 patients (179 hips) who underwent hip arthroplasty using TPP. Patients and methods: Eighty-three patients (87 hips) suffered from osteoarthritis of the hip joint (OA group), 79 patients (92 hips) from osteonecrosis of the femoral head (ON group). The mean age at surgery was 55 years in OA group and 47.4 years in ON group. The mean follow-up period was 97 months in OA group and 104 months in ON group. Results: The mean Merle d'Aubigne's score improved from 8.2 to 16.9 in OA group and from 9.1 to 16.6 in ON group at the final follow-up. Early mechanical loosening of TPP was observed in two hips of OA and one hip of ON. In one patient of ON, bilateral TPPs had to be removed five years postoperatively because of infection. Two female patients with ON suffered from a spontaneous femoral fracture below the tip of the lateral plate. Kaplan-Meier survivorship using TPP removed for any reason as the end point was 97.7% in OA group and 91.5% in ON group after 13 years. Conclusion: The middle-term results of the TPP were satisfactory if the indication for the TPP and the operative procedure were appropriate. The TPP is a useful and safe prosthesis for relatively young patients with not only osteoarthritis of the hip also osteonecrosis of the femoral head.

Date: 2011-09-06
Session: Hip - THA Outcome
Time: 13:30 - 15:00
Room: Meeting Hall I

Abstract no.: 29247

RESULTS OF A BONE PRESERVING CEMENTLESS STRAIGHT HIP STEM – A PROSPECTIVE STUDY WITH A MINIMUM FOLLOW-UP OF 5 YEARS

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Uncemented hip stems are more biological than cemented ones concerning preservation of bone biology and healing. For better tissue preservation a new straight stem was designed. 5 years follow up is the first step for evaluation of a new design concept. Aim: The purpose of this study was the documentation of clinical and radiological results of a cementless stem which preserves the bone stock for less invasive implantation. Material, Method: This prospective and consecutive series include 237 primary total hip arthroplasties all performed by one surgeon. Patients mean age was 61 years. The stem was designed with anterior and posterior flanges which increase bone contact surface and cut section preventing subsidence. Rasping until the cortical bone is not compulsory for primary stability. A small lateral wing prevents rotation. The proximal part is covered by plasma coating and brushite which differs from other calcium phosphates by a better bioactivity. Results: The average follow-up is 6,5 years (5-10). Harris Hip Score rose from 46 to 97. Stems survival rate according to Kaplan-Meier was 98,72 %. All the stems except one were osteo-integrated with an average ARA score of 5,7 and an Engh-Massin score of 25,25. Three stems were removed: 2 for periprosthetic fracture, one for tight pain. Conclusion: The results confirm the less invasive and bone preserving design concept of this stem. No specific complications could be found. These results are as good as those from other stems at the same follow up. Long term follow-up is ongoing.

Date: 2011-09-06
Session: Hip - THA Outcome
Time: 13:30 - 15:00
Room: Meeting Hall I

Abstract no.: 29109

EARLY LOOSENING OF AL₂O₃ FREE SURFACE ZWEYMUELLER FEMORAL STEMS IN TOTAL HIP ARTHROPLASTY – A PROSPECTIVE RANDOMIZED STUDY USING DUAL-X-RAY-ABSORPTIOMETRY

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Total hip arthroplasty using rectangular Zweymueller-stems has proven successful 25-years results. The surface is routinely roughened by grit-blasting. Inevitably, some Al₂O₃ remains on the surface, which might lead to earlier loosening and less osteointegration. Hence, a special process was developed to remove the Al₂O₃. We hypothesized that Al₂O₃-free femoral-stems would lead to less loosening and better osteointegration (measured by DXA) than standard stems. We performed a prospective randomized controlled trial investigating osteointegration using DXA of grit-blasted Zweymueller-stems in two versions (Al₂O₃-free and standard). 49 patients were included and randomized, 25 received standard- and 24 Al₂O₃-free stems. Bone density was measured at follow-ups (1 day pre- and 1 week, 3/6/12/24 months post-surgery). Bone density was assessed in Gruen's zones (1-7), occurrence of loosening on radiographs and revision surgery were noted. Data was analysed using SPSS ($p < 0.05$, Pearson). Bone mineral density in the trial group was significantly higher than in the control group, with exception of zones 6/7 after 12 and zones 2/6/7 after 24 months. Zones 3/4/5, considered most important for anchorage of the Zweymueller-stem, showed higher bone density in Al₂O₃-free stems. 7 of 24 Patients (=29.2%) were revised due to loosening of the Al₂O₃-free stem. Radiological signs of loosening with yet no clinical correlation were observed (n=3). 1/3 of Al₂O₃-free Zweymueller-stems were revised during two years follow-up indicating a disastrous short-term outcome. Clearly, we recommend not to implant Al₂O₃-free stems as osteointegration seems to be impaired.

Date: 2011-09-06
Session: Hip - THA Outcome
Time: 13:30 - 15:00
Room: Meeting Hall I

Abstract no.: 29508

RESULTS OF CEMENTLESS THA IN INDICATIONS FOR NARROW FEMORAL CAVITIES

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Aim: Narrow femoral bone conditions may require dedicated hip stems with an optimized proximal-medial curvature for reliable proximal implant fixation. Small bone conditions and stem design changes may influence the outcome. **Methods:** The mid term clinical and radiological results of a modified straight cementless proximal fixation hip stem for narrow femora have been reviewed in a follow-up with minimum 10 years and compared with published data of the same unchanged and well known straight tapered hip design for standard femoral bone conditions. **Results:** 98 THA could be reviewed at an average follow-up of 12.2 (10.1 – 15.1) years. Indications were 32% prim. OA 38% dysplastic OA, 16% AVN and 14% other. Average patient age at time of index surgery was 57,1 years. At time of last FU HHS reached 93 (60-100) points and Merle d'Aubigné 16.7 (5-18) points. Kaplan-Meier statistics of the cementless hip stem showed a 99% survival at 14 years. However acetabular components showed high failure rates. Cup loosening and polyethylene wear did not affect the periprosthetic proximal bone-implant interface of the studied cementless straight hip stem and the integrity of the femoral component. These findings were not different to the published mid and long term results of the corresponding cementless straight standard hip stem design. **Conclusion:** Clinical and radiological results confirmed the mid to long-term success of proximal hip stem fixation with a specific medial curvature design in THA indications for narrow medullary femoral cavities.

Date: 2011-09-06
Session: Hip - THA Outcome
Time: 13:30 - 15:00
Room: Meeting Hall I

Abstract no.: 29113

IS OSTEONECROSIS A PREDICTOR OF POOR OUTCOMES IN PRIMARY TOTAL HIP ARTHROPLASTY?

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The primary goals of this critical literature review were to determine whether revision rates of primary total hip arthroplasty in patients with osteonecrosis differ based on the underlying associated risk factors and diagnoses, whether the outcomes of this procedure have improved over the past two decades, and to compare outcomes based on study level of evidence. A systematic literature review yielded 67 reports representing 3,277 hips in 2,593 patients who had a total hip arthroplasty for osteonecrosis of the femoral head. Stratification of outcomes by associated risk factors or diagnoses revealed significantly lower revision rates in patients with idiopathic disease, systemic lupus erythematosus, and after heart transplant, and significantly higher rates in patients with sickle cell disease, Gaucher disease, or after renal failure and/or transplant. There was a significant decrease in revision rates between patients operated upon before 1990 versus those in 1990 or later, with rates of 17% and 3%, respectively. The results for arthroplasties performed in 1990 or later were similar to those for all hips in publicly reported national joint registries. Certain risk factors were associated with higher revision rates in patients with osteonecrosis who were treated by total hip arthroplasty. However, most patients (82%) do not have these associated negative risk factors. Overall, this critical literature review provides evidence that osteonecrosis itself, or when associated with the most common risk factors and/or diagnoses, is not associated with poor outcomes in total hip arthroplasty.

Date: 2011-09-06
Session: Hip - THA Outcome
Time: 13:30 - 15:00
Room: Meeting Hall I

Abstract no.: 28661

THE INFLUENCE OF DEMOGRAPHIC FACTORS, SURGICAL APPROACHES AND IMPLANT DESIGN ON LONG-TERM OUTCOME OF TOTAL HIP REPLACEMENT

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Introduction: The role of different surgical approaches and types of implant, surgical technique, patient's age, activity level, weight and other demographic factors have been investigated in a lot of studies. The aim of this study is to assess the effect of these factors as well as the effect of traditional life-style in patients who had total hip arthroplasty (THA) in our centre within the past 20 years. Methods: In a historical case series we reviewed the average Harris Hip Score (HHS) and the prosthesis survival in 210 patients including 235 THAs and 49 revision arthroplasties between 1985 and 2005. The average follow-up was 6.1 years and the average HHS was 78.08 ± 15.7 . Twenty six patients were dead and 17 were inaccessible. Out of the remaining 167, ninety-six patients were invited for an interview and 71 were contacted by telephone. The effects of traditional life-style and daily activity level on implant loosening were also considered in our study. Results: Our investigation showed that patient's sex, surgical technique, surgeon, Body Mass Index (BMI) and use of cement weren't related to either implant loosening or HHS. We had 25 prosthesis dislocations, which were all results of trauma. Considering revision surgery as the end point, the following 10-year-survivals were calculated; cemented cup 60%, uncemented cup 85% and both cemented/uncemented stems 80%. . Considering radiographic evidence of loosening as the end point, the 10-year-survival of cups was 80% and that of cemented and uncemented stems was 60% and 70% respectively. Conclusion: We concluded that unnecessary delays in THA only resulted in more limping (because of defects of joint anatomy and weakness of the surrounding muscles) and lower Harris Hip Scores. Additionally, the survival of our THAs was generally shorter than that in the literature.

Date: 2011-09-06
Session: Hip - THA Outcome
Time: 13:30 - 15:00
Room: Meeting Hall I

Abstract no.: 28774

JOINT REPLACEMENT REVIEWS CONDUCTED BY PHYSIOTHERAPISTS – A SAFE AND EFFECTIVE MODEL

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Aim: Introduction of the physiotherapist-led Joint Replacement Surgery (JRS) clinics was a service re-design aimed at improving the efficiency of the post operative review process following hip and knee arthroplasty surgery and improving access to orthopaedic outpatients. A credentialed extended scope physiotherapist was engaged to work alongside the orthopaedic unit and conduct post operative reviews in place of the surgeons. **Method:** A protocol was developed whereby surgeons conduct the initial 6 week post operative review and the extended scope physiotherapist conducts subsequent reviews at 3, 6 and 12 months and annually thereafter. Radiological imaging is scheduled for immediately post operatively, at 1 year, 5 years and 10 years and then annually. Physiotherapists completed radiology competency training prior to commencing in the clinics. **Results:** Between January and December 2010, 215 appointments were offered in the JRS clinics (n patients = 143) with an 88.8% attendance rate. The physiotherapists discussed 20 cases with the surgeons with only 5 patients requiring referral to the orthopaedic unit for ongoing management. There were no adverse outcomes or sentinel events reported in the JRS clinics. A patient survey demonstrated high levels of satisfaction with the service. **Conclusion:** Utilisation of physiotherapist-led JRS clinics is a safe and effective model of care for the long term follow up of patients post hip and knee arthroplasty surgery. The JRS clinics release additional surgeon time for review of new referrals and complex cases and provide an alternative model of care in the face of increasing demand for joint replacement services.

Date: 2011-09-06
Session: Hip - THA Outcome
Time: 13:30 - 15:00
Room: Meeting Hall I

Abstract no.: 28763

RETURN TO WORK AFTER TOTAL HIP REPLACEMENT. WHAT SHOULD WE TELL PATIENTS?

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Introduction: Total hip replacement (THR) is performed on an increasing number of patients under the age of 65. This cohort of patients expects a THR that allows a return to employment post-operatively. At what stage they return to work and at what intensity is poorly described in the literature. Methods: 250 patients under the age of 65 were reviewed 6 months after THR. Questionnaires detailing return to employment were completed. Return to work date, what type work they performed and if they had any restrictions whilst at work were recorded. Pre and post operative pain scores, SF12 quality of life scores and Oxford hip scores were also recorded. Results: 183 of the patients worked prior to the surgery. The average return to work after surgery was at 13.9 weeks. 78% of patients returned to work with no restrictions. 7% of patients had to be redeployed to a less physically demanding job. Age and BMI were found to correlate significantly with a return to work. Gender was not found to correlate with time of return to work. There was no significant correlation found between the patients who reported a restriction at work and post operative pain scores, SF12 scores or Oxford hip scores. Conclusion: As a result of this study it is possible to counsel patients about when they can expect to return to work. The majority of patients of working age that undergo THR can return to employment. Most patients are able to perform their job as prior to the surgery. There was surprisingly no correlation between return to work and post operative satisfaction scores.

Date: 2011-09-06

Session: Plenary Lecture - James WRIGHT (Canada)

Time: 15:30 - 16:00

Room: Meeting Hall I

Abstract no.: 30657

EVIDENCE-BASED ORTHOPAEDICS: WHAT DOES THAT ACTUALLY MEAN?

James WRIGHT
(CANADA)

George Bush said “I know what I believe, and I believe what I believe is correct”. In the past we have relied strongly on the opinions of experts in determining the best treatment for patients. While our senior colleague or experts have loads of experience, they often disagree on the best treatment for patients leaving us confused. Evidence-based orthopaedics is an alternative paradigm for improving patient care that is rapidly influencing orthopaedics. However, what does this concept actually mean? This presentation will discuss practical strategies for journals, professional societies, and surgeons to implement evidence into practice. Furthermore, the presentation will discuss the need of innovation and more importantly how that innovation can fit with a move to evidence-based orthopaedics.

Date: 2011-09-06

Session: Hip - Periprosthetic Fractures and Dislocations

Time: 16:00 - 17:30

Room: Meeting Hall I

Abstract no.: 30310

TREATMENT OF PERIPROSTHETIC FEMUR FRACTURES ASSOCIATED WITH REVISION TOTAL HIP ARTHROPLASTY

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Periprosthetic femur fractures associated with loose femoral implants are typically treated with revision total hip arthroplasty allowing the surgeon to address the problems of the fracture and the loose implant simultaneously. Historical studies of such revisions have been associated with a high risk of complications, but in the last decade surgical techniques and implants have improved notably. The purpose of this paper is to describe the array of available techniques and to report the results of the different methods at the Mayo Clinic. In the past 15 years most such fractures have been treated with uncemented long-stemmed implants and the clinical results, with respect to fracture healing, implant fixation, clinical outcome and complications will be reported. Attention will be focused on the results of using fluted tapered modular implants to treat such fractures as this is currently the method of choice to treat most such fractures at the authors' institution. This method allows stable axial and rotational fixation of an uncemented implant distal to the fracture, which facilitates biologic management of the fracture site.

Date: 2011-09-06

Session: Hip - Periprosthetic Fractures and Dislocations

Time: 16:00 - 17:30

Room: Meeting Hall I

Abstract no.: 29604

AN ANALYSIS OF THE FAILURE RATES OF LOCKING PLATE FIXATION OF PERIPROSTHETIC FRACTURES OF THE HIP

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Introduction: The worldwide incidence and reasons for locking compression plate (LCP) failure in the fixation of periprosthetic fractures around a total hip arthroplasties has not been reported. We have highlighted the most up to date failure rates in LCP fixation in PPF of the femur and also identified trends in the patterns of failures. Methodology: A literature search was conducted for studies reporting the management of PPF of the femur with LCP fixation. The primary medical search engines used for the study were Ovid MEDLINE (1950 to January 2011), EMBASE (1988 to January 2011), and PsychINFO (1987 to January 2011) databases. Results: The overall plate complication rates following locking plate fixation of PPF of the hip can vary from 4.5 – 42.8%. Important trends in plate complications across the literature include: potential stress at the end of plate, stress concentration in the fracture area due to a too rigid fixation non-union, early loading, errors in the application and neglecting basic principle, absence of cortical strut graft, technical error and improper implant or screw selection. Conclusion: PPF involving a hip arthroplasty presents a technically challenging management dilemma for any orthopaedic surgeon. The use of LCP produces functionally good outcome and low complication rates. However, it is essential that that meticulous planning is carried out before the operations takes place, in order to ensure that all the hardware selection and measurements are correct to order to prevent avoidable complications and consideration to weight bearing status is thought to prevent failure.

Date: 2011-09-06

Session: Hip - Periprosthetic Fractures and Dislocations

Time: 16:00 - 17:30

Room: Meeting Hall I

Abstract no.: 29881

**IS MOVEMENT RESTRICTIONS AFTER HEMIARTHROPLASTY
TREATMENT OF FEMORAL NECK FRACTURES NECESSARY?**

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Hip fracture arthroplasty leads to dislocation in 2-14%. Dementia and posterior approach increases the risk. We treat all geriatric patients with a displaced femoral neck fracture with hemiarthroplasty via an anterolateral approach, and mandatory postoperative restrictions regarding hip flexion/adduction. Our dislocation rate was 0,6% in 2008. The use of restrictions is not evidence based. The hypothesis of this study is that restriction-free rehabilitation does not increase the risk of dislocation when using anterolateral approach; it may improve function and health-related quality of life (HRQoL). Patients in two wards are allowed to move freely during rehabilitation without restrictions, i.e. pseudo-randomised study. The two other wards form the control group with standard restrictions, including a knee brace in patients with delirium. Power analysis regarding dislocations implies a total of 800 patients, but for analysis of function/HRQoL a smaller material is sufficient. Preliminary results will be presented at the meeting. HRQoL, need of ADL aids is measured pre-fracture, 5 days, 6 weeks and 3 months postoperatively; function at 5 days and 3 months. Dislocations and falls during 6 months are monitored via medical records as well. A cost analysis is planned. During May 2010 to January 2011 92 patients are included, and two dislocations are recorded, both in the group WITH restrictions. To our knowledge, this is the first prospective, controlled study, analysing the usefulness in restrictions after hemiarthroplasty. The restrictions may not be cost effective, when other prerequisites such as anterolateral approach and careful implant selection are fulfilled.

Date: 2011-09-06

Session: Hip - Periprosthetic Fractures and Dislocations

Time: 16:00 - 17:30

Room: Meeting Hall I

Abstract no.: 28733

REDUCED OPERATING RISKS WITHOUT COMPROMISED COMPONENT STABILITY WHEN TREATING SELECTED B2 PERIPROSTHETIC FEMORAL FRACTURES BY INTERNAL FIXATION WITH STEM RETENTION RATHER THAN STEM REVISION

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Current management techniques for the treatment of Vancouver B2 fractures recommend stem revision in order to regain femoral component stability in these cases. There are reasons to believe that a subgroup of these fractures, around cemented polished double tapered (CPDT) stems that are loose at the cement stem interface only and can be anatomically reduced, could benefit from the simplified surgical treatment of open reduction and internal fixation (ORIF) without compromising component stability. The aim of this study was to compare surgical risks to the patient measured as the surgical time and perioperative blood transfusion requirements in two cohorts of B2 periprosthetic fractures around CPDT stems: one treated with ORIF alone and one with femoral component revision. Between 2002-2010, 22 Vancouver B2 periprosthetic fractures around CPDT stems were treated in our department. Of these 13 were treated by ORIF and nine by component revision. The operating time and perioperative blood transfusion requirements were compared between the two groups. For the fractures treated by internal fixation without revision the median theatre time was 175 mins (range 143-239) and the skin-to-skin time 120 mins (range 80-165). The Median number of transfusions required was 0 (range 0-4). All fractures healed uneventfully with all femoral components regaining stability in the reduced cement mantle. For the fractures treated by femoral component revision the median theatre time was 270 mins (range 206-352) and the skin-to-skin time 200 mins (range 142-285). The Median number of transfusions required was 3 (range 0-5). Treatment of Vancouver B2 fractures around CPDT stems with ORIF is a viable alternative management that reduces the surgical risks in these complex cases.

Date: 2011-09-06

Session: Hip - Periprosthetic Fractures and Dislocations

Time: 16:00 - 17:30

Room: Meeting Hall I

Abstract no.: 30227

**INCIDENCE OF IMPLANT FRACTURES AT TOTAL HIP ARTHROPLASTY:
A COMPREHENSIVE LITERATURE REVIEW INCLUDING ARTHRO-
PLASTY REGISTER DATA**

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In a structured literature analysis based on a standardised methodology we calculated the incidence of reoperations comparing clinical studies published in Medline-listed journals and annual reports of National Arthroplasty Registers worldwide. The majority of clinical studies are monocentre trials. The publications comprise a cumulative number of about 70.000 primary operations; a survey of the AAHKS covered a similar cohort. Worldwide high value national arthroplasty Register data refer to 733,000 primary operations, i.e. approximately 10 times as many as sample-based datasets. In general, sample-based datasets present higher revision rates than register data. The deviations are high, with a maximum factor of 14,5 for ceramic heads. Whereas the AAHKS survey exhibits lower deviations than the monocentre trials, they are still too high for this data collection tool being considered as reliable and safe to provide valid data for general conclusions. The incidence of implant fractures after total hip arthroplasty in pooled worldwide arthroplasty register datasets is 304 fractures per 100.000 implants. In other words, one out of 323 patients has to undergo revision surgery due to an implant fracture after THA in their lifetime.

Date: 2011-09-06

Session: Hip - Periprosthetic Fractures and Dislocations

Time: 16:00 - 17:30

Room: Meeting Hall I

Abstract no.: 28859

THE RISK OF DISLOCATION AFTER TOTAL HIP ARTHROPLASTY IS DECREASED WITH DOUBLE MOBILITY LINERS IN PATIENTS WITH FEMORAL NECK FRACTURES

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Total hip arthroplasty (THA) has been efficacious for treating hip fractures. However, in these patients with fractures a widely variable prevalence of dislocation has been reported. The purpose was to determine if double mobility liners decrease the risk of dislocation. Between 2000 and 2005, 125 patients with neck fracture underwent primary THA using a double mobility acetabular liner. The results of these 125 double mobility acetabular liners were compared with 380 THA without double mobility liners performed for neck fractures in the same hospital. All patients were followed for a minimum of 5 years. The cumulative risk of dislocation was calculated with use of the Kaplan-Meier method. Results: For patients without double mobility liners, the cumulative risk of a first-time dislocation was 5% at one month and 12% at one year and then rose at a constant rate of approximately 1% every year to 16% at five years. For patients with double mobility liners, the cumulative risk of a first-time dislocation was 1% at one month, 2% at one year and then did not change at 5 years. Multivariate analysis revealed that the relative risk of dislocation for female patients (as compared with male patients) was 2.1 and that the relative risk for patients who were 80 years old or more (as compared with those who were less than 80 years old) was 1.5. Conclusions: The cumulative long-term risk of dislocation for patients with hip fractures is greater than has been reported in short-term studies. The incidence of dislocation is highest in the first year after arthroplasty and then continues at a relatively constant rate for the life of the arthroplasty. Double mobility liners in these patients is an effective technique to prevent post operative hip dislocation.

Date: 2011-09-06

Session: Hip - Periprosthetic Fractures and Dislocations

Time: 16:00 - 17:30

Room: Meeting Hall I

Abstract no.: 28167

DOES THE DOUBLE MOBILITY CUP HAVE A LOW RISK OF DISLOCATION?

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We present the results of 200 patients, operated between 2003 and 2007. Clinical and radiographic parameters were analyzed prospectively. The mean follow-up was done during 30 months. Clinical results were evaluated by the HHS at the out patients clinics: previous and post surgery. From the 200 patients operated (130 women- 70 men / Mean age : 81years old): 57,63% had a primary hip osteoarthritis; 5,77 % femoral necrosis ; 1,13 % rheumatoid arthritis; 16,95 % revision surgeries; 13,45%femoral neck fractures; 3,2% acetabular fractures y 1,5 % hip tumours. HHS before surgery was 45, 83 points on average (from 12 to 79) y post surgery HHS was 80, 03 points (from 37 to 100), increasing the total score after the arthroplasty in a mean of 34, 17 points .Post surgery complications were as follow: 3 dislocations (1 after an enormous fall and 2 in patients with Alzheimer. In our series there are 50 patients diagnosed of dementia-Alzheimer); 1 per prosthetic fracture (revision surgery); 4 deep infections (2 acute: lavage+ antibiotherapy; 2 late ones: spacer + antibiotherapy +second time surgery); 2 Deep vein thromboses (Eco Doppler +) ; 10 urinary infections; 2 urinary retentions and 17 deaths . Double Mobility acetabular implant has shown good results in all the following indications: Revision surgery, hip osteoarthritis, femoral necrosis, rheumatoid arthritis, femoral neck and acetabular fractures, hip tumours and as an implant for Computer Assisted Hip Surgery. The complications founded while this acetabular implant is used appeared with the same percentage than others. The dislocation rate is lower than standard acetabular implants, especially in patients with neuromuscular or cognitive illnesses. Those clinical results are hopeful and they could increase the number of actual indications (hip osteoarthritis in people over 70 years old, multiple illnesses associated, iterative dislocations...) for the double mobility implant on the future.

Date: 2011-09-06

Session: Hip - Periprosthetic Fractures and Dislocations

Time: 16:00 - 17:30

Room: Meeting Hall I

Abstract no.: 29482

LOW DISLOCATION RATES IN TOTAL HIP REPLACEMENT WITH THE USE OF A SMALL DIAMETER (22MM) FEMORAL HEAD IMPLANTED USING A POSTERIOR APPROACH

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Introduction: Traditionally the use of small diameter femoral heads (22mm) and the posterior approach have been associated with higher reported rates of dislocation. We present the results of a consecutive series of 400 total hip replacements performed using a 22mm femoral head and the posterior approach, with prospective data collection. Materials and methods: Between March 2000 and November 2005 364 patients underwent 400 total hip replacements with a small diameter 22mm head under the care of four different consultants, using a standard posterior approach. All of the femoral implants were cemented modular polished triple-tapered C-stems (Depuy Ltd.) and all of the acetabular components were cemented flanged monobloc all-polyethylene components with long posterior walls. Results: Osteoarthritis was the most common pathology (348 cases – 87%) and postoperative complications occurred in 19 cases (4.75%) of which 5 were dislocations (1.25%). There were 4 re-operations, 1 revision for aseptic loosening of the acetabulum, 1 for internal fixation of a peri-prosthetic femoral fracture, 1 washout and debridement of an infected hip (MRSA), and 1 PLAD (Posterior Lip Augmentation Device) for recurrent dislocation. Four occurred on a single occasion only and were stable on reduction and only one required further surgery for recurrent dislocations. Conclusion: Total hip replacement using small diameter femoral heads and a posterior approach has provided excellent results and implant longevity, with a low complication rate. Dislocation was the most common complication, occurring in only 1.25% of cases and was associated with the use of an extended head.

Date: 2011-09-06

Session: Hip - Periprosthetic Fractures and Dislocations

Time: 16:00 - 17:30

Room: Meeting Hall I

Abstract no.: 27813

**LEG LENGTH DISCREPANCY AFTER TOTAL HIP REPLACEMENT
– TYPE AND RELATION TO FUNCTIONAL OUTCOME**

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Introduction: In spite of improvements occurred in implant design, materials and fixation techniques, among many complications following total hip replacement (THR), leg length discrepancy (LLD) is very common but least explored. It can lead to serious complications converting an excellent surgery with rigid fixation to poor functional results. The desirability of lengthening or shortening, clinical and radiological methods of assessment and their correlation with functional outcome etc are some most controversial questions about LLD which are being effort to be answered in this study. Material & methods: 108 cases of THR with any type implant and demographic with equivocal post-op protocol were assessed clinical (true and apparent) and compared with radiologically (pelvic, femoral and combined) measured LLD and finally functional results correlated with measurement of Harris hip score. Results: Overall prevalence of LLD was above 90% but clinical and radiological assessment correlated poorly. Clinically lengthening (83%) was more common than shortening, with maximum lengthening in the range 1-10mm. Radiologically combined (60%) variety outranged femoral while least being pelvic. Only 50% has LLD in range of 1-10mm on radiologically assessment, but more than 90% cases has excellent to good functional results. Conclusion: LLD though inevitable, is controllable complication following THR, which effects adversely on functional outcome affecting it geometrically above the cut off limit of 2.0cm. Preoperative templating and intra operative measurements by careful positioning and orientation of components can decrease LLD and improve the functional outcome.

Date: 2011-09-06

Session: Shoulder - Miscellaneous

Time: 13:30 - 15:00

Room: Meeting Hall IV

Abstract no.: 30294

CURRENT STATUS AND TRENDS WITH THE REVERSE TOTAL SHOULDER ARTHROPLASTY – THE THIRD GENERATION GRAMMONT PROSTHESIS

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¹Clinique St Michel Toulon, Toulon (FRANCE), ²CHU Dijon, Dijon (FRANCE)

Introduction: The glenosphere design in reverse total shoulder arthroplasty using a medialized center of rotation has significantly evolved since its description by Paul Grammont in 1984. The 1st generation (“Trumpet” prosthesis) used a 2/3 sphere glenosphere that was cemented around a glenoid face and scapular neck with a non-modular polyethylene humeral cup. The 2nd generation (Delta I) introduced cementless fixation of the metaglene augmented with screws along with a modular humeral component and utilized a hemispheric glenosphere. The 3rd generation may present with a subtended arc greater than a hemisphere (DuoCentric) providing extended articulation between the glenosphere and humeral cup medial to the glenoid and below the scapular neck. Other options include changing of the insertion technique of the existing glenospheres or enlarging the hemisphere to something greater than 2/3 of a sphere. The hypothesis of this work was that the first and the second generation RTSA are not adapted to the glenoid neck variability, which can result in a high percentages of failures due to mechanical problems such as glenoid notching or instability and loosening. The 2nd generation implant caused direct contact during physiologic adduction of all specimens. Additionally, in specimens with 2nd generation implants, in maximum adduction, there was noted to be lateral translation of the humeral cup against the portion of the sphere. The 1st and 3rd generation implants allowed full physiologic adduction of the humerus without causing impingement between the scapular pillar and the humeral cup. Conclusions: 1st generation RTSA had high rates of mechanical failure of fixation. However, in patients with surviving implants, notching has not been reported. 3rd generation glenosphere designs with inferior coverage of the scapular neck prevent notching, improve adduction to physiologic levels, and minimize the edge loading of the polyethylene.

Date: 2011-09-06
Session: Shoulder - Miscellaneous
Time: 13:30 - 15:00
Room: Meeting Hall IV

Abstract no.: 30212

THE SURGICAL MANAGEMENT OF SYMPTOMATIC OS ACROMIALE

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Os acromiale is an uncommon cause of shoulder pain. Between January 2003 and December 2008, a total of 22 patients (17 males and 5 females) with symptomatic os acromiale were treated. The mean age of the patients was 53.4 years (range, 46 to 67 years). The diagnosis of os acromiale was made on the basis of clinical examination, plain radiographs, bone scan or MRIs. Fourteen of the 22 patients (63.6%) had an associated full-thickness tear of the rotator cuff. All patients had failed non-operative treatment. Of the 22 patients, 2 patients with a small os acromiale fragment underwent excision of the lesion, and 20 patients with large, unstable painful os acromiale underwent open reduction, internal fixation and bone grafting. Of the 20 patients, 6 had internal fixation with K-wires and a tension-band construct, and 14 had internal fixation using cannulated screws and a tension-band construct. Autogenous anterior iliac crest bone graft was used for 20 cases. Arthroscopic repair of the associated full-thickness rotator cuff tear was performed in 12 cases, whereas 2 patients with a massive rotator cuff tear underwent debridement of the tear. The mean length of postoperative follow-up was 65.8 months (range, 24 to 96 months). The mean UCLA score improved from a preoperative 15.4 to postoperative 31.8. Eight of the 22 patients (36.4%) had hardware-related pain and required removal of the symptomatic hardware. We conclude that open reduction-internal fixation and bone grafting of the symptomatic, unstable os acromiale yields satisfactory functional results in the majority of cases.

Date: 2011-09-06

Session: Shoulder - Miscellaneous

Time: 13:30 - 15:00

Room: Meeting Hall IV

Abstract no.: 29383

MANAGEMENT OF GRADE III ACROMIOCLAVICULAR JOINT DISLOCATION USING ARTHROSCOPIC TIGHT ROPE FIXATION

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The treatment of Grade III acromioclavicular joint (ACJ) dislocations has been a subject of much controversy, even as early as Hippocrates. We describe a case series of 15 patients all of whom have had grade III dislocations of the ACJ. The patient population was young active adults. Surgery was performed within four weeks in all cases. One Surgeon in the Queen Elizabeth hospital, University of Birmingham, performed the same procedure on all 15 patients. A standard technique was used for tight rope fixation. The fixation device is comprised of no. 5 fibrewire suture and 2 metal buttons, joined by a continuous loop. This is a low-profile double-metallic button technique. Postoperatively all patients remained in a polysling for three weeks and postoperative rehabilitation was commenced after that point including physiotherapy supervised pendular exercises and gentle passive movements. They were all seen six weeks and three months post operatively. Clinical and radiographic assessment was performed to assess the fixation. Of our cohort of patients, one required revision open stabilization after sustaining a mechanical fall on the affected operated side. At three months postoperatively all patients were satisfied with the functional outcome and were able to return to pre injury level of activity. This technique provides a simple, reproducible, minimally invasive technique for acute ACJ dislocation, which expedites a functional recovery of this acute injury. It is a non-rigid fixation of the AC joint that maintains reduction yet allowing for normal movement at the joint.

Date: 2011-09-06
Session: Shoulder - Miscellaneous
Time: 13:30 - 15:00
Room: Meeting Hall IV

Abstract no.: 29038

ACCURACY OF THE ACROMIOCLAVICULAR JOINT INJECTIONS UNDER IMAGE INTENSIFIER

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Background: Steroid and local anaesthetic injection to the acromioclavicular joint (ACJ) is a very common diagnostic and therapeutic procedure. It can be difficult to localise this joint because of its small size, presence of osteophytes and variable morphology in the population. We have done a study to determine whether the use of image intensifier improves the accuracy of the injection. Method: 45 patients were enrolled in this study between October 2008 and March 2009. We performed 50 injections in total. Five patients had repeated injections. The injections were performed by 2 senior orthopaedic surgeons. First, we clinically palpated the ACJ and marked the area over the joint (A). Then, with the use of a needle and image intensifier, we identified the actual location of the ACJ (B). We measured the distance between A and B in millimetres and determined the accuracy of the injections. Result: We found that in 12 injections, there were no discrepancies between A and B. The use of image intensifier had improved the accuracy of ACJ injection in the other 38 injections. The discrepancies were as high as 20 millimetres in 2 patients. Conclusion: We recommend the use of image intensifier to accurately determine the location of ACJ for steroid and local anaesthetic injection. This prevents injection into the wrong place which can lead to the wrong diagnosis and sub-optimal treatment.

Date: 2011-09-06

Session: Shoulder - Miscellaneous

Time: 13:30 - 15:00

Room: Meeting Hall IV

Abstract no.: 29649

BOSWORTH PROCEDURE VS ROCKWOOD PROCEDURE IN ACUTE ACROMIOCLAVICULAR JOINT DISLOCATIONS

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Prospective randomised clinical study comparing the surgical outcomes of modified Bosworth procedure and Rockwood procedure in acute complete acromioclavicular joint dislocations. With over 30 surgical procedures described for AC joint dislocations, still there is no consensus which is the gold standard. Both of the above mentioned procedures have reported good results with no previous study directly comparing these two procedures. Our study included 18 cases which were randomly segregated in 2 groups with 9 each in Group A & B respectively. Group A, Modified Bosworth procedure done. Group B, Rockwood procedure done. In our study, surgical outcomes in both group A & B were evaluated using Constant Murley scoring system. Statistically significant improvement in Constant Murley scores were seen in Group B (89.55) as compared to Group A (65.44). Group A also had significantly high rates of screw pullouts with redislocation of AC joint (66.66%) as compared to Group B (22.22%). By our study we conclude that Rockwood procedure has much better clinical outcomes with lower screw pullout and subsequent redislocation rates as compared to modified Bosworth procedure alone.

Date: 2011-09-06
Session: Shoulder - Miscellaneous
Time: 13:30 - 15:00
Room: Meeting Hall IV

Abstract no.: 28547

SUBACROMIAL DECOMPRESSION WITH OR WITHOUT ROTATOR CUFF REPAIR – A RANDOMIZED CONTROLLED TRIAL

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Aim: We performed a randomised controlled trial to compare Arthroscopic subacromial decompression (ASD) alone and ASD with rotator cuff repair in patients with degenerate rotator cuff tears associated with subacromial impingement syndrome. **Methods:** 42 patients (29 males, 13 females) with a mean age of 64 years (range 54-77 years) were recruited. 25 patients underwent ASD with rotator cuff repair and 17 patients ASD alone. Mean duration of follow-up was 21 months. **Results:** No significant difference in the mean Constant scores (p value 0.06) and mean patient satisfaction scores (p value 0.44) was noted between the two groups. Mean DASH and ASES scores were significant better (p value 0.05 and 0.03 respectively) in ASD with cuff repair group. Eight patients (32%) in the cuff repair group showed a rerupture in the follow-up Ultrasound scan, however there was no significant difference in the outcome measures between the patients with a rerupture to those with intact cuff. In the ASD alone group the post-operative scans did not reveal any significant progression in the size of cuff tear compared to the pre-operative level (p value 0.55). Three patients (12%) in the cuff repair group and 3 patients (18%) in ASD alone group required a secondary procedure for persistent symptoms (p value 0.67). **Conclusion:** Our study demonstrates no significant differences between Arthroscopic ASD with or without repair of the rotator cuff. A positive trend was noted in the cuff repair group; however a long-term follow-up study would be more conclusive.

Date: 2011-09-06
Session: Shoulder - Miscellaneous
Time: 13:30 - 15:00
Room: Meeting Hall IV

Abstract no.: 29704

**ONCOSURGICAL RESULTS OF LIMB-PRESERVING TUMOR RESECTION
IN THE SHOULDER REGION IN PRIMARY TUMORS AND METASTASES**

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Introduction: Wide resections of shoulder girdle area are due to complex anatomy/ extrakompartimental extension technical challenging. Objective of the retrospective study was the analysis of oncosurgical results after wide resections of shoulder girdle area of primary tumors/ solitary metastases. Methods: 10/02-12/10 23 patients (♀/♂:9/14, age 48.1 years) received wide resection of 11 sarcomas, 5 aggressive benign lesion, 7 solitary metastases. All patients received staging investigations. 12 neoadjuvant radio/chemotherapies were performed. MSTS Classification: S1=7, S2=4, S12=1, S4=1, S34=5, S234=1, S1234=4. Arthroplasty defect reconstruction was in 6 and isolated tube connection in 2, soft tissue refixation of the pectoralis/deltoid at the Trevira tube connection/lateral clavicle in 12 patients. Results: There were 13 wide, 6 marginal resection and due to encasement of the plexus 4 intralesional resections. 7 per adjuvant radio-/chemotherapies were performed. Complications requiring revision occurred in 2 pts due to wound healing disorders. In 2 pts appeared a sensormotor. deficit due to oncological planned nerve resection. In mean follow-up of 22 months 5 local recurrence (initially 2 marginal/ 3 wide/ 1 intralesional resection) after 12.6 months, 7 pulmonary metastases after 5 months occurred. 8 patients died (5 sarcomas, 3 solitary metastases) due to tumor after 11 months. 6 patients are considered alive with disease. Conclusion: The modified.Tikhoff-Linberg resection is a demanding surgical technique with low complication rate and sufficiency oncological resection margins. Extrakompartimental tumor manifestations require an extension of the resection with consecutive reconstruction.

Date: 2011-09-06

Session: Shoulder - Miscellaneous

Time: 13:30 - 15:00

Room: Meeting Hall IV

Abstract no.: 30075

INERTIA-BASED FLAPPING AND CLAPPING TEST: A PROMISING TOOL FOR FUNCTION ASSESSMENT IN PATIENTS WITH SHOULDER COMPLAINTS

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Inertia-based motion analysis (IMA) recently showed high discriminative power between patients with unilateral shoulder pathology and healthy controls using an inertia-derived asymmetry score. This score evaluated differences between both shoulders of subjects during a simple task (e.g.hand-to-head). While the asymmetry showed high discriminative power, it may be less suitable for patients with bilateral pathologies. Furthermore, a test requiring more coordination and strength is needed to investigate whether IMA can serve as diagnostic tool. This pilot study investigates the reliability of a more demanding IMA-based clapping and flapping test and examines its suitability to differentiate pathological from healthy shoulders. Sixteen patients with shoulder pathology and 34 healthy controls performed a clapping and flapping task with an inertia-sensor fixed to the elbow. The test was repeated another day by the same observer (n=7). For both tasks, maximal angular rate (max-AR) and peak accelerations (peak-ACC) in x, y, z axes were calculated using specific algorithms. All parameters (except max-ARz-clapping, peak-ACCx-flapping) were significantly lower in patients (e.g.peak-ACCy-flapping $2.06\pm 0.11\text{m/s}^2$ vs. $1.51\pm 0.60\text{m/s}^2$). The max-ARx-flapping showed highest discriminative power: sensitivity of 94%, specificity of 76% for cut-off value of 1.9rad/s. Test-retest-reliability was moderate (ICC=0.63). This study showed that IMA-based clapping and flapping tests are reproducible and able to differentiate healthy from pathological shoulders. The discriminative power is comparable with previous reported IMA shoulder tests. However, this new test is suitable for patients with bilateral complaints and is more demanding showing its potential as diagnostic and clinical outcome tool. Larger groups are needed to investigate this further.

Date: 2011-09-06
Session: Shoulder - Miscellaneous
Time: 13:30 - 15:00
Room: Meeting Hall IV

Abstract no.: 28155

ROLE OF SUPRASCAPULAR NERVE BLOCK IN CHRONIC SHOULDER PAIN: A COMPARATIVE STUDY OF 90 CASES

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Introduction: Chronic Shoulder Pain is a common condition that brings patients to Orthopaedic OPD's. Suprascapular nerve block has shown promising results in reducing shoulder pain. The aim was to treat shoulder pain with suprascapular nerve block with different drugs, compare the efficacy of these drugs & duration of pain relief after nerve block. Methods: 90 Patients with chronic shoulder pain were subjected to the procedure. Diagnosis was made by clinical and radiological methods. A group of 30 patients were given 10 ml of 0.5% bupivacaine; another group of 30 patients were given 10 ml of 0.5% bupivacaine & 40 mg of Methyl prednisolone acetate. Rest of 30 patients of control group were given normal saline as placebo to block the nerve. Patients were followed up on 2nd, 7th, 21st & 90th days. On the follow up visits patients were examined for range of movements (ROM) and pain. Results: Patients with various pathologies of shoulder pain were given SSNB. Patients with each disease were given all 3 groups of drugs. Efficacy of the suprascapular nerve block was evaluated in all 90 patients with improvement in pain according to VAS and improvement in range of movements. Three study groups were compared to evaluate their relative efficacy in terms of degree of pain relief and improvement in range of movements & duration of pain relief on follow up. Conclusion: The results of this study shows benefit by the use of suprascapular nerve block in cases of chronic shoulder pain. There was statistically and clinically significant reduction in pain and improvement in ROM. While comparing the study groups the group with mixed drug bupivacaine and methyl prednisolone shows a clear benefit. This benefit was prolonged and still present at 90 days of follow up. It is safe, effective, and well tolerated for chronic shoulder pain.

Date: 2011-09-06
Session: Trauma - Humerus
Time: 13:30 - 15:00
Room: Meeting Hall V

Abstract no.: 30064

IS THE MINIMALLY INVASIVE PLATE OSTEOSYNTHESIS (MIPO) BY ANTERIOR APPROACH THE BEST OPTION FOR DISTAL THIRD HUMERAL FRACTURES?

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The treatment of complex distal humeral shaft fractures is a challenge. This work presents the advantages of MIPO by anterior approach in these difficult fractures. We have operated 13 fractures in 13 patients (with arm wrestling mechanism - 4 cases) using indirect reduction and biological plating, avoiding the problems related to the neural vascular structures of the arm (mainly the radial nerve). According to AO classification, there were 2 fractures type 12A, 5 type 12B and 6 type 12C. The proximal approach was realized between the biceps and deltoid muscle. The distal approach was performed by subperiosteal dissection of the lateral supracondylar ridge of the humerus. A DCP plate of 4,5 mm with 10-12 holes was molded and twisted medially to adapt to the anterior face of the humeral lateral column and diaphysis. The plate was inserted from distal to proximal and fixed onto the shaft with at least 2 proximal and 2 distal screws, after reestablishing the humeral axis, length and rotation. After a short immobilization, the patient started rehabilitation. There were no vascular or nerve complications except two transient paresthesia for the radial nerve. All fractures healed within a mean time of 10 weeks after surgery, with good functional results regarding elbow mobility. The radial nerve may be endangered in the lateral column approach but even in such circumstances its identification is not required. The authors are promoting the advantages of this technique which seem to be the best option for distal third humeral fractures.

Date: 2011-09-06
Session: Trauma - Humerus
Time: 13:30 - 15:00
Room: Meeting Hall V

Abstract no.: 27018

EARLY EXPERIENCE OF THE IMPACTION METHOD IN COMBINATION WITH A LOCKING PLATE FOR THE PROXIMAL HUMERAL FRACTURES IN OLDER ADULTS

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The treatment for proximal humeral fractures (PHF) in older patients has been a challenging problem. The locking plate is a new device intended to give secure fixation of PHF. We retrospectively review the early functional and radiographic results of the impaction fixation of the humeral shaft into the humeral head in combination with a locking plate in displaced PHF. The inclusion criteria for the study were 1) AO C type or B type with medial metaphyseal comminution 2) failed treatment including conservative or surgical, and 3) age older than 60 years. 12 patients were treated surgically with the present method. There were 3 men and 9 women with the average age of 72 years. According to AO classification, there were 2 cases of A2, 2 cases of B1, 1 case of B2, and 7 cases of C2. The clinical assessment was performed by using the shoulder scoring system of the Japanese Orthopaedic Association. Radiographic evaluation was done for nonunion, avascular necrosis, and reduction loss. Follow up averaged 15 months. The mean clinical score was 86 % (range 77-97%). Mean Elevation, abduction, and mean external rotation were respectively 115, 108, and 33 degrees. All fractures healed. Screw cutout occurred in two cases, and varus subsidence occurred in two cases. There were no cases of infection, nerve injury, avascular necrosis, nonunion or implant failure. Our study demonstrated that for clinically severe cases of PHF, bone union with satisfactory results can be achieved using an impaction method in combination with a locking plate.

Date: 2011-09-06
Session: Trauma - Humerus
Time: 13:30 - 15:00
Room: Meeting Hall V

Abstract no.: 28396

CAN WE STILL RELY ON RUSH NAILS FOR FRACTURES OF THE HUMERAL DIAPHYSIS?

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The debate continues over the management of diaphyseal fractures of the humerus .We treated 200 patients of shaft humerus fractures of various fracture patterns by closed multiple elastic rush nails with promising results. From January 2000 to January 2006 we treated 200 patients with stable and unstable Humeral fractures with multiple Rush nails. The mean age was 37 years (30-78). One hundred and seventy four males and twenty six females were enrolled for this study. Three fourth of them had sustained a domestic fall while the rest had a vehicular accident. Surgery was performed within forty eight to seventy two hours, on a standard operation table under the guidance of image intensifier. The medullary cavity was filled with Rush nails of unequal lengths and diameter. Postoperative radiographs showed a near anatomical fracture reduction in 88% of patients. The patients were followed up at an average of 12 months. 96% of the cases showed good union with the mean duration of 4 months. Complications were observed in 8 patients. The Rush Nail achieves the inherent stability based on the principle of "Three point fixation". The stability is achieved by the flexibility & elasticity of the nails and the crowding of the medullary canal & the anchorage they gain in the distal humeral metaphysis. Rush Nailing combines the advantages of the minimal invasive surgery, minimal instrumentation, cost efficient implants with a minimum morbidity.

Date: 2011-09-06
Session: Trauma - Humerus
Time: 13:30 - 15:00
Room: Meeting Hall V

Abstract no.: 28437

REVISION WITH PLATES OF HUMERUS NONUNIONS SECONDARY TO INTRAMEDULLARY NAILING

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Introduction: Exchange nailing is generally not indicated in humerus nonunions. Material: We retrospectively evaluated 22 patients with humerus nonunion secondary to failed intramedullary nailing, treated by ORIF with plates, between 1999 and 2009. Seven had locked static nails, five had expansive locking systems (Seidel, Hacketal) and ten had elastic nails (1 to 3); in three cases associated to cerclage wire. Nonunions were metaphyseal in 12 cases and diaphyseal in 10 cases. Eighteen were placed antegrade and four retrograde. Time between trauma and definitive surgery averaged 11 months. Sixteen patients had significant shoulder pain and functional limitation. Three had active infection and two had radial nerve neurapraxia. Results: Nonunions were stabilized using a 4.5mm LC-DCP plate in seven cases, with a 4.5mm LCP plate in four cases, with two plates in six cases, and with a locked 90° blade plate in five cases. In one infected case a two stage reconstruction was performed. In three cases the nail was not removed. Autogenous bone graft was added in 17 cases and morcialized allograft in two cases. Follow-up averaged 21 months. Union was achieved in all cases. DASH score averaged 18 points. Eight patients had limitations in shoulder function (Constant score averaged 76 points) an four patients had some degree of elbow extension loss (average, 20o). Discussion: The amount of bone loss associated to the loose nail, the low incidence of success reported by exchange nailing, and the morbidity associated to the site of insertion of the humeral nail, differentiate these nonunions from similar problems in the lower extremity. Revision with plates allowed achieving good predictable results with high union rate; final functional limitations were secondary to preexisting lesions.

Date: 2011-09-06
Session: Trauma - Humerus
Time: 13:30 - 15:00
Room: Meeting Hall V

Abstract no.: 28202

TREATMENT OF HUMERAL SHAFT NON-UNIONS AFTER INTRAMEDULLARY AND INTERLOCKED INTRAMEDULLARY NAILING

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The nonunion of humeral shaft fractures treated with intramedullary osteosynthesis /IS/ or interlocked intramedullary nails/ILN/ presents with specific symptoms such as rotatory instability, medullar thinning of the inner part of the cortex, bone resorption around the locking screws and implant ends. Material and method: For a period of 5 years 13 patients – 6 after IS / osteosynthesis with multiple K wires – 2, retrograde Ender nails - 4 / and 7 after ILN were treated. There were 6 women and 7 men at the average age of 41 /22-84/. According to the Weber-Cêch classification: 9 atrophic, 3 oligorophic and 1 hypertrophic. Two cases were positive for infection. In all cases bone resorption around the implants was observed. In 4 cases there was debricolage - 3 after IS and 1 after ILN. The main reason for non-union in 7 cases was distraction, in 5 cases unstable fixation and in 9 wrong operative techniques. The operative procedure in all cases included implant removal, abbreviation of bone ends, bone grafting and reosteosynthesis – in 3 cases with DCP, in 8 LCP with hybrid fixation and in two cases ILN. In 12 patients ABG were performed. Results: In all nonunions bone healing was achieved between 8-12 months. The follow up period was 12-48 months. There was no case of iatrogenic nerve or vascular injury. According to Constant score /5 excellent, 6 good and 2 fair/ and Murrey score /10 excellent, 2 good and 1 fair/. Conclusions: In cases with rotatory instability or fracture distraction for more than 8 months an additional operative procedure is recommended or reosteosynthesis by plate and ABG. In cases without bone resorption around the locking screws or at the implant ends – debridement and autogenous bone grafting is enough as an operative procedure. Reosteosynthesis by ILN with reaming is not appropriate.

Date: 2011-09-06

Session: Trauma Committee - Fractures Around the Knee I: Distal Femur

Time: 16:00 - 17:30

Room: Meeting Hall V

Abstract no.: 28431

**MIPO TECHNIQUE FOR DISTAL FEMUR FRACTURES IN THE ELDERLY
– A RETROSPECTIVE STUDY**

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Background: Fractures of the distal femur comprise 4.6% of all femoral fractures. Elderly patients invariably are predisposed to low-energy fractures due to osteoporosis. Treatment of these fractures in the elderly group remains a challenge. The objective of this study is to evaluate the clinical outcomes of Minimally Invasive Plate Osteosynthesis (MIPO) as a surgical option. Patients and methods: Twenty-four elderly patients (mean age 73 years) with distal femur fractures treated by the MIPO technique (2007 to 2010) were reviewed retrospectively. The evaluation included classification of fracture, time to fracture union, knee range of motion, functional knee score (Knee Society Score – Functional) at 6 months and other significant complications. Results: One patient was lost to follow up postoperatively. Eighty eight percent of fractures were extra-articular. The mean time to union was 18 weeks (range: 8 - 28). Mean range of motion achieved at 6 months and beyond was 100 degrees ranging from 0-30 (extension) to 90-120 (flexion). Functional knee score at 6 months from fixation was good based on the scoring chart (mean score of 73). There were no cases of implant failure, non-union and infection. Six patients (25%) developed deep vein thrombosis in the early postoperative period all of which were below the level of the knee joint. Conclusion: MIPO technique fixation in elderly distal femur fractures is promising based on our clinical outcome measurements. Although there is a significantly high incidence of deep vein thrombosis, the complication did not affect the functional outcome which was good.

Date: 2011-09-06

Session: Trauma Committee - Fractures Around the Knee I: Distal Femur

Time: 16:00 - 17:30

Room: Meeting Hall V

Abstract no.: 28491

OPEN REDUCTION AND INTERNAL FIXATION OF SUPRACONDYLAR FRACTURES OF THE FEMUR BY THE LOCKING COMPRESSION PLATE

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The incidence of distal femoral fractures is 4-7 % of all femur fractures. There is a bimodal distribution of these injuries. The 1st group is made up of young adults sustaining high energy trauma and the 2nd group comprising of elderly Osteoporotic females who fall at home. Management of distal femur fractures have developed from conservative treatment to early fixation and mobilization. The Locking Compression Plate (LCP) is a new implant with angular stability developed by the AO/ASIF. It is an alternative for internal fixation in complex intra-articular fractures and high-energy metaphyseal fractures of the long bones. The Objective of this study is to assess outcome of distal femoral fractures treated by locking compression plate 32 patients with acute displaced fractures of the distal femur were treated with anatomical locked distal femoral plate. There were 17 males and 15 females aged 21 to 85 years .Cases were classified according to AO/OTA classifications, there were 9cases of A1 fracture, 1 cases of A2, 3cases B1,7 cases B2, and 12 cases of C1 (minimally displaced). The follow-up period was 2 years. The functional outcome was evaluated according to Schatzker and Lambert criteria excellent results were achieved in twenty cases (62.5%), good in nine cases representing 21% .CONCLUSION: The DF-LCP is a good option for treatment of fractures of the distal femur provides stability and allows early range of motion Key Words: Distal femoral fracture, internal fixation, Distal femoral Locking compression plate

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Session: Trauma Committee - Fractures Around the Knee I: Distal Femur

Time: 16:00 - 17:30

Room: Meeting Hall V

Abstract no.: 28759

PROSPECTIVE EVALUATION OF LOCKING PLATE CONSTRUCTS FOR OSTEOSYNTHESIS OF COMPLEX INTRA-ARTICULAR DISTAL FEMORAL FRACTURES

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Background: Fractures of distal femur still remain a challenge for the orthopedic community considering the need to meticulously reconstruct the articular surface and achieving good functional outcome. Various treatment options for fixation have been used in past but the advent of locked screw plate construct has revolutionised the fixation of these complex fractures. We evaluated the results of osteosynthesis for complex intra-articular distal femoral fractures using locking compression plating. Materials: Forty seven distal femoral fractures in forty five patients were reconstructed from August 2006 to June 2009. There were 32 males (34 knees), 13 females (13 knees) and the mean age was 37 years (range = 22-56 years). The fractures were classified according to AO/ASIF classification for fractures of distal femur. Open reduction for articular fragments and plate fixation was done. All the patients were followed for a minimum of 1 year (mean = 2.1 year; range = 1-4 year). At the follow-up fractures were assessed radiologically for union and clinically for range of motion. Results: There were 25(53%) C3, 14 (30%) C2, 8 (17%) C1 fractures. The average operative time was 81 min (range = 55-110 min). 45 fractures united radiologically during a mean of 9 weeks (range = 5.5-11 weeks). One fracture went into non-union that was treated by refixation and bone grafting while other underwent bone grafting. The average range of motion was 1050 (range = 600-1400). 3 patients had superficial skin infection that subsided with intravenous antibiotic therapy for one week. We did not observe any implant loosening or implant breakage in the treatment group. Conclusion: Treatment with locked screw plate construct gives a reliable and versatile osteosynthesis for distal femur fractures. The precontoured relatively low profile design reduces soft tissue trauma during insertion and operative time; minimizing complications that are fairly common with this fracture fixation.

Date: 2011-09-06

Session: Trauma Committee - Fractures Around the Knee I: Distal Femur

Time: 16:00 - 17:30

Room: Meeting Hall V

Abstract no.: 28861

HOFFA FRACTURES – HOW UNCOMMON ARE THEY?

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A coronal plane fracture of the femoral condyle (Hoffa fracture) is a rare lesion, that results from high energy trauma; simultaneously occurs direct trauma and axial compression forces on a flexed knee, concentrating those forces on the posterior half of the femoral condyles. We present a retrospective study of 9 patients with a Hoffa fracture (3 women and 6 men), with the mean age of 43 years old, submitted to surgical treatment between 2004-2009, with mean follow-up of 29 months. The study includes a clinical and radiologic evaluation, the satisfaction rate and the complications occurred. Most of the Hoffa fractures occurred on the lateral condyle and, in one case, the Hoffa fragment was associated with a femoral shaft fracture. All patients were submitted to open reduction and internal fixation with cannulated screws. The knee was immobilized during 2-3 weeks followed by intensive physiotherapy. We obtained good clinical and radiographic results: only 1 case of nonunion. Most patients were satisfied with the results, with return to labor. The coronal and oblique orientation makes Hoffa fracture sometimes difficult to identify on radiographies, especially in fractures with no deviation. In those cases, and if there is much comminution, a CT scan should be required. Care should be taken to assess knee instability, as these fractures are associated with ligamentous injuries. Conservative treatment is not advisable (even in nondisplaced fractures) because there is a high risk of loss of reduction.

Date: 2011-09-06

Session: Trauma Committee - Fractures Around the Knee I: Distal Femur

Time: 16:00 - 17:30

Room: Meeting Hall V

Abstract no.: 29451

TREATMENT OF THE PATIENTS WITH COMPLEX SEGMENTAL (C2) AND COMPLEX ALLORHYTHMIC (C3) FRACTURES OF SHIN BONE

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Purpose of work: to improve the results of treatment of the patients with complex segmental (C2) and complex allorhythmic (C3) fractures of shin bone by the way of choice of optimal strategy of treatment for such patients at all stages of treatment. Materials and methods: During 1999–2007 119 patients with C2 and C3 fractures of shin bone were under treatment. 144 male (86,2%), 23 female (13,8%). All patients were divided into two groups. Open fractures comprised 57,5%, closed fractures – 42,5%. The Result: We use active surgical strategy among patients with C2 and C3 fractures of shin bone. Treatment on early stages in situ of getting trauma concluded osteosynthesis by Ilizarov apparatus according to shortened scheme (initial stage), till the state stabilization of the patient was achieved. Afterwards patients were transferred to specialized departments for further treatment, where full-featured stabilization of fracture was performed by Ilizarov's apparatus. This method of treatment allowed to achieve healing of fractures among 87,2 % patients in terms of 8-10 months, among 7,3% patients – less than a year, among 5,5% patients – more than a year. Conclusion: Treatment of patients with complex segmental (C2) and complex allorhythmic (C3) fractures of shin bone should be performed in specialized centers of traumatology; the transfer of the patients with stabilization of haemodynamic guides must take place before the appearance of complications. Stabilization of fractures by Ilizarov apparatus allows the performance of surgical interference in more early terms and the prevention of possible complications.

Date: 2011-09-06

Session: Spine - Arthroplasty & Trauma

Time: 13:30 - 15:00

Room: Panorama Hall

Abstract no.: 29653

DOES CERVICAL DISC ARTHROPLASTY REDUCE ADJACENT SEGMENT DISEASE AND OTHER COMPLICATIONS IN COMPARISON TO ANTERIOR CERVICAL DISCECTOMY AND FUSION? A META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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Introduction: To reduce the risk of adjacent segment disease and other procedure-related complications following anterior cervical discectomy and fusion (ACDF), cervical disc arthroplasty (CDA) has been advocated for one-level cervical disc disease. However, it remains unknown whether CDA decreases the occurrence of such complications. As such, the following study addressed a meta-analysis of randomized controlled trials assessing the efficacy of CDA in reducing adjacent segment disease and other complications in comparison to ACDF. **Methods:** Three reviewers performed a literature search for randomized controlled trials comparing CDA to ACDF for radiculopathy and/or myelopathy for one-level cervical disc disease. Studies with 2 years or greater follow-up were selected. Adjacent segment disease, secondary surgery (ie. revision, reoperation, instrumentation/graft removal), and adverse events were assessed and pooled for analyses. **Results:** Three studies were included for review. Due to limitations with study design, studies presented with Level II evidence. CDA exhibited a 49% decrease risk for reoperation attributed to adjacent segment disease, but was not statistically significant (OR: 0.51; 95% CI: 0.23-1.10). Additional procedure-related complications did not statistically differ between groups ($p > 0.05$). **Conclusion:** At two-year follow-up, CDA does not significantly reduce the risk of adjacent segment disease and other complications in comparison to ACDF. Due to the lack of blinding and relatively high withdrawal/drop-out rates among studies, robust conclusions supporting the advocacy of CDA over ACDF are not warranted at this stage. High-quality studies are needed to properly assess the true efficacy of such interventions.

Date: 2011-09-06

Session: Spine - Arthroplasty & Trauma

Time: 13:30 - 15:00

Room: Panorama Hall

Abstract no.: 29100

MAGNETIC RESONANCE IMAGING CLARITY OF CERVICAL DISC ARTHROPLASTY USING TITANIUM DEVICES AND PEEK DEVICES: A PROSPECTIVE, BLINDED RANDOMISED STUDY

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Aim: The purpose of this study is to analyse the pre and post-operative MRI clarity of PEEK and titanium based cervical arthroplasty systems at the level of operation and level adjacent to operated disc. **Methodology:** The pre and postoperative MRI images of 20 patients who underwent cervical arthroplasty using Prestige LP® (Medtronic Sofamor Danek) and NuNec™ Cervical Arthroplasty System (Pioneer Surgical Technology, Marquette, Mich., USA) were assessed. Four observers (one radiologist and three clinicians) who were blinded and provided with a set of random images to score using a four point Jarvick grading system. **Statistical analysis** was completed using SPSS 16.0 statistical package (SPSS Inc, Chicago, IL). **Results:** The pre-operative MR image quality at operated and adjacent levels was excellent in both groups. In the post-operative images, the adjacent level visualisation was adequate in both groups without much difference in average scores. However, at operated level, the quality of MR images in the NuNec group (PEEK on PEEK articulating disc) was excellent and clear visualisation of the cord, central canal, foramen and disc was possible. **Conclusion:** Our study confirms the previously published evidence that titanium devices allow satisfactory monitoring of adjacent and operated levels by providing good quality MRI images. However, provide less than satisfactory images at operated level. But the PEEK devices provide excellent quality image even at the operated level, with clear visualisation of neural structures and is valuable, if one wishes to assess the adequacy of neural decompression at operated level in the post-operative period.

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Session: Spine - Arthroplasty & Trauma

Time: 13:30 - 15:00

Room: Panorama Hall

Abstract no.: 29616

ATLANTOAXIAL FIXATION WITH HARMS TECHNIQUE IN AXIAL DENS ABNORMALITIES – PRELIMINARY REPORT

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Atlantoaxial instability may be caused by various conditions as congenital defects, injuries, tumors and inflammatory diseases. The main objective of an operative treatment is the restoration of stability and prevention of the neurological status deprivation. The aim of this study was to present our experiences in the use of posterior polyaxial screw and rod fixation as described by Harms. The survey was conducted from June 2008 to December 2010 in our institution. During this period we had 10 patients in observation. The average age was 49 years (range 29-78). Six of them were diagnosed with old traumatic C2 fracture as a failure of a non-operative treatment. Two patients had C1-C2 fusion because of pathologic fracture as a result of metastasis to the odontoid process. And two with fresh traumatic fracture primarily treated surgically. The operative technique is based on polyaxial screw insertion to lateral masses and posterior rod fixation. In all cases stability was assessed in radiological images. There were no clinical signs of vertebral artery lesions or spinal roots damage in the perioperative and postoperative period. During the 12-month follow-up we did not observe early or late destabilization. Furthermore, none of the new neurological deficits had occurred. The main complaints were rigidity and torsion movement limitation. Two of the patients who initially were included in the survey passed away due to primary disease progression. In our opinion C1-C2 fixations using Harms technique can be used as an effective treatment method of widely recognized atlantoaxial instability.

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Session: Spine - Arthroplasty & Trauma

Time: 13:30 - 15:00

Room: Panorama Hall

Abstract no.: 29583

MANAGEMENT OF ATLANTOAXIAL INSTABILITY WITH C1/2 FUSION USING THE HARMS TECHNIQUE AND INTRAOPERATIVE ISO-C-3D-IMAGING

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Introduction: Objective of the retrospective study was an analysis of surgical treatment results of C1/2 fusions acc. to HARMS technique with control by intraop. Iso-C3-D-imaging. Methods: 25 patients (age 57 years, m/w: 21/4) with C1/C2 instability due to C1 fractures (Jefferson = 2), C2 (Anderson 10, Benzel 2), combined C1/C2, C2/C3 fractures (4) as well as tumor destruction C1/2 (2), Os odontoideum (3) and ligament. instability (2) were enrolled and operated using the Harms technique. 4 patients had previous surgery with anterior implant failure. 7 patients had a cervical myelopathy and 2 a complete tetraplegia. Stabilization was performed on both sides: bicortical polyaxial Massa- lat.-C1-screws and transpedicular C2 (total: 50 screws). 7 instrumentations were extended to C0,C3,C4 due to additional injuries. 2 patients received C1-laminectomy. Screw placement C1/2 was intraoperatively controlled (Iso-C-3D-imaging). In all patients the accuracy of screws was recorded acc. to Gertzbein&Robbins (GR; pedicle Gr IV. <2.2-4, <4.4-6,> 6 mm). Results: All patients showed postoperatively correct screw positioning (GR I-II:21, III:2). 2 C1screws had to be repositioned due to a marginal position. Complications included unilateral partial visual loss, slight injury of the vertebral artery, one wound infection. The Iso-C-3D imaging allowed a reliable visualization of the C1/2-implant position. Conclusion: The C1/2 fusion in HARMS technique allows a sufficient stabilization of the atlantoaxial complex following C1/2 fractures / instability. The Iso-C-3D imaging reliably allows intraoperative scanning/visualization and correction of malpositioned screws.

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Room: Panorama Hall

Abstract no.: 29717

SURGICAL MANAGEMENT AND CLINICAL OUTCOMES OF CERVICOTHORACIC INSTABILITIES IN TUMORS AND FRACTURES

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Introduction: Reconstruction of cervicothoracic instabilities are due to biomechanical loads on the junctional localization a surgical challenge. Aim of this study was an analysis of clinical/radiological outcome of cervicothoracic posterior stabilizations after tumor resection/fractures. Methods: 01/03-09/10 25 patients (♀/♂: 5/20; mean age 58) received a cervicothoracic posterior stabilization with screw-rod-system due to 11 tumorous vertebral body destruction (2 primary tumors, 9 metastases), 11 unstable fractures (A/B/C: 3/3/5). Preoperative Frankel score: E/D/C/B/A=9/9/4/1/2. 3 patients received an additive posterior stabilization due to implant failure of anterior system. Stabilization was performed at least 2 segments above (49 Massa lat.; 10 transpedicular) and below (49 transpedicular) of the lesion (2/2: 12, 2/3: 1, 2/4: 1, 3/2: 8, 3/3: 3). In 17 cases CT navigation was performed. Results: Mean operation time 265 min., mean transfusion: 4 EK/ 4 FFP. Mean ICU stay 4 days/ hospital stay 20 days. Frankel score improved to E/D/C/B/A=14/7/2/1/1. In mean follow up of 25.29 months 5 revisions were necessary. One tumor case had implant loosening after 2 months. Conclusion: Cervicothoracic stabilizations require due to specific anatomy, biomechanical loads, topographical nearness of important structures an experience in reconstructive spine surgery. We emphasize the advantage of combined cervicothoracic stabilizations. Polyaxial screws and intraoperative navigation for instrumentation of at least 2/3 connection segments facilitate the dorsal reconstruction.

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Session: Spine - Arthroplasty & Trauma

Time: 13:30 - 15:00

Room: Panorama Hall

Abstract no.: 29668

MODIFICATION OF SHORT-SEGMENT FIXATION WITH PEDICLE SCREWS IN FRACTURE SITE WITHOUT FUSION FOR THORACOLUMBAR FRACTURES

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Role of Short-segment instrumentation for the treatment of thoracolumbar fractures is still unclear. We have conducted a controlled clinical trial to define the effect of our modification of short segment instrumentation with transpedicular fixation in fracture site on thoracolumbar spine and patient-related functional outcomes. Methods: From 2001 to 2009, 156 consecutive patients with a single-level Magerle type-A fracture and TLISS score of 4 and more involving the thoracolumbar spine were managed with posterior pedicle screw instrumentation. All patients were followed for at least 18 months after surgery and were assessed with regard to clinical and radiographic outcomes. Clinical outcomes were evaluated with use of the Frankel scale, a visual analog scale, and the Oswestry Disability Index. Radiographic outcomes were assessed on the basis of the wedge and sagittal index and loss of kyphosis correction. There were 13 patients with complications due to screw breakage (8) and malposition of screws (5). Average screw removal was 14 months after surgery. Main predictor of screw breakage was 6 or more points according to Load Sharing Classification, age and level of injury. Our modification of short – segment instrumentation is safe and reliable procedure for the treatment of type A thoracolumbar fractures. Screws in fracture site proved to be effective in giving the additional stability of the construct, and they also have a role in reposition of fractured vertebra.

Date: 2011-09-06
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Room: Panorama Hall

Abstract no.: 29288

LONG-TERM FOLLOW-UP OF LUMBAR TOTAL DISC REPLACEMENT

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AIM: The objective of this study was to evaluate the clinical results and assess the effectiveness of lumbar total disc replacement (TDR) after an average follow-up of 6.1 years. **METHODS:** Between October 2000 and October 2005, 63 TDR were implanted in 58 patients. Indication was limited to degenerative disc disease without facet joint degeneration. Mean age at surgery was 38.4 years (range 25-63 y). Clinically, patients were evaluated at a mean time follow-up of 6.1 years (range 5-10 y) using the VAS grading scale and the Oswestry Disability questionnaire (ODI). Conversion to a posterior lumbar interbody fusion was defined as failure. **RESULTS:** Pre-operative and long-term postoperative clinical evaluation of forty- four patients were obtained. Five patients were lost to follow-up. Nine failures were converted to posterior lumbar interbody fusion after a mean of 3.3 years. Mean preoperative VAS score for back pain was 7.95 (± 1.8), at the long-term the mean VAS score was 3.0 (± 2.9), which was a significant improvement ($p < 0.01$). Long-term postoperative ODI-score was 25.14 (± 22.5), in contrast preoperative ODI-score was 70.23 (± 12.9), again showing a significant improvement after surgery. **CONCLUSIONS:** Based on these results, we can conclude that lumbar total disc replacement can offer significant pain relief and improved function of the back. If a strict indication policy is followed, TDR is a good treatment option for degenerative disc disease.

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Session: Spine - Arthroplasty & Trauma

Time: 13:30 - 15:00

Room: Panorama Hall

Abstract no.: 29345

PROTEOMIC ANALYSIS POST ACUTE SPINAL CORD INJURY IN HUMAN

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Spinal cord injury (SCI) is a leading cause of permanent disability in young adults. Treatment options are currently limited to prevention of secondary injury due to breakdown of extracellular matrix protein. Aims of this study were to 1. To identify potential biomarker for prognostic and a progress monitor after spinal cord injury. 2. Identify a novel protein targets in therapeutic treatment of spinal cord injury patients. Study cohort included patients with complete (n=10) or incomplete (n=5) spinal cord injuries, and patients with simple diaphyseal tibia fracture (n=5). Differences in protein expression following injury were analysed using 2D-DIGE. Among patient with complete spinal cord injury), Up-regulated proteins (n=54) were found superior in number than the down-regulated proteins (n=21). For protein expression between 24hr and day 5 time points, 15 protein spots were significantly up regulated while 2 spots were down regulated. Patients with incomplete injury had predominantly down-regulated protein spots (n=43). Clinical correlation in this group revealed full functional recovery in all. In patients with tibia fractures, there was a balance in the number of protein expression. This study showed direct relationship between the number of up-regulated protein, appearances of unique protein spots and severity of spinal cord injury. Patient with no functional recovery had increased number of unique spots and more up-regulated proteins between two-time points; this identified period of secondary spinal cord injury. The protein spots are identified and possibility of developing inhibitors against up-regulated proteins or stimulator for the down-regulated are examined.

Date: 2011-09-06

Session: Spine - Arthroplasty & Trauma

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Room: Panorama Hall

Abstract no.: 29565

LUMBILIAC FIXATION IN PELVIC RING FRACTURES

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Exact reduction and stable internal fixation in the treatment of pelvic ring fractures are crucial for a functional result. The authors prefer mini- or less-invasive approach, if possible. The instability of lumbosacral junction (mainly in combination of unstable L5 fracture with upper sacral fracture) and comminuted sacral fractures type IV according to Pohlemann classification are considered to be indications for lumbiliac fixation. Lumbiliac fixation is performed as a bilateral spanning technique using transpedicular L4 and L5 screws connected to a pair of screws inserted to both iliac wings, or in combination with screws in iliac wing on one side and one iliac screw plus one transpedicular S1 screw on the other side (in case to avoid unilateral comminution S1 zone). Cross-links are used to secure the rotational stability. Such an instrumentation combined with ventral pelvic segment fixation is considered to be stable enough even for an early mobilization.

Date: 2011-09-06
Session: Spine - Vertebroplasty
Time: 16:00 - 17:30
Room: Panorama Hall

Abstract no.: 28190

CLINICAL OUTCOMES OF VERTEBROPLASTY COMBINED WITH POSTERIOR INSTRUMENTATION FOR OSTEOPOROTIC VERTEBRAL COLLAPSE – A RETROSPECTIVE ANALYSIS OF 100 CASES

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[PURPOSE] The purpose of this study was to assess clinical outcomes of vertebroplasty combined with posterior instrumentation for osteoporotic vertebral collapse with middle column injury. [METHODS] A total of 100 consecutive patients were retrospectively reviewed. The age at surgery averaged 74.2 years and minimum follow-up period was two years. All patients demonstrated severe back pain, and 70 of them indicated neurological symptoms. Posterior instrumentation was performed at 2-above 1-below in spinal cord level, while 1-above 1-below in cauda equina level. Posterior decompression was performed when needed. The calcium phosphate cement (CPC) was injected into the collapsed vertebra. Local bone graft was performed over posterolateral fusion bed. [RESULTS] Average intraoperative blood loss was 258g and operation time was 156 minutes. Average local kyphosis was 27.5 degrees preoperatively, 9.7 degrees postoperatively, and 12.3 degrees at the latest follow-up. Instrumentation failure was not detected in any cases and fusion rate was 95%. Surgical complications were found in two cases including CPC leakage and deep wound infection. Perioperative general complication occurred in one case. Back pain was improved in all cases. In cases with myelopathy, average JOA score was improved from 59% to 86% at the latest follow-up. The incident of new vertebral fracture in all cases was 20% at postoperative two years; however, it was 42% in steroid induced osteoporosis, and 86% in Parkinson disease. [DISCUSSION] This procedure demonstrated little correction loss, sufficient neurological recovery, and excellent pain relief. As well, this procedure was less invasive compared to anterior reconstruction or posterior osteotomy reported in the literature. Furthermore, perioperative general complication was rare even in elderly patients. The incidence of additional vertebral fracture in all cases was comparable to conservative treatments or vertebroplasty alone reported in the literature, however, it was considerable high in steroid osteoporosis and Parkinson disease.

Date: 2011-09-06
Session: Spine - Vertebroplasty
Time: 16:00 - 17:30
Room: Panorama Hall

Abstract no.: 29677

VERTEBROPLASTY TECHNIQUE OPTIMIZATION EXPERIENCE

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Introduction: Vertebroplasty is an effective method for treatment of severe back pain, caused by osteoporotic compression fractures, vertebral hemangiomas and other osteolytic spinal lesions. The use of fluoroscopic guidance for needle placement and to monitor bone cement injection does not always ensure the correct installation of needle, and does not exclude the development of complications associated with cement extravasation. Purpose: To optimize the technique of vertebroplasty. Methods: 7 patients with back pain caused by osteolytic lesions in the spine were operated on using an optimized technique. In the 4 cases for needle placement we used computer-assisted system. In 6 patients the volume of the osteolytic focus was determined before the operation. During vertebroplasty the equal or less amount of bone cement was injected. Results: In all cases the using of computer-assisted system for needle placement during vertebroplasty ensured a precise introduction of needles into the pathological osteolytic lesions. All cases of preliminary determination of volume of the pathological focus and the subsequent introduction of an equal or smaller amount of bone cement into the vertebral body were not accompanied by cement leakage. Conclusion: We believe that the use of an optimized method of vertebroplasty, including the use of computer-assisted navigation system and a preliminary determination of volume of the pathological focus in order to determine the amount injected cement is very promising for reducing the incidence of possible complications of the procedure.

Date: 2011-09-06
Session: Spine - Vertebroplasty
Time: 16:00 - 17:30
Room: Panorama Hall

Abstract no.: 30120

PREVENTION OF DEVASTATING COMPLICATIONS FOLLOWING VERTEBROPLASTY, A TECHNICAL NOTE

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Background Context: Though there are very less complications of PMMA (cement) leakage via venous channels following percutaneous vertebroplasty leading to pulmonary embolism, acute respiratory failure, intracranial embolic stroke, inferior vena cava syndrome, & cardiac perforation with tricuspid regurgitation, we present a novel technique using Gel foam embolisation to prevent this complication. Purpose: To demonstrate the usefulness of Gel foam embolisation and its intraoperative effectiveness, as we do not have a single such complication of cement leakage in last 4 years in approximate 51 consecutive patients. Study Design: Intraoperative technique and review of complications in literature. Method: Presenting a case study of 69 year female with L1 vertebral body osteoporotic wedge compression fracture with no neurological deficit, with only low back pain. We did percutaneous vertebroplasty using Gel foam embolisation. Intraoperatively we reported leakage of contrast dye(Niopam) leaking in anterior internal plexus from intravertebral basivertebral veins. After using our regular Gelfoam embolisation, we injected the same dye to confirm the leak, which was not there as the venous channels were blocked. Then after confirmation on image intensifier, we injected PMMA (cement). Patient went home the next morning with significant pain relief. Result: Using a time tested simplified Gelfoam technique can be useful in reducing risk of devastating life threatening complications as well as it is useful in preventing cement leak in surroundings area. Conclusion: Following Gel foam embolism and confirming dye under image intensifier before injecting PMMA (cement) in percutaneous vertebroplasty reduces venous leakage of cement significantly, and risk of complications can be actually nullified. It makes vertebroplasty a very safe procedure.

Date: 2011-09-06
Session: Spine - Vertebroplasty
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Room: Panorama Hall

Abstract no.: 27311

DIFFERENTIATED APPROACH TO KYPHO- AND VERTEBROPLASTY IN SPINE FRACTURES

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Research Objective: to increase the efficiency of treatment of patients with compressive fractures of vertebral bodies in thoracic and lumbar segments. Results of treatment of 117 patients aged from 16 to 73 with spine fractures are analysed. Besides the basic examination methods biomechanical investigations were carried out as well. It has been observed, that vertebra support ability degree depends on the destruction degree of its supporting columns, and therefore the support ability assurance depends on the degree of restoration of vertebral body height, allocation area of the introduced osteoplastic material inside the vertebra and its volume. So when having just an anterior column injury of spine with no less than 0,75 wedging index and no more than 60 kyphosis angle in patients of advanced age, introduction of cement into vertebra anterior parts is quite enough. When having an injury of anterior and medial columns with the wedging index up to 0,5 and more than 12 o kyphosis angle, it is necessary to allocate the cement all over the vertebra contour in combination with transpedicular system. In the cases when restoration of vertebral body height is failed, transpedicular system is used in combination with kyphoplasty. When there was a displacement of bone fragments towards the spinal canal, vertebro- and kyphoplasty were carried out after the impaction of bone fragments. Devised criteria of differentiated anatomo-boimechanical approach to the application of different complex surgical interventions made it possible to reduce hospital stay period by 2-3 times and to improve their life quality considerably.

Date: 2011-09-06
Session: Spine - Vertebroplasty
Time: 16:00 - 17:30
Room: Panorama Hall

Abstract no.: 27258

**KYPHO-IORT: TECHNICAL FEASIBILITY OF A NOVEL COMBINED
KYPHOPLASTY AND INTRAOPERATIVE RADIATION FOR SPINAL
METASTASES**

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The spinal column is the leading focus of metastasis in the skeleton. Recent developments in surgical techniques lead to data for spinal metastases with epidural compression in favor for a combination of metastasis resection with stabilisation and adjuvant radiotherapy. In patients without epidural compression less invasive techniques such as kypho- or vertebroplasty with the benefit of short surgical times and low morbidity have shown their ability for stabilisation, prevention of further deformity and pain reduction in several studies. At the same time improvements of radiotherapy came up. Stereotactic radiosurgery has the potential for high-doses in 1-5 fractions, with single fraction doses as high as 24Gy. Data suggests that radiosurgery could benefit over conventional radiotherapy with more durable response and local control independent of tumor histology. In front of this background, the combination of kyphoplasty for immediate stabilization and high-dose radiation intraoperative in a single stage procedure is appealing. We present the results from development and cadaver study of a new combined kyphoplasty and intraoperative radiation (Kypho-IORT). In addition the results of the clinical feasibility study with 17 patients treated with the new method are presented.

Date: 2011-09-06
Session: Spine - Vertebroplasty
Time: 16:00 - 17:30
Room: Panorama Hall

Abstract no.: 29145

NEUROLOGICAL FUNCTION AND SURVIVAL OUTCOME OF SURGICALLY TREATED SPINAL MULTIPLE MYELOMA PATIENTS

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Objective: To describe the neurological status and survival outcome after surgical intervention in patients with spinal myeloma. Background: Multiple myeloma is one of the most frequent malignant spinal tumors, and is most frequently localized in the spinal vertebral body. Patients often suffered from severe back pain, pathological fracture, and cord compression. The quality of life is decreased in those patients. Patients and methods: This study included 33 patients (19 men, 14 women, mean age of 59 years) with spinal myeloma. All the patients underwent surgical treatment after complete diagnostic evaluation during December 1994 to November 2009 at Aarhus University Hospital in Denmark. All the information was prospectively collected into the Aarhus Spinal Tumor Database. Results: Thirty patients (91%) had local symptoms before operation with mean duration of 129 ± 182 days. Twenty-five patients (82%) had radicular symptoms with mean duration of 32 ± 45 days. Twenty-one of the cases (64%) were identified as Tomita Type 7 (Multiple lesions). Ten patients (30%) were located between Tomita Type 4 to 6 (Extra-compartmental). Thirteen of the cases (39%) had chemotherapy, and 5 Patients (15%) had radiotherapy prior to surgery. Operation duration was 181 ± 95 minutes. Blood loss was 2271 ± 1745 ml. The neurological status was improved in 12 Patients (36%), maintained in 12 cases (36%) and decreased in three patients (9%). At the end of study, 29 patients died. The mean survival duration was 25 ± 20 months. Conclusion: Spinal multiple myeloma patients underwent surgical treatments based on the Aarhus Algorithm could improve or maintain neurological function.

Date: 2011-09-06
Session: Spine - Vertebroplasty
Time: 16:00 - 17:30
Room: Panorama Hall

Abstract no.: 28546

UNIPEDICULAR VERSUS BIPEDICULAR BALOON KYPHOPLASTY FOR THE TREATMENT OF MULTIPLE MYELOMA LESIONS

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Study design: a retrospective cohort study. Objective: to analyze differences in between the unipedicular versus bipedicular balloon kyphoplasty for the treatment of multiple myeloma lesions Summary of background data: Both vertebroplasty and kyphoplasty are reported to be effective for the treatment of vertebral compression fractures in multiple myeloma patients. Kyphoplasty is often performed with a bipedicular approach while vertebroplasty with a monopedicular approach. Monopedicular kyphoplasty is investigated as a viable surgical technique alternatively in comparison with the bipedicular method. Methods: We performed 37 surgical procedures, 18 vertebroplasty (group A) and 19 kyphoplasty, 9 unipedicular approaches (group B1) and 10 bipedicular approaches (group B2), on 14 patients affected by MM with a mean clinical and radiographic follow up of more than 12 months. Results: Both kyphoplasty techniques lead to a better postoperative improvement of the vertebral height and kyphotic deformity if compared with the vertebroplasty, with a statistical significance only for the body height restoration ($p = 0,0066$). The unipedicular and the bipedicular kyphoplasty have similar results in term of kyphotic deformity correction and height restoration. The 85,7% of the patients (12/14) had an immediate improvement of the pain and no difference between the vertebroplasty and kyphoplasty groups were observed regarding the pain. We observed a 24,3 % of cement leakage in all groups with no clinical symptoms and noticed that the risk of extravasation was higher in multilevel treatment, in bipedicular kyphoplasty procedures and in patients not treated previously for a bone marrow transplant. Conclusions: both vertebroplasty and kyphoplasty are effective in treating vertebral compression fracture due to MM. Unipedicular kyphoplasty could give equivalent results as with bipedicular kyphoplasty in multiple levels disease, aiming only to restore the sagittal alignment of the spine and the height of the vertebral body especially at the thoraco-lumbar spinal segment.

Date: 2011-09-06
Session: Spine - Vertebroplasty
Time: 16:00 - 17:30
Room: Panorama Hall

Abstract no.: 30235

**DOES EVERY RESPONSIBLE VERTEBRA OF OSTEOPOROTIC
VERTEBRAL COMPRESSION FRACTURE NEED TO BE
AUGMENTATED?**

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Background: Percutaneous vertebral augmentation in patients with osteoporotic vertebral compression fracture has been popular in clinical experience, but in the multi-level compression fracture, selection of the operative level is still a question with few studies reported. Methods: Twenty-three multi-level fractured cases were reviewed, with average 73.1 years old, and with 2 or more responsible vertebrae. Visual analogue scale (VAS) and activities of daily living scale (ADL) before the operation, at the second day, 3-month and 1 year after the operation were recorded. Among the responsible vertebrae, the first responsible vertebra was defined according to our clinical scale. The patients were divided into two groups, while group A included consecutive 8 patients with all the responsible vertebrae augmented. Group B included consecutive 15 patients with only the first responsible vertebra augmented. Results: The first responsible vertebra was mainly located in the thoracolumbar junction (T12, L1). VAS and ADL showed difference before and after operation, but no significant difference found between 2 groups. Conclusion: Percutaneous kyphoplasty allows alleviation of pain in patients with osteoporotic vertebral compression fracture. The effect of pain releasing with augmentation of the first responsible vertebra is as good as that with multi-level operation during the first year after operation.

Date: 2011-09-06

Session: Trauma - Pelvis & Acetabulum

Time: 13:30 - 15:00

Room: Terrace I

Abstract no.: 28241

MINIMALLY INVASIVE FIXATION OF PELVIC RING DISRUPTIONS

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Background: Open reduction and internal fixation is a standard treatment for unstable pelvic injuries to prevent malunions and nonunions with persistent instability and chronic pain. Surgical exposures of the pelvis are usually extensive with soft tissue dissections, blood loss, and possible healing problems. The aim of this study is to report results of minimally invasive fixation (MIF) of pelvic ring disruptions. Patients and methods: This prospective study included 20 patients with pelvic ring disruptions that were treated by the pelvic trauma team of our University Hospital using MIF. Closed reduction using Joy-stick techniques and manual traction was done in 15 patients, and minimally invasive open reduction through small incisions was needed in 5 patients. Percutaneous lag screws were used in all patients. They were used alone in 13 patients; 6 patients had associated ipsilateral fracture pelvis and acetabulum and 7 patients had displaced transverse fracture acetabulum. Lag screws were combined with percutaneous single-pin supra-acetabular external fixator in 7 patients with unstable pelvic fractures and associated urological injury with suprapubic tube insertion. Patients were followed up till fracture healing, with radiological assessment according to Tornetta and Matta and functional assessment according to Majeed' score. Results: Excellent radiological reduction was achieved in 13 patients, good in 5 and fair in two. None of patients received blood transfusion. Fracture healing was achieved in all patients. Fracture reduction and fixation was maintained till fracture healing without re-displacement in all patients. Functional recovery was remarkably fast and functional result was excellent in 14 patients good in 5 patients, and fair in one. Conclusion: Minimally invasive fixation of pelvic ring disruptions provides excellent to good radiological and functional results. Whenever possible, MIF is preferred to open reduction with extensive surgical dissections. However, these techniques are demanding and image dependent which needs pelvic trauma specialists.

Date: 2011-09-06

Session: Trauma - Pelvis & Acetabulum

Time: 13:30 - 15:00

Room: Terrace I

Abstract no.: 28233

SINGLE PIN SUPRA-ACETABULAR PELVIC EXTERNAL FIXATOR TOGETHER WITH PERCUTANEOUS ILIOSACRAL SCREWS IN TREATMENT OF UNSTABLE PELVIC RING DISRUPTIONS WITH RUPTURE LOWER URINARY TRACT

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Displaced lesions of the pelvic ring including either vertical fracture of the sacrum, or dislocation of one or both sacroiliac joints, often pose problems of reduction and fixation. These lesions are optimally stabilized with internal osteosynthesis, which is performed by open surgery under visual control or by combined open and closed methods; in conjunction with percutaneous iliosacral screws. In cases of fracture pelvis associated with rupture urinary bladder or posterior urethra, anterior symphyseal plating may hinder the following procedures in order to repair the lower urinary tract. This work presents our experience in treating unstable pelvic ring disruptions associated with rupture urinary bladder or posterior urethra by single pin supra-acetabular pelvic external fixator together with percutaneous iliosacral screws under 2D fluoroscopic control in one sitting in supine position. 12 patients presented with fracture pelvis type C associated with rupture lower urinary tract. They were all men and their ages averaged 28 years. Pre-operative planning and operative techniques are described. Union of the fracture was achieved in all cases. Time to fracture union averaged 6 weeks. External fixator is removed after 6-8 weeks in 11 patients. 1 patient (8.33%) developed pin track infection and external fixator was removed after 4 weeks. No case had injury of lateral cutaneous nerve of the thigh or any vascular injury. 9 patients (75%) were pain free, 2 patients (16.66%) had mild posterior pain on lengthy walks and the remaining one (8.33%) had persistent pain. All patients had an almost no limb length discrepancy. No patient had secondary failure of the percutaneous iliosacral screws after external fixator removal. We recommend using single pin supra-acetabular external fixator together with percutaneous iliosacral screws in supine position as rapid and minimally invasive method in stabilizing pelvic ring disruptions associated with rupture lower urinary tract system.

Date: 2011-09-06

Session: Trauma - Pelvis & Acetabulum

Time: 13:30 - 15:00

Room: Terrace I

Abstract no.: 27535

LATE INTERNAL FIXATION OF VERTICALLY UNSTABLE PELVIC FRACTURES

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This study represents a case series of 18 patients with 22 vertically unstable pelvic fractures who presented 3 weeks or more after initial trauma. The inclusion criteria were 1) persistent pelvic instability 2) displacement of the fracture more than one centimeter and 3) neurological manifestations with CT-scan suggesting sacral roots compression. There were fourteen unilateral and four bilateral type-C pelvic fractures. Seven patients had neurologic injuries. The aim of surgery is to render the pelvic ring stable and to achieve union even if only near anatomical reduction is achieved (up to 5 mm). The following concepts were considered during preoperative planning: 1-Combined posterior and anterior stabilization of pelvic ring to neutralize the great forces on the pelvic ring. 2- Direct open reduction of the fracture. 3- Wide surgical exposures and soft tissue dissections. 4- Fusion of sacroiliac joint in neglected disruptions. 5- Sacral root decompression if there is compression by bone fragments in CT-scan. 6- Bone grafting in patients with sacral nonunion and bone gap to avoid sacral over-compression and foraminal narrowing. Assessment of reduction was done according to Matta and Tornetta, and functional assessment was done using Majeed' score. All fractures healed. Fracture reduction was considered excellent in 12 patients, good in five, and fair in one. Functional result was excellent in 13 patients, good in four and fair in one. Complications included transient L5 palsy (n=1), ilio-femoral DVT (n=1), early metal failure (n=2). This study supports planned surgical intervention for delayed vertically unstable pelvic fractures.

Date: 2011-09-06

Session: Trauma - Pelvis & Acetabulum

Time: 13:30 - 15:00

Room: Terrace I

Abstract no.: 29182

**VESICO-CUTANEOUS FISTULA FOLLOWING PUBIC RAMI FRACTURE
– A CASE REPORT**

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Introduction: We report a rare case of vesico-cutaneous fistula in the groin draining urine, following an extraperitoneal bladder injury after unilateral superior and inferior pubic rami fracture. Case Report: An 81 year old female attended the orthopaedic clinic with complaints of swelling in right groin and a sinus discharging clear fluid. She had sustained fracture of pubic rami 2 months back. There was no history of hematuria after the fracture. On examination, a swelling was noted in the right groin with a sinus, discharging urine. Trans-urethral catheter was put in. Cystogram showed a right pubic rami fracture and an extra-peritoneal leak from the bladder wall, extravasating into groin. Plan was made by the urologist to treat conservatively. After 8 weeks of catheterization, the groin wound healed completely. Repeat cystogram showed that there was no extravasation of urine and the pubic rami fracture was healing. The catheter was then removed and she was discharged home. Discussion: The incidence of bladder trauma with pelvic fractures is 9.5%. When gross hematuria is present with pelvic fractures, 45-54% of them have associated bladder ruptures. Surgical exploration and repair has been the traditional treatment for all bladder ruptures. For extra-peritoneal ruptures, there is an increasing support for conservative treatment. This case report signifies the importance that even isolated pubic ramus fracture carries the risk of major visceral injury and should be treated with great caution. It also shows the need for regular follow-up of these patients as they can present with a delayed complication.

Date: 2011-09-06

Session: Trauma - Pelvis & Acetabulum

Time: 13:30 - 15:00

Room: Terrace I

Abstract no.: 27905

FUNCTIONAL OUTCOME SCORES OF PERCUTANEOUS SI SCREW FIXATION OF TILE TYPE C FRACTURES USING THE MAJEED AND IOWA PELVIC SCORES

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Objective: To report functional outcome of patients who underwent closed reduction and percutaneous iliosacral screw fixation for Tile Type C fractures. Materials and Methods: Data collected from medical records and pre and post operative radiographs. Prospectively, we followed up patients with two questionnaires, the Majeed and Iowa Pelvic Scores. Minimum follow up time was 12 months with the mean being 24 months. 45 patients were followed up with a mean age 34 years (range 14- 65). Fracture types included 1 C1-1, 18 C1-2, 26 C1-3. Results: Types of injury included: 42% percent road traffic accidents, 16% pedestrians hit by car, 11% crush injury, and 11% falls from >10ft. Thirty two percent of injuries occurred at work. The most commonly associated injury was spinal injury. The average Majeed score was 68 (good). The average Iowa score was 71 (good). There was significant difference in the Majeed ($p=0.0018$) and Iowa ($p=0.0031$) scores comparing Tile C1-2 to Tile C1-3 patients. The average Majeed score for patients with a urethral injury was 61 and Iowa score was 62. Those with bladder injury were 68 and 67, respectively. Three men experienced erectile dysfunction. 36% of patients returned to their previous job, 36% were unable to return to work, 4% retired and, 22% were unemployed pre and post injury. The average visual pain score was 3.9/10. Conclusion: Our patients had a good functional outcome after undergoing closed reduction and percutaneous iliosacral fixation for Tile Type C fractures.

Date: 2011-09-06

Session: Trauma - Pelvis & Acetabulum

Time: 13:30 - 15:00

Room: Terrace I

Abstract no.: 29926

SELECTION OF SURGICAL METHOD FOR TRANSACETABULAR FRACTURES: A DIFFERENTIAL APPROACH

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Aim: To clarify the indications for reconstructive and primary total hip replacement during transacetabular fractures. **Materials and methods:** Data of 61 patients with non-union transacetabular fractures, from 2 to 25 months after trauma were analysed. The indication for surgery is derived from the following factors: 1. Signs of avascularisation and severe deformation of femoral head, confirmed radiologically. 2. Possibility of anatomical reduction of fracture fragments 3. The choice of the patient. In 24 patients, reconstruction was achieved with minimal devitalization of fracture fragments during surgeries. In the other 12 patients, whom the time interval of injury is more than 3 weeks we performed reconstruction of fracture fragments through the joints. Minimal devitalisation and skeletonization is done during Primary total hip replacement in 37 patients, because the exact anatomical reposition of fracture fragments was not a goal for us. Conventional osteosynthesis followed by armed acetabular primary hip replacement with auto bone graft was done in 23 patients. Two zone fixation (ischium & iliac bones) without osteosynthesis was performed with Muller acetabular ring in 12 patient and Burch-Schneider reinforcement cage in 2 patients. **Results:** Avascular necrosis of femoral head or fracture fragments of acetabulum occurred in 5 of 22 patients during the period of 1 year after reconstructive surgery. The median value according to Harris scale was 82.4 ± 6.8 points after reconstructive surgery and 86.2 ± 6.2 after primary hip replacement.

Date: 2011-09-06

Session: Trauma - Pelvis & Acetabulum

Time: 13:30 - 15:00

Room: Terrace I

Abstract no.: 27625

**TRICORTICAL ILIAC CREST GRAFT IN RECONSTRUCTION OF
COMMINUTED POSTERIOR WALL ACETABULUM FRACTURE**

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Introduction: Anatomical reconstruction of comminuted posterior acetabular wall fracture is difficult to achieve because of the difficulty in fixation of small fragments, inability to understand the orientation of the fragments and soft tissue detachment. **Methods:** We present eight cases of such fractures where the comminuted fragments were excised and the posterior wall defect was reconstructed with tricortical iliac crest graft. The graft was buttressed with a reconstruction plate on its posterior aspect. The patients were followed up every week until radiological signs of union were seen. Subsequent follow-up was after six months, one year and annually. Patients were evaluated clinically by Merle d'Aubigne and Postel score and radiologically by Matta score at their final follow-up. **Results:** All fractures united radiologically after an average follow-up of 3.2 months. The clinical outcome after mean follow-up of 3.34 years (minimum two years and maximum five years) was as follows: two (25%) were excellent, two (25%) were very good, three (37.5%) were good and one (12.5%) was fair. Radiological grading at last follow-up showed excellent in one (12.5%), good in four (50%) and fair in three (37.5%) patients. No complication in the form of infection, heterotopic ossification, neurovascular injury or graft resorption was noticed. **Conclusion:** Excision of the small comminuted fragments and reconstruction of the wall using iliac crest strut graft is a viable alternative technique for reconstruction of the comminuted posterior acetabular wall fracture. The medium term clinical and radiological results of this technique are satisfactory.

Date: 2011-09-06

Session: Trauma - Pelvis & Acetabulum

Time: 13:30 - 15:00

Room: Terrace I

Abstract no.: 28230

**THE MODIFIED STOPPA APPROACH FOR ACETABULAR FRACTURES:
WHAT IS POSSIBLE AND WHAT IS IMPOSSIBLE?**

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Mina DAWOOD

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Background: The ilioinguinal approach is widely used for ORIF of acetabular fractures. An extraperitoneal (modified Stoppa) approach through the rectus abdominus muscle has been described as an alternative approach. This approach uses a single window for obtaining an intrapelvic pro-peritoneal view of the fracture site by retraction of the peritoneal sac, with protection of spermatic cord and iliac vessels. Objective: The aim of this study was to evaluate the technical aspects of this modified Stoppa approach, the intraoperative possibilities and impossibilities, the operative results, and associated complications. Patients and methods: This approach was used in 16 patients with acetabular fractures that were candidates for anterior approach. Inclusion criteria were indications for use of an ilioinguinal approach (anterior wall, anterior column, associated both-column fractures, anterior column posterior hemitransverse, and anteriorly displaced T-shaped and transverse fractures). Results: This modified Stoppa approach provides access to the pubic body, the superior ramus, the iliopectineal line up to the anterior sacroiliac joint, quadrilateral plate, and medial aspect of the posterior column. The principle difference between the ilioinguinal and the modified Stoppa approach is avoiding the middle window, thus avoiding dissection of inguinal canal, retraction of the iliopsoas muscle with femoral nerve, and external iliac vessels. An advantage is the excellent intrapelvic view allowing better visualization of fracture zone with possible manipulation and reduction of the quadrilateral plate and posterior column. The use of a lateral window was required in 6 patients for reduction of a high anterior column fracture, plate fixation, or lag screw insertion. Good to excellent reduction was achieved in 14 out of 16 patients. Infection was reported in one patient that needed wound excision and secondary closure. There was no vascular complication or nerve injury. This approach allows adequate exposure for most acetabular fractures but not posterior wall and posterior column fractures.

Date: 2011-09-06

Session: Trauma - Pelvis & Acetabulum

Time: 13:30 - 15:00

Room: Terrace I

Abstract no.: 28490

LONG-TERM RESULTS OF SURGICAL TREATMENT OF COMPLEX FRACTURES OF THE ACETABULUM

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Objective: The purpose of this study was to investigate the clinical and radiographic results of surgical treatment of complex fractures of the acetabulum. Materials and methods: During the period from 2000 to 2008 were operated 65 patients with displaced F, G, H, I, J fractures types according Letournel classification. 68% of patients were operated on within 3 weeks, 32% in terms of 3 to 4 weeks after injury. In determining the indications for surgical treatment were assessed the integrity of the roof of the acetabulum, the magnitude of the arch angle, congruence and stability of the femoral head, subchondral layer structure of the acetabulum on CT. The Kocher-Langenbeck approach was used in 32 cases, ilio-inguinal in 19 cases, extended ilio-femoral in 3 cases, a combination of one-stage anterior and posterior approach in 11 cases. Fixation of fractures in all series was carried out using reconstructive plates and screws. Results: Anatomic reduction of the acetabulum was achieved in 63% of patients. Long-term results of treatment were studied in 66% of patients, mean follow-up 3 years 4 months. Evaluation of the results was performed according to the system Merle D'Aubigne and Postel, Matta. Excellent treatment results were obtained in 40% of the studied patients, good and satisfactory in 35%, unsatisfactory in 25% of patients. Observed line quantitative assessment of the degree of radiological and clinical outcome of treatment. Conclusions: Method of choice for the treatment of complex fractures of the acetabulum within 3 weeks after the injury is open reduction and internal fixation. In the later periods indicated conservative treatment with the prospect of hip replacement.

Date: 2011-09-06

Session: Trauma - Proximal Femur I

Time: 16:00 - 17:30

Room: Terrace I

Abstract no.: 28393

SHORT PROXIMAL FEMORAL NAIL FIXATION FOR TROCHANTERIC FRACTURES

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Purpose: To review outcomes of 100 patients who underwent short proximal femoral nailing for stable and unstable intertrochanteric fractures. Methods: Records of 62 men and 38 women aged 56 to 83 (mean, 67) years who underwent short proximal femoral nailing for stable peritrochanteric A1 (n=36), unstable peritrochanteric A2 (n=40), and unstable intertrochanteric A3 (n=24) fractures were reviewed. Results: 80 patients achieved anatomic reduction. At the one-year follow-up, 90% of the patients had good or excellent outcomes, and 50% had returned to their pre-injury functional level. One patient with avascular necrosis noted at 20 months and another patient with non-union/pseudarthrosis underwent a revision bipolar arthroplasty. Two patients had a Z effect and one a reverse Z effect. Six patients with osteoporosis had superior migration of the nail with varus collapse. Two patients had cutting out of the screw, but the fractures eventually healed. Ten patients had shortening of <2 cm. Seven patients had lateral thigh discomfort attributed to irritation of the protruding screws against the tensor fascia lata, and 5 of them underwent screw removal. None had fractures of the femoral shaft or trochanter or experienced nail breakage. Conclusion: The short proximal femoral nail is a superior implant for stable and unstable intertrochanteric fractures in terms of operating time, surgical exposure, blood loss, and complications, especially for patients with relatively small femora.

Date: 2011-09-06

Session: Trauma - Proximal Femur I

Time: 16:00 - 17:30

Room: Terrace I

Abstract no.: 28391

VALGUS INTERTROCHANTERIC OSTEOTOMY COMBINED WITH FIBULAR GRAFTING FOR NEGLECTED FEMORAL NECK FRACTURES IN YOUNG ADULTS

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The study included 32 consecutive cases of neglected (more than 1 month old) femoral neck fractures treated at our centre between February 2005 and February 2010. Young adults were treated with a valgus intertrochanteric osteotomy and fibular grafting. The average age of the patients was 37 years (range: 21–60 years). 23 of the patients were male and 9 were female. The interval between the injury and operation ranged from 1 to 12 months (average: 4.3 months). Osteosynthesis of the fracture is done with the screw and osteotomy is fixed with A double-angled modified DHS (120°). Using a template we then removed a wedge of bone at least 1.0 cm distal to the dhs barrel at the level of the lesser trochanter. The 20-30° wedge allowed accurate apposition of the osteotomy. Patients were reviewed at 6 weeks and 3 months after surgery and then at 6-monthly intervals. Individual follow-up ranged from 12 to 54 months (average: 30 months). A fracture union rate of 85% (27 cases) was achieved. 3 of the healed cases developed avascular necrosis, 2 cases went into non-union successfully converted to bipolar prosthesis. After 2 years of follow up, 27 patients (85%) had achieved excellent to good results. We believe that intertrochanteric osteotomy with fibular grafting provides good alternative management for neglected femoral neck fractures.

Date: 2011-09-06

Session: Trauma - Proximal Femur I

Time: 16:00 - 17:30

Room: Terrace I

Abstract no.: 28110

FEMORAL NECK COLLAPSE AFTER INTERNAL FIXATION OF INTRACAPSULAR HIP FRACTURES

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Excessive collapse of the femoral neck after internal fixation of intracapsular hip fractures has been thought to lead to residual pain or impaired hip function. This theory remains to be proven in clinical practice. The new Targon FN hip screw has been designed for the internal fixation of intracapsular hip fractures and allow for limited collapse along the line of the femoral neck with multiple telescoping lag screws, whilst resisting varus deformity. This enables femoral neck collapse to be measured on follow-up radiographs. 197 patients with displaced intracapsular hip fractures were treated by internal fixation with the Targon FN screw/plate fixation. Collapse was calculated by measuring the amount of slide that occurred in the sliding screws. The mean collapse was 8.6mm. This was significantly increased in those fractures which resulted in non-union (mean 13.3mm), but not for those that later developed avascular necrosis (mean 9.6mm). For those fractures that healed the mean collapse after healing was 5.8mm for undisplaced fractures, and 9.3mm for displaced fractures (p value for difference 0.001). Fractures that healed after excessive collapse were associated with a statistically significant increase in residual pain in the hip and greater impairment of mobility at one year from injury. There was no significant difference in the amount of collapse related to sex/age of the patient. Excessive collapse of the femoral neck after an intracapsular hip fracture has a detrimental effect on outcome. Future research looking at ways to prevent this is indicated.

Date: 2011-09-06

Session: Trauma - Proximal Femur I

Time: 16:00 - 17:30

Room: Terrace I

Abstract no.: 28195

OSTEOSYNTHESIS AND PRIMARY VALGUS OSTEOTOMY IN UNSTABLE INTRACAPSULAR FEMORAL NECK FRACTURES IN YOUNG ADULTS

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Background: Displaced intracapsular femoral neck fractures continue to be a difficult problem to treat. Various treatment modalities and their modifications have been proposed to improve the outcome. Osteosynthesis and primary valgus angulation osteotomy is one of them. Technique and outcome in a consecutive series of recent intracapsular femoral neck fractures in young adults, from a single center, is presented. Materials and Methods: Fifty-five patients of recent (<3 weeks old) displaced intracapsular fracture neck femur (Garden III and IV, Pauwels III, with or without comminution) in the age group 20-50 years (mean 35.4±10.4 years) were subjected to osteosynthesis and primary valgus intertrochanteric osteotomy using contoured broad dynamic compression plate (DCP). The patients were followed up from two to six years (mean 4.6 years). Results: Fifty-one fractures united by six months of the index procedure (92.7% union range). Avascular necrosis (AVN) developed in six patients (11%). The other complications were shortening (six), coxa vara (two), infection (two) and delayed union at osteotomy site (one). Excellent results were achieved in 48, good/fair in four and poor in three patients. Conclusion: Osteosynthesis with cancellous screw and primary valgus intertrochanteric osteotomy stabilized by a contoured broad DCP is a simple, easy to perform, biological treatment. Failure in a particular case can be treated with any appropriate second procedure. Level of Evidence: IV; Keywords: Femoral neck fracture, osteosynthesis, primary valgus osteotomy, broad DCP

Date: 2011-09-06

Session: Trauma - Proximal Femur I

Time: 16:00 - 17:30

Room: Terrace I

Abstract no.: 27180

**A COMPARATIVE STUDY OF THE INTERNAL FIXATION OF
INTERTROCHANTERIC FRACTURES USING SLIDING HIP SCREW WITH
PLATE AND PROXIMAL FEMORAL NAIL**

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A variety of implants have been used to fix intertrochanteric fractures {#}. Material and methods: 60 patients with intertrochanteric # with an average age of 70.8 years were studied retrospectively from June 2004 to August 2006. The # were classified according to A.O {OTA} classification. There was a total of 11 A-1, 40 A-2 & 9 A-3 #. 30 patients were treated with sliding hip screw{shs} and plate while 30 were treated with pfn. All patients were operated surgically according to routine surgical protocol for shs with plate & pfn. Results and complications: The amount of blood loss, total time for surgery completion, amount of sliding & shortening was more for shs group as compared to pfn group. Implant failure was seen in 6% cases in pfn group & 3% in shs group. Infection was seen in 2 cases of shs group. 1 non union was seen in shs group. 1 patient died in each group. Harris hip score was better at end of 1 month for pfn group but the scores were almost similar in long term follow up. In conclusion both the implants are here to stay, it's the fracture geometry, bone quality, medical co-morbidities which will influence the choice of fixation. The shs with plate is still the implant of choice for A-1 & A-2-2 types. The P.F.N is useful in A2.2 & A2.3. In the reverse oblique # the P.F.N is the implant of choice and shs with plates should never be used for this # pattern.

Date: 2011-09-06

Session: Trauma - Proximal Femur I

Time: 16:00 - 17:30

Room: Terrace I

Abstract no.: 30094

OPERATIVE POSTPONEMENT DUE TO ACUTE MEDICAL PATHOLOGY IN PROXIMAL FEMORAL FRACTURES

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Introduction: While much evidence supports early surgery for proximal femoral fractures, timing of surgery for medically unstable patients is contentious. Holt et al (2010) demonstrated improved survival with surgical postponement until 'major' medical abnormalities described by McLaughlin (2006) are reversed. Although surgical postponement for acute medical pathology is commonplace, it is unclear whether this is instituted consistently in routine practice. Aims: To investigate whether patients with proximal femoral fracture who undergo operative postponement for medical reasons are selected consistently, according to McLaughlin's criteria. Patients and Methods: A retrospective review was undertaken of 105 proximal femoral fractures in a District General Hospital. Relationships between the presence of major and minor medical abnormalities and operative postponement were analysed. Results: 24(22.9%) patients had preoperative major abnormalities, 28(26.7%) had minor abnormalities only, while 53(50.5%) had none. 48(45.7%) patients underwent surgery within 24 hours; of these, 6(10.5%) had major abnormalities, compared to 18(37.5%) of the postponed group. This difference was statistically significant ($p = 0.002$). Patients with major abnormalities were more likely to have surgery postponed than those without (75% vs 37% $p = 0.001$). Conclusion: Patients with major medical abnormalities are more likely to undergo postponed surgery in routine practice. Most postponed cases have no major abnormalities and their selection is not consistent with McLaughlin's criteria. We recommend routine use of McLaughlin's criteria to screen patients who may benefit from surgical postponement and medical optimisation and those where this is perhaps unnecessary. Further study is needed into early goal based reversal of medical pathology.

Date: 2011-09-06

Session: Trauma - Proximal Femur I

Time: 16:00 - 17:30

Room: Terrace I

Abstract no.: 29347

MORTALITY IN SURGICAL TREATED HIP FRACTURES: WHAT ARE THE PREDICTORS?

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Introduction: Hip Fractures are associated with substantial mortality, approximately 15-20% in 1 year of fracture. The objective of the study is to determine the predictors of higher mortality amongst surgically treated patients with hip fractures. Material and Methods: we reviewed 180 patients (64 males and 126 females) from 2005 to 2008 who had hip fracture and were submitted to surgical treatment. There were 60% intertrochanteric and 40% femoral neck fractures. Dynamic Hip Screw was used in 36.1%, nail in 23.9%, cannulated screw in 13.9% and arthroplasty in 26,1%. Patients demographic, mortality, comorbidities, ASA score, ambulation capacity and surgical timing were recorded and analyzed. Results: The patients had medium age of 79.2 ± 24.8 years. 70% had ≥ 75 years, 57.8% were operated in 24h, 20.0% in >24 and ≤ 72 h and 13.3% in >72 h. The cumulative mortality rates were: 6.1% during hospital stay, 8.9% in one month and 13.9% in 6 months after surgery. Patients ≥ 75 years (28,6%, $p=0.002$) and male sex (25.0%, $p=0.001$) had higher mortality rates at 6 months. Patients with an acute medical comorbidity that delayed surgery had one month mortality of 17%, 2.4 times greater than the ones initially fit for surgery ($p<0.001$). Discussion: There factors associated with higher mortality were: older age, associated diseases, ASA score, male sex and surgery >72 h. Patients should undergo surgical treatment without delay and with adequate comorbidity treatment to prevent further morbidity and mortality.

Date: 2011-09-06

Session: Trauma - Proximal Femur I

Time: 16:00 - 17:30

Room: Terrace I

Abstract no.: 29041

THE IMPORTANCE OF TIP-APEX DISTANCE (TAD) IN SLIDING HIP SCREW FIXATION OF PROXIMAL FEMORAL FRACTURES

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AIM: The aim of this study was to establish any association between implant cut-out and a Tip Apex Distance (TAD), $\geq 25\text{mm}$, in proximal femoral fractures reduced closed and stabilised with either a Dynamic Hip Screw (DHS) or Intra-Medullary Hip Screw (IMHS) device and whether any difference in cut-out rate may also be related to fracture configuration or implant type. **METHODS:** Radiographs of 65 consecutive patients with complete clinical details who underwent either DHS or IMHS fixation of proximal femoral fractures were reviewed retrospectively. The TAD was measured in the standard fashion using the combined measured AP and lateral radiograph distances. Fractures were classified according to the Muller AO classification. **RESULTS:** 35 patients underwent DHS fixation and 30 patients had IMHS fixation. 5 in each group had a $\text{TAD} \geq 25\text{mm}$. There were no cut-outs in the DHS group and 3 in the IMHS group. 2 of the cut-outs had a $\text{TAD} \geq 25\text{mm}$. The 3 cut-outs in the IMHS group had a fracture classification of 31-A2, 31-A3 and 32-A3.1 respectively. In addition, the fractures were inadequately reduced and noted as being fixed into a varus position. **CONCLUSION:** A $\text{TAD} < 25\text{mm}$ would appear to be associated with a lower rate of cut-out. The cut-out rate in the IMHS group was higher than the DHS group. Contributing factors may have included an unstable fracture configuration and inadequate closed fracture reduction at the time of surgery.

Date: 2011-09-06

Session: Trauma - Proximal Femur I

Time: 16:00 - 17:30

Room: Terrace I

Abstract no.: 28866

**TRAUMATIC DISLOCATION AND FRACTURE DISLOCATION OF HIP
– A RETROSPECTIVE STUDY OF 209 CASES**

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Traumatic dislocation hip is an orthopaedic emergency. The aim of our study was to assess the final outcome of simple dislocation hip, hip dislocation with associated fracture head of femur and fracture acetabulum. The Parameters used were Short Form (SF-36) scoring for general health status and Hip Scoring by Merle d'Aubigne. A total of 209 cases came for study. Of these 46 cases were of simple hip dislocation, 24 cases with associated femur head fracture and 139 patients of fracture acetabulum with dislocation. Evaluation of present status and reduction of femur head under the dome was assessed; displacement of femur head arc and acetabulum arc within 1-3 mm was graded as good, 3-6 mm as fair and >6 mm as Poor. The mean follow up period was 3.1 years. 177 patients were males. Associated injuries were found in 77(36.84%) patients. Open reduction was done in 132 (63.16%) patients. Physical component summary (PCS) Score and mental component summary (MCS) score more than 45 was seen in 69.6% and 68% patients respectively. Patients having PCS scores more than 55 also had hip score excellent or good. Complications included avascular Necrosis (AVN), coxarthrosis, sciatic nerve injury and heterotopic ossification. AVN was found in 6(13.04%) patients with simple dislocation hip, 28(20.14%) patients with associated fracture acetabulum and 5/24(20.83%) patients with Femur Head fractures. All patients who had AVN had reduction done after 6 hrs. 9/17(52.94%) patients of fracture acetabulum with poor reduction had AVN. PCS score less than 35 was found in patients with AVN and in 33% of patients with associated injuries. Delay in reduction more than 6 hours is associated with increased incidence of AVN. Poor quality of reduction results in low scores.

Date: 2011-09-06

Session: Trauma - Proximal Femur I

Time: 16:00 - 17:30

Room: Terrace I

Abstract no.: 28556

VALGUS INTERTROCHANTERIC OSTEOTOMY FOR NON-UNION NECK OF FEMUR

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From 1998 to 2008, we treated 40 patients with non union neck of femur with an intertrochanteric valgus osteotomy fixed with a double angle blade plate. Of these patients, 32 were followed up at an average period up of 5 years with radiographic and clinical scoring. The average age was 42 yrs (17-60), average period of non union was 5 months (1-32 months), average time to union was 6.5 months (3-15). 29 of 32 patients united and the average Harris Hip score was 82.5. Two of the 3 non unions later on underwent cemented Total hip replacement. Although 15 of 32 patients showed some stage of AVN, grade 4 changes were seen only in 2 patients who were symptomatic. There was no correlation between the final outcome with the degree of the valgus correction, or the pre op absence of neck. Our series is unique in the long period of pre op non union and the long follow up. This series also had patients with resorption of the neck. We present valgus osteotomy as a viable alternative to replacements especially in the younger age group. The absence of the femoral neck and pre op avascular necrosis are not contraindications for this surgery and in fact buy time for a replacement later once the patient becomes symptomatic due to avascular necrosis.

Date: 2011-09-06

Session: Spine - Infectious Spondylitis

Time: 16:00 - 17:30

Room: Club A

Abstract no.: 29456

MR EVALUATION OF TUBERCULAR SPINE

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We report sequential on treatment MRI findings in active & healed TB spine with/without paraplegia. 51 consecutive proven spinal TB patients (21M; 30F) were enrolled. Pretreatment and 8 months followup MRscans were reviewed for findings on vertebral column and intraspinal contents. CervicalSpine (n=6) Dorsalspine (n=20), LumbarSpine (n=29) were affected with total 162 vertebrae, 14 had paraplegia. Mean ESR was 54 mm. Mean vertebrae involved were 2.56 on X-Ray, 3.2 on MRI (range 2-15). The lesions were more extensive on MRI (n- 16) with Concomitant neural arch involvement in 3 cases. Disc was preserved in 83% instances. End Plate Erosions (158/162 VB), lost VB height (150/162), exudative lesion (157/162), granular lesion (5/162), Pre and paravertebral collections (48/51 cases, marrow edema (160/162), discitis (157/162), epidural involvement (111/162), epidural spread (116/162), subligamentous spread (144/162). Canal encroachment (10-90%) was seen in 37 cases. Mean Motor and Sensory scores with >50% canal encroachment were 87/100 & 156/168. Cord edema was observed in 11 cases with neural deficit. Nerve root compression/encasement (60% cases). Cord atrophy was seen in 1 case each before and after treatment. On healing complete resolution of marrow edema and collections, fatty replacement of bone marrow and resolution of cord signal intensity was observed after 8 months of DOTS regimen in 9/20 cases. Conclusion: MR observations were consistent to diagnose active and healed disease. 8 months DOTS regimen showed healing in 45% cases only.

Date: 2011-09-06

Session: Spine - Infectious Spondylitis

Time: 16:00 - 17:30

Room: Club A

Abstract no.: 28420

KYPHOSIS IN SPINAL TUBERCULOSIS – PREVENTION AND CORRECTION

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Spinal deformity and paraplegia/quadriplegia are the most common complications of tuberculosis (TB) of spine. TB of dorsal spine almost always produces kyphosis while cervical and lumbar spine shows reversal of lordosis to begin with followed by kyphosis. Kyphosis continues to increase in adults when patients are treated nonoperatively or by surgical decompression. In children, kyphosis continues to increase even after healing of the tubercular disease. The residual, healed kyphosis on a long follow-up produces painful costopelvic impingement, reduced vital capacity and eventually respiratory complications; spinal canal stenosis proximal to the kyphosis and paraplegia with healed disease, thus affecting the quality and span of life. These complications can be avoided by early diagnosis and treatment of tubercular spine lesion to heal with minimal or no kyphosis by suspecting and diagnosis the disease in a predestructive stage and subjecting them for MRI with or without CT guided biopsy for diagnosis. When tubercular lesion reports with kyphosis of more than 50° or is likely to progress further, they should be undertaken for kyphus correction. In children all lesions whether healed or active if have more than 2 spine a risk signs suggestive of progressive kyphosis should be undertaken for correction of kyphosis. The sequential steps of kyphosis correction include anterior decompression and corpectomy, posterior column shortening, posterior instrumentation, anterior bone grafting and posterior fusion. During the procedure, the spinal cord should be kept under vision so that it should not elongate. Internal kyphectomy (gibbectomy) is a preferred treatment for late onset paraplegia with severe healed kyphosis. Keywords: Kyphotic deformity, late onset paraplegia, TB spine, kyphus correction, extrapleural anterolateral approach

Date: 2011-09-06

Session: Spine - Infectious Spondylitis

Time: 16:00 - 17:30

Room: Club A

Abstract no.: 29279

TRANSFORAMINAL LUMBAR INTERBODY FUSION FOR TUBERCULOUS SPONDYLODISCITIS OF THE LUMBOSACRAL SPINE

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Introduction: Surgical treatment of TB spondylodiscitis aims at debridement of the inflammatory necrotic material and stabilizing the affected segment. Although several alternatives were described for the lumbar spine, transforaminal debridement and interbody fusion is an option to be considered. This study aims to evaluate the efficacy of unilateral TLIF in the treatment of resistant TB spondylodiscitis of the lumbosacral spine. **Methods:** This prospective study included 20 consecutive patients with resistant TB spondylodiscitis of the lumbosacral spine. The average age was 41 y. The level affected was L4/5 (n=9), L5/S1 (n=7), L3/4 (n=4) and L1 (n=3). Through a unilateral transforaminal approach, the infected necrotic tissue was removed; the disc was aggressively debrided and packed with autograft bone combined with pedicle screw instrumentation. Patients were followed-up for an average of 3.5y. **Results:** Immediate pain relief was noted in all patients; at final follow-up, excellent or good clinical results were achieved in 90%, whereas 10% had poor results. The average ODI improved from 76 to 18 points and the VAS improved from an average of 8.2 to an average of 1.9. The fusion rate was 95% with no evidence of recurrence of infection except in 1 patient (5%). All 5 patients with a preoperative neurologic deficit had an improvement in their neurologic status. **Conclusions:** TLIF using iliac bone autograft and pedicle screw instrumentation are a safe efficient alternative to treat resistant TB spondylodiscitis which yielded excellent clinical and radiographic outcomes.

Date: 2011-09-06

Session: Spine - Infectious Spondylitis

Time: 16:00 - 17:30

Room: Club A

Abstract no.: 27352

TREATMENT OF ACUTE TUBERCULOUS SPONDYLITIS BY THE SPINAL SHORTENING OSTEOTOMY: TECHNICAL NOTES AND CASE ILLUSTRATIONS

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Spinal tuberculosis has been recognized as a cause of spinal deformity and paraplegia for the last two centuries. Further, because of the increasing in the global incidence of the tuberculosis worldwide thus the incidence of spinal tuberculosis is now increasing. Although, antituberculous chemotherapy is a fundamental for the treatment of the spinal tuberculosis but surgical treatment for spinal tuberculosis is remaining necessary in particular cases that encounter with large necrotic tissue, and spinal cord compression. However, there is no standard method for the surgery as many surgical procedures have been described. Spinal shortening osteotomy procedure is an alternative method of the surgery in which has been described for the correction of sagittal balance in late kyphotic deformity but, so far, there has no report as a surgical treatment in acute stage. Thus the aim of this report is to present the surgical techniques and clinical results of the patients treated with this procedure. Three patients with tuberculous spondylitis at the thoracic spine were surgically treated with this procedure. All the patients presented with severe progressive back pain, kyphotic deformity and neurological deficit. The patients recovered from surgery uneventfully without further neurological deterioration. The pain was improved in and the patients remained free of pain during the follow-up period. In conclusions, the posterior spinal shortening osteotomy should be an alternative method for the management of tuberculous spondylitis.

Date: 2011-09-06

Session: Spine - Infectious Spondylitis

Time: 16:00 - 17:30

Room: Club A

Abstract no.: 29567

POSTOPERATIVE INFECTIOUS COMPLICATIONS: 10-YEAR SINGLE-CENTER STUDY

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A follow up of postoperative infectious complications in orthopaedic and traumatology department is a condition of an evaluation of preventive acquisitions. The survey information about the infectious complications occurrence followed up continuously in 10 years is the goal of the work. A group of 24 013 patients (14 473 elective and 9 540 traumatological procedures) operated on in our department in 2000-2009 was prospectively tracked. There were early and late infectious complications in 193 patients (65 elective and 128 traumatological procedures) according to Willenegger-Roth classification. The range of infectious complications was 0.8% (0.4 in elective and 1.3% in traumatological procedures). Gram-positive bacteria were found in 52% and gram-negative bacteria in 28% of all the patients. A mixed flora was evidenced in 20% of the patients with positive cultures. Methicilin-resistance Staphylococcus aureus (MRSA) was proven in one patient out of 79 within first 5 years, whereas within the next 5 years MRSA was identified as the infectious agent in 10 patients out of 114. In spite that there was a significant increase in number of infectious complications in elective operations ($p=0,018$), but there was no significant difference in THA (1,0% vs. 0,8%, $p=0,548$), neither in TKA (1,9% vs. 0,9%, $p=0,195$).

Date: 2011-09-06

Session: Spine - Infectious Spondylitis

Time: 16:00 - 17:30

Room: Club A

Abstract no.: 29341

DIFFERENCES BETWEEN BIOFILM CHARACTERISTICS OF MRSA AND MSSA CAUSING ORTHOPAEDIC IMPLANT INFECTION

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Prosthetic joint infection by Staphylococcal organisms is one of the most vexing problems in Orthopaedic surgery. Previous studies suggest potential correlations between levels of resistance to beta-lactam antibiotics and biofilm phenotype in these organisms. The aims of this study were to assess the relationship between methicillin sensitivity and ability to form biofilm by orthopaedic staphylococcal isolates and to compare the results to those of staphylococcal reference strains. Biofilm phenotypes of 31 each of MRSA and MSSA isolates from infected orthopaedic implants were characterised. Ability to form biofilm under standard and biofilm-inducing growth conditions was related to methicillin susceptibilities. Case notes of affected patients were reviewed to record difficulty encountered in eradicating the infections and whether behavior of the isolates in laboratory setting has clinical correlation. There was significant association between methicillin resistance in the isolates and their capacity to produce biofilm. NaCl and glucose when compared to MSSA twice induced biofilm formation in MRSA. There was a statistically significant association between a prosthetic infection-associated *S. Aureus* isolates and the presence of the *ica* gene cluster. Clinical MRSA isolates were more induced by glucose rather than NaCl; in contrast the reference strains were strongly induced by NaCl and not glucose. Alteration of biofilm growth is a potential non -antibiotic way of controlling implant related infection. This study suggest that regulatory pathways controlling biofilm phenotype in reference strains may be different from those used by clinical isolates, therefore results derived from use of reference strains should be interpreted with caution.

Date: 2011-09-06

Session: Spine - Infectious Spondylitis

Time: 16:00 - 17:30

Room: Club A

Abstract no.: 28934

CAN INFECTION FOLLOWING SCOLIOSIS INSTRUMENTATION SURGERY BE A 'NEVER EVENT'? : DRAMATIC REDUCTION IN INFECTION RATES AT ONE INSTITUTION AFTER IMPLEMENTATION OF A MULTIMODAL PREVENTION PROTOCOL

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Aim: In 2008, an increased rate of scoliosis instrumentation SSI was noted at our institution. This prompted an in-depth review of our infection-prevention protocol and implementation of a new standardized multimodal SSI-prevention protocol. The new protocol included an antibiotic prophylaxis educational program, dual peri-operative prophylaxis with cefazolin and tobramycin (based on pathogen susceptibility at our institution), pre-operative CHG-bathing, and high-volume lavage prior to closure. The purpose of this study was to evaluate the rates of SSIs before and after the prevention protocol was implemented. **Methods:** Retrospective chart review of all children who underwent posterior or combined spinal instrumentation for scoliosis at our institution from January 2006 to December 2009. **Results:** During the study period, 424 scoliosis-correction procedures were performed on 268 patients (60.6%-Female, 39.4%-Male). The etiology of scoliosis included: 36.1% idiopathic and 63.9% non-idiopathic scoliosis. The average number of procedures increased throughout the study period from 17.25 cases/quarter in 2006 to 34.75 cases/quarter in 2009. The proportion of non-idiopathic scoliosis before and after implementation of the SSI prevention protocol was similar (62.1% vs 67.6%, $p=0.283$). Prior to implementation of the SSI prevention protocol, the average quarterly infection rate was 7.03% (SD=6.78) peaking in the 3rd quarter of 2008 at 23.1%. In the 12 months post-implementation, no cases of infection were observed. **Conclusion:** Quarterly surgical site infection rates showed a sustained reduction for one year following implementation of a multimodal SSI-prevention protocol at our institution. There was no change in the etiology of scoliosis operated on during this period. **Significance:** The study shows institution of a standardized multimodal SSI-prevention program can dramatically reduce SSI rates in pediatric scoliosis instrumentation surgery.

Date: 2011-09-06

Session: Spine - Infectious Spondylitis

Time: 16:00 - 17:30

Room: Club A

Abstract no.: 29530

POSTEROLATERAL DEBRIDEMENT AND ANTERIOR RECONSTRUCTION BY LIMITED SPINAL SHORTENING IN THORACIC SPINE INFECTIONS

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In severe osteomyelitis of the spine, open debridement and anterior fusion by anterior bone grafting offers the advantage of eradication of the focus of infection and improvement of conditions for bony fusion of the affected vertebral bodies. Some limited papers reported the use of spinal shortening for anterior reconstruction after fractures or tumors. Ten patients of infections of the thoracic spine were treated surgically at Sohag University Hospital, Sohag, Egypt by single posterolateral exposure. Age of the patients ranged between 35 and 71 years with a mean age of 56.5 years. All patients were operated in the prone position through a single posterior exposure. Posterior stabilization by transpedicular screw fixation was performed. Anterior dissection enables debridement of the lesion and evacuation of any abscess. Then, reconstruction of the anterior column was performed by limited spinal shortening followed by posterior fusion. Causative organisms were TB in 8 patients, Staph aureus in 1 patient and bacteriologic testing of intraoperative samples did not find germs in 1 patient. Mean follow up was 30.7 months (range; 5- 80 months). No active infection occurred till the end of follow up. Seven patients got neurological improvement. Two complications were encountered; kyphosis progression (patient 3) and temporary neurological deterioration (patient 10). In conclusion, in cases of thoracic spinal infections, single posterolateral exposure is sufficient to debride the infected material, decompress the neural elements, and reconstruct the spine. Limited spinal shortening allows anterior reconstruction without the need for bone grafting.

Date: 2011-09-06

Session: Tumours - Reconstructions

Time: 13:30 - 15:00

Room: Club B

Abstract no.: 30263

MASSIVE OSTEOCHONDRAL ALLOGRAFTS IN LIMB SALVAGE SURGERY

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Introduction: The use of preserved Bone and Cartilage is not a recent technique and since 1879 fresh and frozen grafts has been used in numerous cases. What is new is the knowledge of the Mechanism of Conservation and the behavior of Chondral Deep-Frozen Allografts - The chondrocytes has to be protected to be able to fix the water molecules on the glyco-amino-glycans present in the cartilage. - We cannot use a stérilisation by irradiation which destroy all the cells and we have to use very carefully DMSO 8% to stop massive ice cristal formation, not to impare the cartilaginous cellular function. - The cartilaginous tissue is deep frozen and conserved in Liquid nitrogen at – 196°C - The Cartilaginous Matrix has to have a normal tightness to protect the Chondrocytes - The sub-chondral bone has to be vascularized to survive, but the Cartilaginous cells only needs synovial fluid imbibition - The Cartilaginous cells are not replaced , and the one seen some years after grafting are those initially present in the graft - The Cartilage is a special tissue which don't give immune response - If we have an immune response it is because of the surrounding tissue - Taking apart each component of the cartilage gives an immunological response but when we graft the whole cartilage, there is no reaction.

Date: 2011-09-06

Session: Tumours - Reconstructions

Time: 13:30 - 15:00

Room: Club B

Abstract no.: 29010

HEMICORTICAL RESECTION AND RECONSTRUCTION WITH RECYCLED BONE FOR PAROSTEAL OSTEOSARCOMA

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Introduction: Parosteal osteosarcoma (POS) is the rare and low grade osteosarcoma which arises in the surface of long bones. Since 1992, we have treated POS with hemicortical resection followed by reconstruction using a heat-treated recycled autograft. The purpose of this study is to analyze the outcome of patients with POS, and clarify the efficacy of heat treated recycled bone grafting. Methodology: Seven patients with POS who were surgically treated from 1993 to 2007 are the subjects of this study and included 3 men and 4 women with a mean age of 35 years. Tumor locations were the distal femur in 3 patients, and tibia in 4. All 7 lesions were treated by hemi-cortical resection. After histological specimens were cut, the remainder of the bone was treated in saline at seventy degrees Centigrade for 15 minutes, and this heat- treated bone was placed back into the bone defect. Cortical or intramedullary invasion, bone union, surgical margin, oncological outcome and functional outcome were reviewed retrospectively. Results: Surgical margins were wide in 5 patients, and marginal in 1. No local recurrence or distant metastasis was found. Functionally, MSTS score were 100% in 6 patients, and 80% in 1. Toronto Extremity Salvage Score was an average 91(70-100). Conclusion: More than half of the patients with POS have been treated with wide resection and tumor type prosthesis in the literature. POS that has no or slight medullary involvement can be treated with hemi-cortical resection and reconstruction using a heat treated recycled bone graft with excellent results.

Date: 2011-09-06

Session: Tumours - Reconstructions

Time: 13:30 - 15:00

Room: Club B

Abstract no.: 28882

FUNCTIONAL OUTCOME AND COMPLICATIONS AFTER RECONSTRUCTION WITH AN EXPANDABLE ENDOPROSTHESIS IN CHILDREN WITH OSSEOUS SARCOMAS

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Introduction: There is heterogeneity of the results reported within the literature regarding the use of expandable endoprostheses within pediatric osseous sarcoma patients due to the different types of endoprostheses compared. This study aims to determine the functional outcomes and complications of a single type of expandable endoprosthesis in patients undergoing distal femoral reconstructions. Methods: We screened our outpatient database to identify children treated with a percutaneously lengthened femoral endoprosthesis (Stryker Howmedica ®) from January 2005 – September 2010. Outpatient records and radiographs were reviewed to determine demographic data, surgical procedure characteristics, functional outcome and complications. Results: 8 patients (5 boys and 3 girls) were included (8 endoprostheses). 8/8 patients underwent distal femur reconstructions. All patients were alive at final follow-up (mean: 27.2 months). 5/8 patients underwent lengthenings (mean: 2.00) with a mean of 3 procedures. Mean time from initial implantation to first lengthening was 24 months. Time between lengthenings was 10.4 months. Mean bone stock and osteoplastic lengthening were 10.76 cm and 1.32 cm, respectively. Knee flexion contractures were the most common complication reported (4/8 patients). Resolution involved physical therapy and/or surgical release. Other complications included superficial wound infection (1/8 patients), proximal migration of the femoral stem with poor bone stock (1/8 patients), and periprosthetic fracture (1/8 patients). The mean knee ROM was 97°. Patients walked with one crutch or independently with slight limping. Conclusion: Reconstruction with expandable endoprostheses has good functional outcomes. To avoid complications, physical therapy as well as pre-operative planning is of crucial importance.

Date: 2011-09-06

Session: Tumours - Reconstructions

Time: 13:30 - 15:00

Room: Club B

Abstract no.: 29219

**MALIGNANT AND AGGRESSIVE BONE TUMOURS AROUND KNEE:
TREATED WITH INNOVATIVE ROTATION-PLASTY**

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Introduction: Bone tumors occur most commonly around the knee joint. There are different modalities of the treatment for these sarcomas; including amputation or limb salvage procedures and rotation-plasty. Method: Fifty-two tumors were treated by this method in the last 15 years including osteosarcoma, chondrosarcoma, malignant fibrous histiocytomas and other malignant and benign aggressive tumors. There were 38 male and 14 female patients. The surgery included the wide resection with adequate margins after innovatively applying the tourniquet in the supra-trochanteric area for the lower femoral tumors. Rotation-plasty was performed and the fixation was done using intramedullary nail instead of plate. A trough in the broad metaphyseal tibia allowed more contact area for union. Chemotherapy was given as per hospital protocol. Results: As far as the fixation and union of the site is concerned we had no case of non union. The nailing was easy to perform and retrieve without damaging the loop of neurovascular structures. The overall procedure related results had been quite encouraging. Discussion: Rotationplasty is described method for saving the foot instead of amputation in young patients for the sarcomas around the knee. It is better than amputation as there are no phantom sensations, no neuromas and there is preservation of the proprioception and the psychological feeling of the salvaged foot. This procedure needs lot of counseling. The video films of the previously operated cases should be shown to the patients and parents. The advantages of the modifications will also be highlighted.

Date: 2011-09-06

Session: Tumours - Reconstructions

Time: 13:30 - 15:00

Room: Club B

Abstract no.: 29359

RESECTION AND ARTHRODESIS USING EXTRA LONG INTRA-MEDULLARY NAIL FOR GIANT CELL TUMORS AROUND KNEE

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Introduction: Giant cell tumors (GCTs) of bone are aggressive benign tumors. Wide resection is reserved for a small subset of patients with biologically more aggressive, recurrent and extensive tumors. As the patients affected with GCT are young or middle-aged adults with a normal life expectancy; arthrodesis is an attractive option for reconstruction in these patients. Materials and Methods: Thirty-five patients (16 males and 19 females) of mean age 32 years (range 20 to 55 years) with Campanacci grade III giant cell tumors around the knee (20 distal femoral and 15 proximal tibial) were treated with wide resection and arthrodesis during last 12 years. Arthrodesis was performed using extra long intramedullary Kuntscher's nail and autologous cancellous and strut bone grafts. Results: Fusion was achieved in 94% of the patients. Local recurrence was observed in two patients. Two patients had repeat surgery for nonunion/graft fracture with implant breakage. Conclusion: Wide resection and arthrodesis in aggressive GCTs around the knee is a good treatment option. Use of intramedullary nail for arthrodesis achieves high fusion rates, least shortening and early rehabilitation. Resection arthrodesis offers a biological reconstruction alternative to amputation in a special group of patients when extensive resection precludes mobile joint reconstruction. An arthrodesed knee in good alignment and functional position is considered to be an appropriate sacrifice to achieve a stable, pain-free limb.

Date: 2011-09-06

Session: Tumours - Reconstructions

Time: 13:30 - 15:00

Room: Club B

Abstract no.: 29742

PROSTHESIS SURVIVAL AND FUNCTIONAL OUTCOME AFTER ENDOPROSTHETIC RECONSTRUCTION OF THE LOWER EXTREMITY WITH THE MUTARS PROSTHESIS

Rachid MAHDAD, Celine KARIJODIKORO, Christiaan KEURENTJES, Michiel SANDE VAN DE, Anthonie TAMINIAU, Rob NELISSEN, Sander DIJKSTRA
LUMC, Leiden (NETHERLANDS)

Introduction: In 1996 we've started using the MUTARS prosthesis for endoprosthetic reconstruction after oncological hemipelvic, hip and knee resection. The aim of this study is to give an overview of our thirteen year experience with the use of this prosthesis and provide the survival rate of the prosthesis and the functional outcome. Patients and Methods: A retrospective study of prosthesis survival and functional outcome for megaprosthesis implantation after oncological resection of hemipelvis, hip or knee. All patients were treated between 1996 and 2009 in the orthopedics department of an academic medical centre. Results: 111 patients were operated with a megaprosthesis between 1996 and 2009 (57 men and 54 women). There were 64 Mutars knee, 30 Mutars hip and 17 hemipelvic Mutars. The primary tumour diagnosis was osteosarcoma in 38 patients (34%) and chondrosarcoma in 39 patients (26%). The cumulative incidence for revision for any reason of all prosthesis at 10 years is 42% (95%-CI: 32-53%). The cumulative incidence for revision for any reason of the knee prosthesis at 10 years is 46% (95%-CI: 32-59%). The cumulative incidence for revision for any reason of the hip prosthesis at 10 years is 36% (95%-CI: 18-54%). The cumulative incidence for revision for any reason of the hemipelvic prosthesis at 10 years is 35% (95%-CI: 13-58%). Conclusion: The cumulative incidence for revision for any reason of the megaprosthesis at ten years varies between 35% and 46%. Functional scores will be provided in the presentation.

Date: 2011-09-06

Session: Tumours - Reconstructions

Time: 13:30 - 15:00

Room: Club B

Abstract no.: 29644

**PROGNOSTIC FACTORS IN THE MANAGEMENT OF OSTEOSARCOMA:
A CLINICAL STUDY**

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Background: Risk stratification based on prognostic factors has become pertinent in osteosarcoma in order to restrict the side effects of intensive chemotherapy. Method: 28 patients of primary skeletal osteosarcoma were followed up prospectively. The following factors were assessed for prognostic relevance- age, sex, location, length of tumour, fungation, pathological fracture, skin fixity, joint involvement, neurovascular involvement, serum ALP, serum LDH, ESR, type of surgery, post-operative infection and post-chemotherapy histologic tumour necrosis. Expression of tumour markers Ki-67 and HER2/neu was assessed in the biopsy specimens using immunohistochemistry. Kaplan-Meier survival curves were drawn. Results: The median follow up duration was 18.5months (4-36 months). The event free survival values at 18 months and 36 months were 32.5% and 20.3% respectively and the overall survival values were 68.7% and 42.1% respectively. Factors significantly associated with poor overall survival were fungation and histologic necrosis <90%. Factors associated with poor event free survival were fungation, skin fixity, pathological fracture and histologic necrosis <90%. All three patients with HER2 positivity had poor survival. Other patients did not express HER2. Ki-67 staining was increased in four cases, and all of them had expired by nine months. Conclusion: Fungation, skin fixity, pathological fracture and histologic necrosis <90% portend poor prognosis in osteosarcoma. The prognostic role of HER2 needs further investigation. Ki-67 may be a useful marker for the prediction of the outcome.

Date: 2011-09-06

Session: Tumours - Reconstructions

Time: 13:30 - 15:00

Room: Club B

Abstract no.: 29826

PAUWELS OSTEOTOMY IN THE MANAGEMENT OF PATHOLOGIC FEMORAL NECK FRACTURES

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Pt B D Sharma PGIMS, Rohtak (INDIA)

Treatment of pathologic femoral neck fractures secondary to extensive lesions of fibrous dysplasia, simple bone cysts and low malignant giant cell tumours has been controversial. We think that modified Pauwels' intertrochanteric osteotomy and osteosynthesis can result in sound healing of the lesion and of the fracture, with no recurrence, low complication rates, and good functional results. Of the eleven patients, seven patients were treated with a uniform approach consisting of biopsy (Stage I) and osteotomy with osteosynthesis (Stage II). Curettage of the lesion and bone grafting were not done in 4 patients of low malignant giant cell tumours. The average follow up was 129.20 months (range, 50-240 months). All of the fractures and osteotomy sites healed in an average of 16 weeks (range, 12-20 weeks) and 9.1 weeks (range, 8-10 weeks), respectively. All fibrous dysplasia lesions healed radiologically. Grade IV radiographic healing was seen in both patients with simple bone cysts after 35 and 92 months. Using the Musculoskeletal Tumor Society functional evaluation and Toronto Extremity Salvage Score, all the patients had good to excellent results. Complications such as infection, local recurrence, refracture, femoral neck deformity, osteonecrosis of the femoral head, and growth arrest of capital femoral physis were not seen. In addition to biomechanical advantages, the procedure seems to have had a biologic role in healing of the fracture and of the lesion by initiating osteogenesis to replace the defect with new bone.

Date: 2011-09-06
Session: Tumours - Reconstructions
Time: 13:30 - 15:00
Room: Club B

Abstract no.: 29148

CT-GUIDED PERCUTANEOUS REMOVAL OF OSTEIOD OSTEOMA

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The primary objective of the study was to evaluate the methods of CT-guided percutaneous removal of osteoid osteoma. We evaluated 56 patients treated with CT-guided percutaneous removal of osteoid osteoma at our hospital between 1992 and 2008. There were 46 male and 14 female patients with ages between 10 - 22 years old. The patients presented symptoms on average during 18 months before surgery and the femur was the most frequently affected site. CT scan confirmed the diagnosis in all cases with the characteristic image of the nidus. The whole nidus was removed by trephine passed through a guidewire which was inserted into nidus. The complete tumor resection was checked with post-procedure CT. 52 patients (92%) had excellent clinical results with no pain and complete functional recovery. 2 patients presented a mild postoperative hematoma that resolved without further procedures. 4 patients were reintervened due to local recurrence of pain with complete recovery and pain free status after the repeat procedure. No late complications were recorded. Histological analysis confirmed osteoid osteoma in 41 patients (72%) CT-guided percutaneous removal of osteoid osteoma is a valid technique providing excellent clinical results and a high percentage of diagnosis confirmation through the histological analysis.

Date: 2011-09-06
Session: Tumours - Reconstructions
Time: 13:30 - 15:00
Room: Club B

Abstract no.: 29142

98 BENIGN TUMORS OF THE PERIPHERAL NERVE

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The aim of this study is the benign tumors of the peripheral nerves; they represent 2-5% of soft tissue tumors; Knowledge of the different types of lesions is essential in order to avoid iatrogenic lesions. Material: Our retrospective cohort from 1979 to 2005 was comprised of 98 benign tumors (89 patients): Men 48, female 41, mean age 48,6 (18-80). The diagnosis is based on the clinical examination: pain (81%), palpable mass (62%), pain upon percussion of the mass (58,5%), sensory disturbance (29,2%), motor disturbance (14,6%). Location is very variable (upper member and plexus 44%). The MRI is actually the reference examination in the cases of a suspected nerve tumor. The biopsy of the nerve is not indispensable. The schwannoma (70), neurofibroma (14), lipofibroma (2), plexiform neurofibroma (3); several tumor in 7 cases. The delay of the surgical procedure is 19 months (1-180). A microsurgical dissection permits the liberation of the tumor fascicles; in our cohort, resection of the tumor required nerve repair in ten cases: Suture (4), autograft (6). Plexiform neurofibroma and lipofibromas are not resectable. RESULTS: The follow up is 96 months (5-306). Results are good in more than 91% of cases; the results are less good for the patients treated for a second time with 30% of intermediate or poor results. Conclusion: Only MRI allows the evaluation of this type of lesion. Excision using microsurgical techniques is associated with good results in the presence of schwannoma; poor initial treatment can result in iatrogenic lesions.

Date: 2011-09-06
Session: Tumours - Miscellaneous
Time: 16:00 - 17:30
Room: Club B

Abstract no.: 30571

PELVIC CHONDROSARCOMA: EXPERIENCE OF THE ISTITUTO RIZZOLI

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Objectives: Aim of this retrospective study was to review the long-term oncologic and functional outcome of surgical management in a large series of patients with pelvic chondrosarcoma (CS). Methods: We reviewed 235 patients treated from 1975 to 2008. There were 101 central CS, 83 peripheral CS, 33 dedifferentiated CS and other less frequent types. Tumor involved the iliac wings (57 cases), iliac wing and sacro-iliac joint (8), iliac wing and periacetabulum (34), anterior arch and periacetabulum (49), anterior arch only (22) and the entire hemipelvis (33). Forty-one patients had an external hemipelvectomy (17%) and 194 patients (83%) underwent a limb-salvage procedure. Margins were wide in 151 cases, wide but contaminated in 30 cases, marginal in 41 cases and intralesional in 13 cases. Results: Overall survival was 82% at 5 years and 73% at 10 years. At a mean of 9 years (2–32 years), 158 patients were continuously disease free, 13 were disease free after treatment of local recurrence, 49 patients died of disease, 12 patients died of other causes and 16 patients were alive with disease. Incidence of local recurrence was 29.8%, statistically higher in surgery involving periacetabular areas. In central and peripheral CS, high-grade tumors correlated with worse survival ($p=0.012$). Dedifferentiated CS had a statistically significant worst prognosis ($p<0.0001$) than other types. Conclusions: Surgery is the mainstay of treatment for pelvic CS. External hemipelvectomy is rarely indicated. Pelvic location offers challenging technical problems to reliable and lasting reconstruction. There is a significant correlation between tumor grading and survival.

Date: 2011-09-06

Session: Tumours - Miscellaneous

Time: 16:00 - 17:30

Room: Club B

Abstract no.: 28474

EN BLOC EXCISION AND AUTOGENOUS FIBULAR RECONSTRUCTION FOR AGGRESSIVE GIANT CELL TUMOR OF DISTAL RADIUS: A REPORT OF 12 CASES AND REVIEW OF LITERATURE

Vikas BACHHAL, Mandeep DHILLON, Kamal BALI
PGIMER, Chandigarh (INDIA)

Introduction: Giant cell tumor (GCT) of distal radius follows a comparatively aggressive behaviour. Wide excision is the management of choice, but this creates a defect at the distal end of radius. The preferred modalities for reconstruction of such a defect include vascularized/non-vascularized bone graft, osteoarticular allografts and custom-made prosthesis. We here present our experience with wide resection and non-vascularised autogenous fibula grafting for GCT of distal radius. Materials and methods: Twelve patients with a mean age of 34.7 years (21-43 years) with Campanacci Grade II/III GCT of distal radius were managed with wide excision of tumor and reconstruction with ipsilateral nonvascularised fibula, fixed with small fragment plate to the remnant of the radius. Primary autogenous iliac crest grafting was done at the fibuloradial junction in all the patients. Results: Mean follow up period was 5.8 years (8.2-3.7 years). Average time for union at fibuloradial junction was 27 weeks (14-57 weeks). Mean grip strength of involved side was 71% (32-87%). The average range of movements were 52° supination, 37° pronation, 42° flexion, 31° extension with combined movements of 162°. Overall revised musculoskeletal tumor society score averaged 91.5% (78-93%). There were no cases with graft related complications or deep infections, 3 cases with wrist subluxation, 2 cases with non union (which subsequently united with bone grafting) and 1 case of tumor recurrence. Conclusion: Although complication rate is high, autogenous non-vascularised fibular autograft reconstruction of distal radius can be considered as a reasonable option after en bloc excision of Grade II/III GCT.

Date: 2011-09-06
Session: Tumours - Miscellaneous
Time: 16:00 - 17:30
Room: Club B

Abstract no.: 30577

PROSTHETIC RECONSTRUCTION OF THE LOWER LIMB IN MUSCULOSKELETAL ONCOLOGY: THE EXPERIENCE OF THE ISTITUTO RIZZOLI

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Objective: to review the experience of the Rizzoli with megaprosthesis reconstruction of the extremities in musculoskeletal oncology. Material and methods: Between 1983 and 2010, 1175 modular uncemented megaprotheses of the lower limbs were implanted: 160 KMFTR, 653 HMRS prostheses, 68 HMRS Rotating Hinge and 294 GMRS. Sites: distal femur 754, proximal tibia 226, proximal femur 157, total femur 29, distal femur and proximal tibia 9. Most frequent histological diagnosis was osteosarcoma. Major prostheses-related complications were analysed and functional results evaluated according to the MSTs system. Statistical analysis was done with Kaplan-Meier actuarial curves. Results: Major complications causing implants failure were 102 infections (8.7%), 71 aseptic loosening (6.2%) and 31 breakages (2.6%). In lower limbs infection occurred in 18 KMFTR, 56 HMRS, 6 HMRS Rotating Hinge, 22 GMRS. Breakage of the prosthetic reconstruction occurred in 16 KMFTR, 14 HMRS, 1 HMRS Rotating Hinge. Aseptic loosening occurred in 15 KMFTR, 31 HMRS, 18 HMRS Rotating Hinge, 7 GMRS. Most patients showed satisfactory function according to the MSTs evaluation system. Implant survival to all major complications of lower limb megaprotheses evaluated with Kaplan-Meier curve was 80% and 60% at 10 and 20 years. Implant survival for the newer designs (GMRS) showed an implant survival to major complications at about 85% at 5 years. Conclusions: Megaprotheses are the most frequently used type of reconstruction after resection of the extremities, since they provide good function and a relatively low incidence of major complications. Function and implant survival improved in the last decades with the introduction of newer designs and materials.

Date: 2011-09-06

Session: Tumours - Miscellaneous

Time: 16:00 - 17:30

Room: Club B

Abstract no.: 29673

RHABDOMYOSARCOMA IN ADULTHOOD – A RETROSPECTIVE SINGLE-CENTRE ANALYSIS OF 29 CASES

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Rhabdomyosarcoma (RMS) is a rare soft tissue tumor mainly affecting children and adolescents. It only accounts for less than 2% of adult soft tissue sarcomas. Consequently, clinical experience with RMS in adulthood is limited. We retrospectively evaluated the outcome in 29 adult patients with a minimum age of 18 years (mean age, 52 years; range, 20-78 years) treated for RMS within the Vienna Bone and Soft Tissue Tumor Registry. With 24 males, there was a clear male preponderance. Main tumor sites were the lower extremity in 16 patients, the trunk in seven and the upper extremity in six. Twenty-two patients underwent wide tumor resection, two patients were initially amputated and one patient had a resection-replantation of the arm. The remaining four patients underwent conservative treatment only. All but three patients had adjuvant radiation and 21 patients underwent further chemotherapy, mainly consisting of the CWSS-protocol. The mean follow-up was 37 months (range, 1-161 months). Twenty-two patients died of their disease; the 5-year overall survival was 30.6%. The mean follow-up for surviving patients was 44 months (range, 4-93 months). Nine patients had metastatic disease upon first diagnosis, five patients developed metastases at a mean of 22 months post-operatively (range, 6-41 months). Four patients developed a local recurrence, requiring secondary amputation in three cases. Eight patients suffered from complications related to the surgical therapy. Adult RMS has a low overall survival, clearly advocating aggressive surgical and adjuvant treatment strategies to improve outcome and tumor control.

Date: 2011-09-06

Session: Tumours - Miscellaneous

Time: 16:00 - 17:30

Room: Club B

Abstract no.: 29217

FIBULA AS A BIOLOGICAL IMPLANT: OUR EXPERIENCE OF ITS DIFFERENT UTILITIES

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Introduction: Fibula is very good bone for different types of biological fixations like bridging defects after tumor resection, for fracture fixation in osteoporotic bones, for gap non-unions and filling the cavities after curettage as autologous strut graft. Methods: We have used this bone for bridging gaps after tumor resection in 54 patients, for treatment of gap non-union in 18 patients as tibialisation of fibula, as intra-medullary strut in osteoporotic bones for augmentation of internal fixation in 22, for fixation of femoral neck fractures in 30 patients and for strut grafting after curettage in benign bone tumors and tumor-like lesions in 26. We have thus the experience of 150 patients for its use. Results: For the gap non-union particularly in tibia it has been used as Huntington's procedure and we achieved very good results in more than 90% of the cases. In femoral neck fractures it has been used for the delayed and non-unions and achieved good results in more than 92% cases. And for the tumor resection it has served as good strut graft and good results in more than 80% of our cases of arthrodesis and the strut grafting after curettage. Discussion: Fibula is a very good biological graft for its multiple utilities including large defects. The procedure is cost effective and no chances of disease transmission; it being an autologous graft. We achieved very good results in suitable indications and found that fibula is a bone of great utility to an orthopedic surgeon.

Date: 2011-09-06

Session: Tumours - Miscellaneous

Time: 16:00 - 17:30

Room: Club B

Abstract no.: 30171

USE OF FIBULAR GRAFTS IN DIFFERENT ANATOMIC LOCATIONS AFTER TUMOUR RESECTIONS

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The authors present their experiences with the use of normal as well as vascular fibular grafts in different anatomical locations used for reconstruction after tumour resection. Close to 100 fibulas were used in different age groups and different locations. In the proximal humerus all fibulas show resorption within time. It is a question if this problem can be solved using vascularised fibulas. All intercalary fibular grafts on the upper extremity work well as well as wrist arthrodeses. Fibula grafts for tibia give excellent results and show hypertrophy independently if used as vascular or non vascular grafts. We demonstrate regeneration of the whole fibula taken subperiosteally with full remodeling on the recipient site. In young children a vascularized fibula will remodel even into a metaphysis when used as for knee arthrodesis. The femur is the most complicated bone. Short diaphyseal grafts up to 10-12 cm work well even in adults. Proximal mtadiaphyseal grafts when situated medially (opposite from the plate) show in children complete remodeling. Distal femoral grafts show remodeling only very slowly and combined structural allografts with vascularized fibular grafts are probably the best solution for this location.

Date: 2011-09-06
Session: Tumours - Miscellaneous
Time: 16:00 - 17:30
Room: Club B

Abstract no.: 29818

MORPHOLOGICAL DIAGNOSTICS OF LOW GRADE CHONDRO-SARCOMA

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It is analysed the biopsy and surgical material of patients who has been operated in clinic CITO as well as consulting cases with the diagnosis low-grade chondrosarcoma (chondrosarcoma-I) for the last 25 years. The analysis of the data has shown that for the investigated period of time chondrosarcoma had been diagnosed for 458 patients, among them chondrosarcoma-I revealed in 228 (49,78 %) cases. Most often chondrosarcoma-I was localized in a femur - 70 (30,7 %), ilium – 41 (17,98 %), humerus – 27 (11,84 %), spine – 16 (7,01 %), tibia and fibula – 18 (7,89 %) cases, respectively. In the remaining 56 (24,58 %) cases this chondrosarcoma-I had been diagnosed in bones of a forearm, small bones of hands and feet, scapula, sternum. At the histologic research, chondrosarcoma-I is almost cytologically identical of enhondrome and microscopic differences are minimal and there are substantially subjective. Chondrocytes with small dense sometimes increased nuclei. Relatively rarely multinuclear and binucleate cells detected. Stroma is usually hondroid type with rare myxoid fields. Hallmarks of chondrosarcoma-I are merging knots or weights of the cartilage divided by bands of fibrous tissue; malignant cartilage is permeating marrow spaces and it is surrounding and destruction of preexisting of bone trabeculae. Differential diagnosis in the analyzed of biopsy material, frozen sections of urgent histological research, or surgical material obtained after curettage, as a result of fragmentation and disturbance of the architectonics of tissue, is very difficult.

Date: 2011-09-06
Session: Tumours - Miscellaneous
Time: 16:00 - 17:30
Room: Club B

Abstract no.: 27454

REHABILITATION OF PATIENTS WITH PRIMARY TUMORS AND TUMOR-LIKE LESION OF THE TIBIA USING TRANSOSSEOUS OSTEOSYNTHESIS

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Management of primary tumors and tumor-like bone lesions is a challenging part of clinical oncology and restorative orthopaedics. Wide application of joint replacement and various types of bone grafting do not solve this problem. Aim of the study is to evaluate efficacy of Ilizarov transosseous osteosynthesis for management of primary tibia and fibula tumors. The work is based on treatment results of 71 patients with morphologically verified diagnosis. 20 patients had malignant tumors (osteogenic sarcoma – 13, juxtacortical osteosarcoma – 1, malignant fibrous histiocytoma – 5, long bone “adamantinoma” – 1). 9 patients had tumor-like tibial lesions. Osteoclastoma caused tibial destruction in most of the patients. The tibia was preserved in all patients. The tumor was removed and the defect was managed by one-, two- or three level bone transport. Autografts and compression osteosynthesis were applied in 8 patients. Intramedullary wires with osteo-induction coating in combination with transosseous osteosynthesis were applied in 3 patients. Upon indications 18 patients with malignant tumors (osteogenic sarcoma – 13, malignant fibrous histiocytoma – 5) received neoadjuvant poly-chemotherapy in pre- and post-operative period. Results: Patients with benign tumors didn't have recurrences, bone tissue defects were completely filled in with the newly formed bone tissue. Overall 3-year survival of malignant tumor patients was 73.6%, overall 5-year survival – 52.6%. Within a year after discharge from a hospital 97.5% patients had full function of the involved limb. Conclusion: Ilizarov compression-distraction osteosynthesis is effective for management of primary tibial tumors, allows filling in surgical bone defects and optimal limb reconstruction.

Date: 2011-09-06

Session: Tumours - Miscellaneous

Time: 16:00 - 17:30

Room: Club B

Abstract no.: 28743

SSXS REGULATE SARCOMA INVASION VIA RAC1-MYOSIN PATHWAY AND MMP-1

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SSX genes were initially identified as fusion partners of SS18 gene in human synovial sarcomas carrying a recurrent t (X; 18)(p11.2; q11.2) chromosomal translocation. Besides adult human testis, SSX genes were expressed at varying frequencies in a number of malignancies thereby categorized as cancer/testis antigens. We previously reported that SSXs were overexpressed in human soft tissue tumors, and positively correlated with clinical stage. In order to examine the biological function of SSX, we made stable transfectants with wild type SSX using human fibrosarcoma cell line, HT1080, which endogenously expressed SSX1 in high level. The transfectants increased motility and invasiveness using Boyden chamber assay, promoted colony formation in soft agar and lung metastasis in nude mice. By contrast, the lowering of the endogenous expression of SSX1 in HT1080 cells with specific siRNA markedly decreased membrane ruffling, chemotaxis, invasiveness and 3D growth in collagen gel but did not affect cell proliferation in the 2D culture. Moreover, SSX1 deficient HT1080 cells showed decreased Rac1 activity and myosin light chain phosphorylation. Overexpression of SSX increased the expression level and activity of MMP-1, and knockdown of SSX decreased MMP-1 expression. We identified several binding proteins of SSX, including Histone H1 and PARP-1 using immunoprecipitation and LC/MS/MS. We further confirmed that SSX could bind the promoter region of MMP-1 using CHIP assay. Wrapped liposome containing SSX siRNA effectively inhibited both primary tumor growth and lung metastasis in xenograft model. Collectively, these data suggested that SSXs would be novel proteins regulating sarcoma invasion via Rac1-myosin pathway and MMP-1, and potential molecular target(s) under clinical setting.

Date: 2011-09-06

Session: Research - Animal & In Vitro

Time: 13:30 - 15:00

Room: Club C

Abstract no.: 29126

RECONSTRUCTION OF A CRITICAL SIZED BONE DEFECT IN THE OVINE TIBIA BY SCAFFOLD-BASED BONE ENGINEERING

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Well-established therapies for bone defects are restricted to bone grafts. These face disadvantages (limited availability, donor site morbidity, insufficient integration). Therefore, we aimed to develop an alternative approach investigating the regenerative potential of mPCL-TCP scaffolds +/- rhBMP-7. Ovine tibial critically-sized defects were left untreated, reconstructed with autologous bone graft or mPCL-TCP scaffolds +/- rhBMP-7. Animals were held for 12 and 48 weeks. X-ray analysis and torsional testing was performed. Qualitative CT, μ CT analysis and histology (PMMA, Safranin-O/v.Kossa) was carried out to assess mineralization and callus architecture/composition. Radiologic analysis confirmed the critical defect nature. Only minor bone formation was observed in the scaffold group after 12 and 48 weeks resulting in poor mechanical outcomes. No inflammatory reaction to the scaffolds was observed. Full defect bridging occurred in the autograft and mPCL-TCP+rhBMP-7 groups after 12 weeks with bone formation further increasing towards week 48. Biomechanical testing at 12 weeks revealed a higher torsional moment/stiffness ($p < 0.05$), CT and μ CT analysis a significantly higher amount of bone formation for the rhBMP-7 group when compared to the mPCL-TCP group. At 48 weeks the rhBMP-7 group revealed significantly higher mechanical strength when compared to autografts. After 48 weeks clear signs of bone remodelling were evident restoring the characteristic, diaphyseal, long-bone morphology consisting of cortex and marrow cavity. This study suggests that mPCL-TCP scaffolds combined with rhBMP-7 can serve as an equivalent alternative to autologous bone grafting in long bone defect regeneration.

Date: 2011-09-06

Session: Research - Animal & In Vitro

Time: 13:30 - 15:00

Room: Club C

Abstract no.: 27803

NEW BIODEGRADABLE NERVE CONDUIT, CROSSLINKED URETHANE-DOPED POLYESTER ELASTOMERS (CUPES), IN RATS

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Introduction: Bridging the nerve gap with autologous nerve grafting caused donor site morbidity. With the advances of bioengineering and material science, biodegradable nerve conduits are emerging. CUPES is a new synthetic biodegradable polymer which is soft, strong and elastic. This study aims at determining the efficacy of CUPES as nerve conduit on the neural regeneration over a nerve defect in rats. Methods: Sixteen adult Sprague-Dawley rats were divided into the investigational group and the control group, each containing 8 rats. A 10 mm nerve defect was produced over the right sciatic nerve. In the investigational group, the nerve gap was reconstructed with CUPES nerve conduit. A reversed autologous nerve graft served as control. By 8 weeks, the reconstructed nerves were harvested for histomorphometric analysis, including nerve fiber density and axonal diameter. The non-inferiority margin for the difference between the decreases in fiber density of the distal nerve among 2 groups was calculated. Results: The center of all seven conduits contained regenerating nerve tissues across the distal anastomosis, except one conduit dislodged over the distal end. Histomorphometric analysis demonstrated that the percentage decrease of fiber density in the post-graft nerve segment over pre-graft was -26.5% (95% CI -38.9% to -14.0%) in autograft group, versus -39.2% (-44.7% to -33.7%) in the conduit group. In testing non-inferiority, the difference between the 2 groups was less than 20%. Conclusion: CUPES nerve conduit was effective in promoting neural regeneration across 10 mm nerve gap in comparison with nerve grafts.

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Session: Research - Animal & In Vitro

Time: 13:30 - 15:00

Room: Club C

Abstract no.: 28421

EFFECTS OF CONTINUOUS AND PULSATILE PARATHYROID HORMONE (PTH) TREATMENTS ON OSTEOGENIC DIFFERENTIATION OF HUMAN FRACTURE HEMATOMA-DERIVED CELLS IN VITRO

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Introduction: Parathyroid hormone 1-34 (PTH) has been reported to accelerate fracture healing in vivo. Previously, we demonstrated human fracture hematoma-derived cells (HCs) contained osteoprogenitor cells. We here investigated the effect of PTH on osteogenic differentiation of human fracture HCs by intermittent or continuous PTH treatments in vitro. Methods: HCs were isolated from 9 patients and cultured. HCs were divided into four groups: control, PTH (-) (osteogenic medium (OM) without PTH), PTH-C (OM with continuous PTH), and PTH-P (OM with pulsatile PTH). For PTH-P group, cells were exposed to PTH for the first 6 hour of each 48 hour cycle. In PTH-C group, cells were continuously exposed to PTH. Cell proliferation was assessed using MTS assay. Osteogenic differentiation was assessed using alkaline phosphatase (ALP) activity, real-time PCR analysis, and alizarin red S staining. Results: There was no significant difference in the proliferation kinetics of HCs among four groups at day 2, 4 and 8. At day 14, ALP activity in PTH-C group was higher than in control group and PTH-P group. The gene expression of Runx2, ALP, and osteopontin in PTH-C group was higher than in other groups at day 14. HCs in PTH (-) and PTH-C was strongly stained with Alizarin red S staining at day 20. Summary: This is the first study demonstrating the effects of continuous and pulsatile PTH treatments on in vitro proliferation and osteogenic differentiation of human fracture HCs. PTH treatment did not affect cell proliferation. Osteogenic differentiation was found to increase with continuous PTH treatment.

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Time: 13:30 - 15:00

Room: Club C

Abstract no.: 28264

THE BIOCHEMICAL EFFECTS OF TOBACCO SMOKE ON FRACTURE HEALING: AN IN VITRO MODEL

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Introduction: Clinical and demographic studies have shown that tobacco smoking is a major contributor to non- and delayed-union in fracture healing. The cellular and molecular basis for this are poorly documented, and few studies have been conducted using human fracture tissue. The aims of this study were to evaluate some of the in vitro effects of tobacco smoke at the cellular and molecular level within the fracture microenvironment. Methods: Tibial fracture haematomas were collected from non-smoking, anaesthetised patients (n=10) during surgical fixation. The semi-solid material was explanted into tissue culture flasks. Cell populations were incubated in complete culture media at 37°C in a humidified 5% CO₂ environment. Harvested cells were characterised by immunofluorescence and flow cytometric immunophenotyping using specific MSC antibody markers for CD29, CD44, CD73, CD105 and CD166. Cigarette smoke extract (CSE) was manufactured using the methods by Bernhard (2004) and subjected to the cultures (CSE treated vs. untreated). MSC proliferation rates, and amounts of cytoplasmic VEGF-A and IL-6 were compared between CSE-treated and untreated cells. Nitric oxide (NO) levels were also quantified and compared. Results: There was a reduction in the rate of proliferation of MSCs in CSE-treated cells over 3 passages (-200%). Amounts of VEGF-A, IL-6 and NO were reduced in CSE-treated cells (VEGF-A -10%; IL-6 -15%; NO 12%; P<0.05, Student's T test). Summary: The effect of smoking on fracture healing appears to contribute to the inhibition of MSC proliferation, angiogenesis and the acute-phase response. The deficiency of NO may explain a reduced vasodilatation in fracture repair.

Date: 2011-09-06

Session: Research - Animal & In Vitro

Time: 13:30 - 15:00

Room: Club C

Abstract no.: 29433

MEROPENEM LOADED ACRYLIC BONE CEMENT – AN IN-VITRO STUDY

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The use of antibiotic loaded acrylic bone cement (ABC) to treat infections remains popular but resistance to routinely used antibiotics has led to the search for more effective alternatives. We studied in-vitro the elution kinetics and bio-activity of four different concentrations of meropenem loaded ABC. Elution kinetics was studied by measuring the drug concentrations from meropenem loaded ABC cylinders serially immersed in 30 ml of normal saline. Samples of saline were collected at pre-determined intervals and analysed by High Performance Liquid Chromatography. Bio-activity of the eluate of two different antibiotic concentrations was tested for a period of three weeks against each of the following organisms: Staphylococcus aureus ATCC 2593 (MSSA), Enterococcus faecalis ATCC 29212, Pseudomonas aeruginosa ATCC 27853, Escherichia coli ATCC 25922, Staphylococcus aureus ATCC 43300 (MRSA), Klebsiella pneumoniae ATCC 700603 (ESBL). All samples showed high early release rates followed by rapid decay. Higher doses of antibiotic concentration resulted in greater elution of the antibiotic incorporated. The eluate was found to be biologically active against Staphylococcus aureus ATCC 2593 (MSSA), Pseudomonas aeruginosa ATCC 27853, Escherichia coli ATCC 25922 and Klebsiella pneumoniae ATCC 700603 (ESBL) for a period of three weeks. Meropenem elutes from ABC for a period of 3 to 27 days depending on the concentration of antibiotic. The elution of meropenem is in keeping with typical antibiotic loaded ABC elution characteristics. The use of high dose meropenem loaded ABC seems to be an attractive option for the treatment of resistant Gram-negative orthopaedic infections but needs to be tested in-vivo.

Date: 2011-09-06

Session: Research - Animal & In Vitro

Time: 13:30 - 15:00

Room: Club C

Abstract no.: 27588

FUNCTIONAL ANALYSIS OF LINEAR UBIQUITIN CHAIN-ASSEMBLY COMPLEX (LUBAC) IN LM8 MURINE OSTEOSARCOMA LUNG METASTASIS MODEL

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Lung metastasis in osteosarcoma (OS) patients is still critical and challenging. To overcome this difficulty, we first established a LM8 murine OS cell line (RIKEN Cell Bank, Japan) by in vivo selection of parental Dunn OS lung metastasis. LM8 cells form multiple lung metastases 4 weeks after subcutaneous inoculation in the back. In the following subtraction analysis of LM8 and Dunn, we found that NF- κ B plays a key role in LM8 lung metastasis. In the present study, we next investigated the role of a new ubiquitin ligase LUBAC composed of HOIP and HOIL-1L in LM8 lung metastasis model. Since both HOIP and HOIL-1L are overexpressed in LM8 compared with parental cells, we first knock-down HOIL-1L by RNAi. The loss of LUBAC function resulted in reduced NF- κ B activity, anchorage independent growth, MMP2 production, invasiveness as well as lung metastasis in vivo. To further investigate the mechanism, we tracked LM8 cells injected from the tail vein by in vivo imaging using luciferase chemiluminescence. Consequently, HOIL-1L knock-down cells accumulated in lung were rapidly washed out by 24 hours, suggesting the impairment of extravasation and/or colonization in lung tissue. This phenomenon was also observed in ICAM-1 knock-out cells, which is a major downstream gene of NF- κ B. We revealed the precise molecular mechanism of LM8 lung metastasis. In addition, this study provided the first clinical observation showing that an ubiquitin ligase plays a role in signal transduction other than classical protein degradation.

Date: 2011-09-06

Session: Research - Animal & In Vitro

Time: 13:30 - 15:00

Room: Club C

Abstract no.: 30139

**HAMSTRING HARVESTING: PREDICTION OF PREMATURE CUT ON A
CADAVER STUDY**

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Hamstring tendons harvesting is a technique considered not very invasive and simple. Premature cut of the transplant due to vincula is a known risk. M&M: Dissection of 30 cadaveric knees studied topography of hamstring based on anatomic references, and anatomy of Gracilis, Semitendinosus and merged tendon. Bridles have been quantified, measured (distance, width). We carried out histologic analysis of samples. Results: Topography of hamstring tendons is comparable between both sides of a subject. Tibial tubercle is a bad landmark due to variations when lateral plateau edge 42mm (+/-7) is very stable. Gracilis showed 1[0-3] bridle, first at 69mm[30-140] from distal hamstring bound, second at 76mm[59-93]. Semitendinosus described 1,3 bridles[1-2] at 48mm[0-126] of the tibia. Three bridles were found beyond 100mm to 140mm. Significant link between first bridle insertion and existence of a second one ($p=0,03$) only for Gracilis. Vinculae reached generally Gastrocnemius aponeurosis but also pretibial periosteum or other tendons. Histological study showed two types with tendon organization or aponeurosis structure. Discussion: Gracilis receives a bridle in most cases, what is less known that Semitendinosus fascial band. These expansions have an important inter and intra-individual variability but can be pointed out beyond 100mm. We defined two histological types. Our simple classification according to macroscopic aspect, orientation reflects properties of resistance and increasing risk of premature cut. Conclusion: Even procedures known as risk free can lead to a greater morbidity for patients. Release of the hamstring bridles of aponeurosis or tendon texture remains a crucial step in hamstring tendons harvesting.

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Session: Research - Animal & In Vitro

Time: 13:30 - 15:00

Room: Club C

Abstract no.: 28717

CRYOIMMUNOLOGICAL ANTI-TUMOUR EFFECTS ARE ENHANCED BY DENDRITIC CELLS PULSED WITH A TUMOUR LYSATE IN MURINE OSTEOSARCOMA

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The standard treatment of osteosarcoma consists of preoperative chemotherapy, surgical tumor excision, and postoperative chemotherapy. We developed a limb salvage technique by treating tumor-bearing bone with liquid nitrogen. We also reported systemic antitumor immunity was enhanced by cryotreatment in a murine osteosarcoma (LM8) model. We therefore combined the cryotreatment of tumor with dendritic cells to promote tumor-specific immune responses. We determined whether our technique could enhance systemic immune response and inhibit metastatic tumor growth in a murine osteosarcoma model. To evaluate activation of the immune response, we prepared six groups of C3H mice (80 mice total): (1) excision only, (2) reimplantation of the cryotreated primary tumor alone, (3) dendritic cells combined with reimplantation of the cryotreated primary tumor, and (4) dendritic cells exposed to cryotreated tumor lysates with reimplantation of the cryotreated primary tumor. We then compared and verified the activation state of each group's antitumor immunity. Mice that received dendritic cells exposed to cryotreated tumor lysates with reimplantation of the cryotreated primary tumor group had high serum interferon γ , reduced pulmonary metastases, and increased numbers of CD8(+) T lymphocytes in the metastatic areas. Combining tumor cryotreatment with dendritic cells enhanced systemic immune responses and inhibited metastatic tumor growth. We believe the approach may be a useful alternative for patients with osteosarcoma when other treatment options including chemotherapy, radiotherapy, and surgical treatment have been ineffective.

Date: 2011-09-06

Session: Research - Animal & In Vitro

Time: 13:30 - 15:00

Room: Club C

Abstract no.: 30230

ANALYSIS OF CORTICALIZATION USING PIXEL VALUE RATIO (PVR) AND CALLUS PATHWAY – A GUIDE TO FIXATOR REMOVAL IN TIBIA LENGTHENING USING ILIZAROV RING FIXATOR USING A NOVEL SCORING SYSTEM

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Background: It is important to define callus maturation and corticalization during distraction osteogenesis. We hypothesize that a simple score combining radiomorphology (callus pattern) and Pixel Value Ratio (PVR), both of which can be assessed from the same digital radiographs, would be good method to judge the optimal timing of fixator removal. Methods: Prospective analysis of 30 tibial segments in 18 patients (6 males, 12 females, mean age 18 years) was performed. For Ru Li pathways we gave score of 1, 0 and -1 to homogeneous, heterogeneous and lucent pathway respectively. A score of 1 was given to a cortex at PVR=1 and PVR<1 was 0 score. Full weight bearing and fixator removal was done when combined score reached 3. Complications like angular deviation; callus subsidence and callus fracture were assessed 2 monthly. Results: Mean lengthening was 139.56±20.3mm (range,75-171mm). Mean inter-observer correlation for pixel values was significant for proximal segment (0.91), distal segment (0.87) and for the regenerate (0.92), lateral cortex (0.90) and medial cortex (0.70). The PVR=1 at the regenerate was achieved sequentially at lateral, posterior, medial and anterior cortex. There was no regenerate fracture, increased angular deformity or wire breakage with fixator removal at score of 3. Callus subsidence calculated at one year post fixator removal was 3.5±3.17mm (range 1.1- 0) with only 3/36 (8%) tibial segments with subsidence > 10mm. Conclusions: This scoring system can be utilized for objective assessment of timing of fixator removal, however large sample studies are further needed.

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Time: 13:30 - 15:00

Room: Club C

Abstract no.: 28444

GENE EXPRESSION OF RAD (RAS ASSOCIATED WITH DIABETES) IS UPREGULATED IN EXPERIMENTAL NONUNIONS COMPARED TO STANDARD HEALING FRACTURES

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Introduction: Rad and Rem are the prototypic members of a subfamily of Ras-related small G proteins. Our previous study using microarray analysis showed that Rad is highly expressed in nonunion fracture. The purpose was to investigate the immunolocalization and gene expression of Rad and Rem. Methods: Three-month-old S-D rats were used. For standard healing models, K-wire was inserted retrograde into the femoral intramedullary canal and a transverse fracture was created. Nonunion models were produced by periosteal cauterization at the fracture site. At post-fracture day 14, specimens were harvested for immunohistochemistry. For real-time PCR, RNA was extracted from callus or fibrous tissue at post-fracture day 3, 7, 10, 14, 21, and 28. Results: In standard healing models, Rad staining was detected in fibroblast-like spindle cells, proliferating chondrocytes and early hypertrophic chondrocytes as well as in osteoblasts and osteocytes at the ossification front, but barely in hypertrophic chondrocytes. Nonunion models showed that the interfragmentary gaps were filled with fibrous tissue. The fibrous tissue was stained positively for Rad. No significant difference of Rad gene expression was observed between standard healing and nonunion at the earlier time points (Day3, 7, and 10). In contrast, significant higher gene expression of Rad in nonunion models was observed at the later time points (Day14, 21, and 28). While, there were no significant differences of Rem gene expression at all time points. Summary: The gene expression pattern of Rad was different between nonunions and standard healing fractures. Rad may have a role in nonunion development.

Date: 2011-09-06
Session: Research - Clinical I
Time: 16:00 - 17:30
Room: Club C

Abstract no.: 29806

CLINICAL FEATURES OF ARTICULAR EBURNATION OF THE KNEE IN OSTEOARTHRITIS PATIENTS

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[Background] Many approaches to reveal the knee kinematics had been challenged, however it is still unclear. Articular eburnations of the knee are sometimes seen at knee surgeries. We speculate that these findings may contribute to understand how to bend the knee. [Methods] Ten, consecutive patients who underwent total knee arthroplasty were evaluated. Radiographs, CT, and macroscopic photograph of operative findings were obtained. Relationship between anatomic landmarks (such as surgical epicondylar axis for the femur, Akagi line for the tibia, etc.) and characteristics of the articular eburnation were analyzed. [Results] All cases were varus, the mean of femur-tibia angle at standing radiograph was 189 degrees. The femoral eburnations were mostly observed in medial condyles of the posterior portion. The directions of the eburnations were almost the same axes of the medial condyles. The tibial eburnations were also observed in medial condyles, six cases were occurred in the anterior portion, two were in the center and two were in the posterior. The directions of the eburnations were varied individually; whereas six axes of the eburnations were almost the same axes of the Akagi's line, four cases were internally rotated. [Discussion] It is obvious that these eburnations were results of cyclic knee motion under weight bearing. It is considered that knee bends with medial pivot in normal knee, however, our results suggested that the flexion-extension axes of the knee with varus deformity were varied individually and were different from normal ones. Further research, especially, about valgus knee deformity should be conducted.

Date: 2011-09-06
Session: Research - Clinical I
Time: 16:00 - 17:30
Room: Club C

Abstract no.: 29890

TREATMENT OF LATERAL EPICONDYLITIS – COMPARATIVE STUDY BETWEEN AUTOLOGOUS BLOOD INJECTION AND LOCAL CORTICOSTEROID INJECTION

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Lateral epicondylitis or tennis elbow is a common injury, which affects not only people who play tennis but occurs with many different activities. It reflects overuse of the extensor muscles of the forearm. There are some other pathologies which have to be separated from epicondylitis. The choice of different treatments is hard to overlook and there are only a few good clinical trials which support one treatment option by means of evidence based medicine. During the acute phase topical NSAIDS, steroid injections, ultrasound and acupuncture are helpful. There is no consensus about the effectiveness of physiotherapy, orthoses, laser, electrotherapy or botulinumtoxininjections. During the chronic phase none of the different treatment modalities is effective according to criterias of evidence based medicine. This is a prospective randomized comparative study which included 40 patients of lateral epicondylitis not responding to usual conservative measures for a period of 6 weeks. Age group was 18 – 54 years the patients were allocated one of the two treatment groups by sealed envelope method. Group I was treated by local injection of 2 ml autologous blood mixed with 1 ml 2% xylocain, Group II was treated by local injection of 2 ml Depomedrol mixed with 1 ml 2% xylocain. Visual analog scale and Nirschl staging at defined intervals recorded and results were analysed. Local autologous blood injection is a safe method and offers better long term results as compared to local corticosteroid injection.

Date: 2011-09-06
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Time: 16:00 - 17:30
Room: Club C

Abstract no.: 29972

EVALUATING A NEW FINGER JOINT IMPLANT USING A NOVEL FINGER JOINT MOTION SIMULATOR

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A finger joint motion simulator has been developed for assessing wear and fatigue characteristics of new proximal interphalangeal (PIP) finger joint implants. The simulator consists of three testing stations to generate repeated flexion-extension cycles between 0° and 110° of joint motion. In addition, a dual-motion pattern was programmed on each testing stations to simulate rapid free movements of finger joint at flexion-extension cycle following a series of heavy joint load at relatively slow motion. This simulator creates a normal joint load between 10N to 15N for rapid free movements at 3Hz and then generates a heavy pinching action of joint load about 120N at 1 Hz joint motion. The first motion pattern was repeated for 500 cycles while the second motion pattern was applied for 10 cycles. Such a dual-motion pattern was repeated up to a total of 5 million cycles to all of the testing samples. After every half million cycle, the testing samples were unloaded from the simulator to measure their wear characteristics. Test results showed that the total loss of material thickness on the articulating surfaces of the proximal and distal components after a 5 million motion cycles were 142.37µm and 209.95µm respectively. In terms of volumetric wear loss and induced wear particle sizes, the results indicated that the wear performance of the new finger joint implants is comparable with the published wear study results of artificial hip joints.

Date: 2011-09-06

Session: Research - Clinical I

Time: 16:00 - 17:30

Room: Club C

Abstract no.: 30111

HOW IMPORTANT IS MORPHOMETRIC ANALYSIS OF SACRAL HIATUS IN CAUDAL BLOCK?

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Caudal approach to epidural space produces reliable and effective block of sacral nerves. It is necessary to have a detailed knowledge of sacral hiatus for successful caudal epidural block. Aim was to perform the detailed morphometric analysis of sacral hiatus. 140 adult dry human sacral bones were examined for morphologic measurements using vernier caliper. Sacral hiatus was categorized on the basis of shape. Most commonly encountered shape was inverted U (40.71%). Its apex and base were most commonly observed against 4th and 5th sacral vertebrae respectively. Various defects in dorsal wall of sacral canal were recorded. Length and Anteroposterior depth at the apex of hiatus ranged from 4.20-39.40mm and 1.80-10.60mm respectively. Mean intercornual distance at base was 12.40 ± 2.59 mm. The triangle formed by right and left posterior superior iliac spines and apex of sacral hiatus was found equilateral in 45% cases only. Sacral cornua were marked by their bilateral presence in 55.0 % and were impalpable in 20.71% cases. Minimum distance between S2 and apex was 7.10mm. Thus the needle should not be pushed beyond 7mm into sacral canal so as to avoid dural puncture. In 9.29% cases depth of hiatus was less than 3 mm, one of the causes for failure of needle insertion. Single bony landmarks may not help in locating sacral hiatus because of anatomic variations. Surrounding bony irregularities, different shapes of hiatus and defects in dorsal wall of sacral canal should be taken into consideration before undertaking caudal epidural block so as to avoid its failure.

Date: 2011-09-06
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Time: 16:00 - 17:30
Room: Club C

Abstract no.: 29762

THE NORMAL PROXIMAL ULNAR ANATOMY INFLUENCES ELBOW RANGE OF MOTION

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Purpose: The proximal ulna dorsal angulation (PUDA) is an anatomical characteristic of the ulna, present in 96% of the population. This angulation results in a dorsal bow of the ulna. The purpose of this study was to quantify the impact of having a PUDA on the range of motion of the elbow. **Method:** Lateral radiographs were taken of each elbow at 90° of flexion, maximal flexion and at maximal extension in neutral forearm rotation of healthy adults. PUDA, maximal extension and maximal flexion were measured on the radiographs. The influence of the PUDA on range of motion was evaluated with a Pearson Correlation. Two study groups were created: PUDA 5° or less and PUDA greater than 5°. **Results:** The population was composed of 31 females and 20 males, with an average age of 32 years old (± 9). The mean maximal flexion was of $150^{\circ} \pm 5^{\circ}$ and the mean maximal extension was of $12^{\circ} \pm 7^{\circ}$. The average PUDA was $5.2^{\circ} \pm$ SD 2.8. Elbows with a higher PUDA have significantly less extension ($r=0.33$, $p=0.001$). The group of elbows with a PUDA of 5° or less had significantly greater extension (10° vs 14° , $p=0.015$) than elbows with a PUDA greater than 5°. **Conclusion:** The magnitude of the PUDA influences maximal elbow extension and then ROM. Knowledge of the proximal ulnar dorsal angulation may be important when clinically assessing elbow range of motion pre or post-surgery.

Date: 2011-09-06
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Time: 16:00 - 17:30
Room: Club C

Abstract no.: 29289

EFFECT OF KNEE FLEXION CONTRACTURE ON SAGITTAL SPINAL ALIGNMENT AND SPINAL RANGE OF MOTION

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Background: Only a few papers demonstrating relationships between knee joints and spinal alignment in a population-based study have been published. The purpose of this study was to elucidate the effect of knee flexion contracture on sagittal spinal alignment and spinal range of motion. Materials and methods: Medical check-ups were conducted for residents of a mountain village in Japan. Subjects included 107 males and 157 females (528 knees) with a mean age of 71.1 years (range, 60-87). A questionnaire dealing with any current symptoms involving the knees was carried out, and physical examinations dealing with the range of motion (ROM) of knee were conducted . A SpinalMouse® was used to measure sagittal spinal alignment:Thoracic kyphosis(TK), Lumber lordosis(LL), Sacral inclination(SI) ,Trunk inclination(Inc) ,and ROM. The subjects were divided into a group with knee flexion contracture (FC group) and a group without knee flexion contracture (non-FC group) in order to conduct a comparative study of both groups. Results: Knee pains were present in 47.1% of the FC group, and 36.1% of the non-FC group. With regard to static spinal alignment, LL and SI decreased significantly in the FC group ($p<0.05$). With regard to spinal ROM, it indicated a significant decrease in spinal ROM in the FC group ($p<0.05$). Conclusion: Results suggested that an involvement of spinal ROM decreases may lead to decreases in lumber lordosis and sacral inclination during knee flexion contractures. The current study may explain the development of knee-spine syndrome.

Date: 2011-09-06

Session: Research - Clinical I

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Room: Club C

Abstract no.: 29646

**ROLE OF MESH IN ORTHOPAEDIC ONCOLOGICAL RECONSTRUCTION:
A CLINICAL STUDY**

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Introduction: Resection of a malignant bone tumour along with the soft tissue cuff results in large fascial layer defects, loss of attachment sites for muscles and tendons and instability of joints. Materials and method: The histopathological diagnoses included osteosarcoma (23 patients), GCT (26 patients), Ewing's sarcoma (6 patients), chondrosarcoma (4 patients), malignant fibrous histiocytoma (MFH, 2 patients), and synovial sarcoma (1 patient). Mesh was used for containment of morcellised allograft in patients with intercalary reconstruction or arthrodesis, for bridging of soft tissue defects and reattachment of muscles, tendons and ligaments following reconstruction with extracorporeally irradiated osteoarticular tumour segment or endoprosthesis, for closure of the cortical window following curettage and bone grafting of GCT, and for reconstruction of musculofascial defects following hip disarticulation or resection of pelvic wall tumours. Results: Closure of the soft tissue defect along with primary skin closure was achieved in all cases. The stability of joints in periarticular resections and endoprostheses was found to be satisfactory after healing. Seven patients developed wound discharge post-operatively which subsided with antibiotics. No other complications attributable to mesh insertion were seen. Conclusion: Polyglactin 910 or polypropylene mesh is a useful adjunct to the reconstruction methods following resection of bone tumours with minimal added morbidity. There can be numerous instances in which the mesh can be found useful in tumour reconstruction.

Date: 2011-09-06
Session: Research - Clinical I
Time: 16:00 - 17:30
Room: Club C

Abstract no.: 30010

A NOVEL ULTRASOUND SYSTEM FOR AUTOMATED 3D SURFACE ANALYSIS OF LONG BONES

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An ultrasound-based scanner prototype is described. The following features have been taken into account: contact-less and x-ray free examinations, improved 3D reconstruction accuracy, its reliability, advanced visualisation. Evaluation and validation studies on long bones were carried out: validation of the scanner, by a relative comparison of a 3D modelling accuracy with other common modeling techniques, using a sawbone; evaluation of the accuracy of 3D reconstructions on animal's limbs, investigation of visual fracture detection in 3D models. Bone surface reconstruction is performed using B-Mode (5-8MHz) ultrasound. The scanner includes a water-filled basin, linear US-transducers, rotated around and translated along a vertical axis with a fine mechanics tracking system, synchronized with PC. Surfaces are extracted automatically and reconstructed into 3D models. Distance errors (RMS, mean and std) between a tested and a referenced (CT) model were calculated for various modelling techniques: optically tracked touch pointer (a), proposed scanner (b) and freehand ultrasound(c). A partially fractured tibia sawbone and a broken sheep tibia were reconstructed to test the visual fracture detection. Highest accuracy of the touchpoint method (a) was expected. Our scanner (b) demonstrated a comparable accuracy, while the freehand ultrasound(c) suffered from motion artifacts. The RMS (mm) values were 0.24(a), 0.27(b), 0.63(c); mean: 0.2(a), 0.3(b), 0.5mm(c) and std: 0.13(a), 0.11(b), 0.28mm(c) respectively. The limb reconstruction was found slightly worse (RMS 0,32mm) due to soft-tissue interference. The fractures of ~1mm thickness were well detected on specimens. Promising results were reached by precise bone surface modelling and fracture detection without exposure to radiation.

Date: 2011-09-06
Session: Research - Clinical I
Time: 16:00 - 17:30
Room: Club C

Abstract no.: 30207

THE EFFECT OF ELBOW AND HAND POSITIONS ON THE RADIO-CAPITELLUM RATIO (RCR) – PRELIMINARY STUDY

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The measurement of radial head translation about the capitellum (in percent): the radio-capitellum ratio (RCR) has proven to have excellent reliability when measuring it on a lateral elbow radiograph at 90° of flexion with the hand in neutral. The normal range of the RCR is between -5% to 13%. The purpose of the study was to validate the RCR in different elbow and hand positions. Methods: The RCR measurements were done on lateral elbow radiographs of 40 healthy adults in five different positions: maximal extension, maximal flexion, elbow at 90° with the hand in neutral, supination and pronation. Results: The mean RCR for each position were the following: elbow in maximal extension: -2%±9%; elbow in maximal flexion: -8%±10%; elbow at 90° with the hand in neutral: -3%±5%; elbow at 90° with the hand in supination: 1%±7% and elbow at 90° with the hand in pronation: 0%±5%. All of these values (except in maximal flexion) are present in the normal range of the RCR previously defined as between -5% and 13%. The highest variability of the RCR is found in the two maximal elbow positions. A significant difference exists between the RCR in different elbow positions (p=0.004) and between the RCR in different hand positions (p=0.001). Conclusion: The RCR measurement method is somewhat dependent on elbow (flexion-extension) and hand positions (pronation-supination). In order to decrease its variability, we recommend as a convention measuring the RCR on lateral X-Rays with the elbow at 90° and the hand in neutral position.

Date: 2011-09-06

Session: Spine - Cervical Decompression & Fusion Techniques

Time: 13:30 - 15:00

Room: Club D

Abstract no.: 28468

C2-C7 POSTERIOR FIXATION RECOMMENDED IN CERVICAL MYELOPATHY WITH LOCAL KYPHOSIS

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(Introduction) In patients with kyphosis ($\geq 10^\circ$), adequate correction of the local kyphosis was reported to be required for neurological improvement. The purpose of this study is to review and compare the surgical results of two procedures for cervical myelopathy with local kyphosis. (Patients & Methods) We retrospectively examined 12 patients (mean age: 69.7 y.o). Mean follow-up period was 13.5 months. In 6 patients, C2-C7 fixation was performed (Group A), while fixation below C3 was performed in 6 patients (Group B). We used crossing laminar screws in C2, lateral mass screws in C3-6, and pedicle screws in C7 and T1. We separately evaluated JOA score, perioperative complications, and radiological findings including the kyphosis correction, bone union, and loss of the correction. (Results) In both groups, mean JOA scores were improved, while no instrument failure, screw-related complications, or surgical site infections were found. However, transient C5 palsy was found in 2 out of 6 patients (33%) in Group A. Postoperatively, kyphosis correction was achieved in all patients (Group A: 11.3° , Group B: 10.1°). Bony union was observed in all cases. However, there was a significant difference in loss of correction at the final follow-up (Group A: 0.3° , Group B: 3.6° , $p=0.01$). (Conclusions) To obtain adequate correction, C2-C7 fixation is recommended. However, we should pay attention to the development of C5 palsy.

Date: 2011-09-06

Session: Spine - Cervical Decompression & Fusion Techniques

Time: 13:30 - 15:00

Room: Club D

Abstract no.: 29398

**CRANIO-VERTEBRAL REGION HEREDITARY AND ACQUIRED
PATHOLOGY DIAGNOSIS AND TREATMENT**

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We analyzed clinical data and imaging studies of 124 patients with Arnold-Hiari malformation, post-traumatic syringomyelia and cranial-vertebral stenosis in upper cervical spine injuries. The age of patient varied from 16 to 82 years, time of observation varied from 1 to 9 years. Features of medulla and spinal cord complications were identified using different methods of MRI, new methods of evoked potentials (especially blink-reflex) and a new method of craniometry based on McRae line. The clinical picture included local symptoms and supra-spinal symptoms of the CNS damage. The combination of brain stem static compression and dynamic irritation had place in patients with long-term consequences of the injury. The appearance and the growth of medulla and spinal cord disturbances were taking place in the presence of structural changes in brain stem and the cervical spinal cord (syrinx, external and internal hydrocephali). Pyramid insufficiency correlated with the degree of the cord compression and instability of the atlas-occipital articulation. For the purpose of partial or complete elimination of pathologic deformation and neurological disturbances 68 patients were operated by using decompress craniotomy of the occipital bone, myelorrhachyolysis, cysterno-peritoneal and cysterno-vertebral shunt operations, distraction-stabilization regime of Halo-fixation. Effectiveness of the surgical treatment controls of the dynamic changes in MRI and data of electrophysiology investigations.

Date: 2011-09-06

Session: Spine - Cervical Decompression & Fusion Techniques

Time: 13:30 - 15:00

Room: Club D

Abstract no.: 29852

PRE-OPERATIVE PATIENT CHARACTERISTICS; DO THEY INFLUENCE CLINICAL OUTCOMES FOLLOWING CERVICAL DISC REPLACEMENT SURGERY

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Introduction: Cervical disc replacement (CDR) has become one of the treatment options for cervical myelopathy and radiculopathy. To our knowledge, the effect of associated psychological co-morbidities (Depression/Anxiety), smoking history, gender, work benefits and employment status on the clinical outcome measures have not been reported. Materials & methods: We included 85 patients who underwent CDR in our Spinal Unit between May 2006 – July 2010. The pain intensity was evaluated using the Visual Analogue Score for neck pain and arm pain; functional outcomes were measured with Neck disability Index. The overall general health benefits were recorded using the Bodily Pain component of the Short Form 36 questionnaire. Statistics were obtained using SPSS 16.0 for Windows (SPSS Inc, Chicago, IL). Results: There were 42 males. Average duration of follow up was 14.4 months (Range 6-35). Out of 85 patients, 25 patients had a history of anxiety/depression, 15 patients gave history of smoking, 33 were actively working at the time of operation and 18 were receiving social benefits. We have found that gender; smoking status, associated co-morbidities, working and benefit status had no statistically significant contribution to clinical outcome measures in the follow up period. Conclusion: In our study, we conclude that there was no statistically significant contribution of these associated factors (Gender, associated co-morbidities (Depression/Anxiety), work benefits and working status) on the clinical outcomes following CDR. Although smoking is known to affect the results of cervical fusion; this does not seem to be the case in Cervical Disc Replacement.

Date: 2011-09-06

Session: Spine - Cervical Decompression & Fusion Techniques

Time: 13:30 - 15:00

Room: Club D

Abstract no.: 29040

CERVICAL HEMILAMINOPLASTY FOR CERVICAL MYELOPATHY

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Introduction: Cervical laminoplasty is one of the surgical procedure for the cervical spondylotic myelopathy, cervical ossification of posterior longitudinal ligament(OPLL)and cervical spinal cord tumor, and the good operative results have been reported. In our hospital, the hemilaminoplasty have been applied for the cervical lesions. In this series, the operative result of the cervical hemilaminoplasty is reported. Method: Clinical materials are 45 operated cases. They are 35 males and 10 females. The mean age of the operation was 72.9 years old. Mean follow-up period is 17.9 months. Clinical diagnosis are as follows; CSM 30cases, OPLL 15 cases and cervical cord tumor 1 case. The change of cervical canal space on the CT photograph before and after the operation is calculated. Mean recovery rate, mean operating time and operative bleeding volume and post-operative complications such as axial pain and C5 root palsy are reviewed. Results: The change of the cervical canal space is as follows. From 0.8cm² to 1.8cm² at C 3/4, 0.9cm²→2.0cm² at C4/5, 0.9cm² →1.8cm² at C 5/6 and 0.8cm² → 1.7cm² at C 6/7. Mean operating time is 2 hours 18 minutes, mean bleeding volume is 355ml and mean recovery rate is 60%. Post-operative axial pain was found in 7cases and post-operative C5 root palsy in 1 case. Conclusions: The cervical hemilaminoplasty is one of the useful surgical procedures for the cervical compressive lesions because of the enlargement on the CT photograph after surgery and good operative results with less severe complication.

Date: 2011-09-06

Session: Spine - Cervical Decompression & Fusion Techniques

Time: 13:30 - 15:00

Room: Club D

Abstract no.: 29871

PEEK ON PEEK CERVICAL DISC REPLACEMENT: CLINICAL AND RADIOLOGICAL OUTCOMES AT ONE YEAR

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Introduction: This is a single centre, prospective study to evaluate the clinical and radiographic outcomes of cervical disc replacement (CDR) using the NuNec™ Cervical Arthroplasty System (Pioneer Surgical Technology, Marquette, Mich., USA). Methodology 36 patients with radiculopathy/myelopathy were included. Pain and function were evaluated by Visual Analogue score for Neck pain (VAS-NP) and Arm pain (VAS-AP), Neck disability index (NDI) and SF-36 questionnaires. Radiological assessments include assessing overall range of movement (ROM) and at functional segment unit (FSU). Statistical analysis was completed using SPSS 16.0 statistical package (SPSS Inc, Chicago, IL). Results: 8 patients received CDR at one-level and 28 patients had multiple level surgery. At the time of final follow-up (Mean 14.25 months, Range 12- 22.5 months) the mean NDI improved from 49.35; to 33.78 ($p < 0.001$). Similarly, statistically significant improvement noted in VAS-NP ($p < 0.001$), VAS-AP ($p < 0.001$) and SF-36BP (pre- $p < 0.002$). The overall global ROM movement was preserved (pre-op: 46.80 ± 10.52 , post-op: 45.04 ± 11.53) and an improvement in ROM at FSU was observed (pre-op: 16.60 ± 8.50 , post-op: 20.22 ± 12.22) at final follow-up. Conclusion: Our results of NuNec™ CDR show statistically significant improvement in the outcome measures. In addition, preservation of global cervical spine ROM and improvement in FSU ROM was observed despite single or multiple surgery. In our preliminary results, we report that NuNec™ CDR device is safe and effective.

Date: 2011-09-06

Session: Spine - Cervical Decompression & Fusion Techniques

Time: 13:30 - 15:00

Room: Club D

Abstract no.: 29954

INTRAOPERATIVE ISO-C C-ARM BASED NAVIGATION IN CHALLENGING CERVICAL SPINE FIXATIONS

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Cervical Pedicle Screw fixation remains a technically demanding procedure. Most of the surgeons opt for alternative modality of stabilization in presence of significant morphological and pathological alterations. The relevance of Iso-C based navigation in such cases has not been adequately discussed in literature. The challenging cervical fixations was defined as presence of one or more of the following: 1) obscure anatomical landmarks as in ankylosing spondylitis, severe arthritis or traumatic disruptions, 2) altered anatomy with pedicle variations as in congenital anomalies, 3) gross instability, 4) altered spinal alignment as in trauma, tumor or infective pathology and 5) pediatric cervical spine. Twenty one patients (14 male, 7 female) with mean age of 37.5 years fulfilling above criteria underwent stabilization using intraoperative Iso-C 3D C-arm based navigation. Postoperatively CT scan was done to assess the accuracy of screw placement. Good intraoperative pedicle visualization in multiple planes was achieved with navigation in all cases. Surgeon felt that 15 of the 86 of cervical pedicles were not suitable for screw placement. Of the 71 cervical pedicle screws implanted, 66(93%) had a correct screw position, 4(5.6%) had a minor breach and one (1.4%) had a major breach in postoperative CT assessment. There were no procedure or implant related complications in postoperative and follow-up period. Intraoperative Iso C navigation is a valuable aid to the surgeon, while stabilizing cervical spine in challenging situations.

Date: 2011-09-06

Session: Spine - Cervical Decompression & Fusion Techniques

Time: 13:30 - 15:00

Room: Club D

Abstract no.: 27598

ANTERIOR CERVICAL DISCECTOMY, FUSION (ACDF) WITH AUTOGRAFT AND PLATING IN CERVICAL SPODYLOMYELOPATHY: A LONG-TERM STUDY

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Introduction: Cervical spondylotic myelopathy (CSM) is the most common cause of cord dysfunction in patients over 55 years of age. Plating provides rigid fixation, resists setting and development of segmental kyphosis, promotes higher fusion rates, allows for less cumbersome external immobilization and reduces the incidence of graft extrusion. **Methods:** Thirty patients with mean age of 58.5 years with clinical and radiological evidence of CSM underwent ACDF with autograft and plating and prospectively studied for mean duration of 6 years. Multilevel cervical spondylosis with neutral or lordotic, kyphotic sagittal alignment, degenerative segmental instability without anterior compressive pathology or kyphosis, anterior pseudoarthrosis without associated kyphosis, congenital cervical stenosis etc.were excluded from the study. Clinical outcome was assessed using Odom's criteria, Japanese Orthopaedic Association Score and Nurick's grading. All patients received pre and post-operative conventional and functional radiographs and MRI. **Results:** At final follow up, symptoms resolution remained greater than 92% and fusion occurred in 94% of the disc spaces operated on. Post-operatively, MRI signs of myelopathy disappeared in 90% of the patients. All pre-operative and post-operative differences are significant at the $p < 0.001$ levels. **Conclusion:** There is integrated improvement of radiologic signs, clinical signs and symptoms and quality of life in patients with cervical spondylotic myelopathy after anterior cervical discectomy and fusion with autograft and plating.

Date: 2011-09-06

Session: Spine - Cervical Decompression & Fusion Techniques

Time: 13:30 - 15:00

Room: Club D

Abstract no.: 28700

LAMINOPLASTY VERSUS LAMINECTOMY AND FUSION FOR MULTILEVEL CERVICAL SPONDYLOSIS

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Laminoplasty and laminectomy & fusion are being increasingly used to treat multilevel cervical spondylosis, but definitive guidelines have not yet been established. Fifty eight patients who were followed up for more than a year and who were treated for multilevel cervical spondylosis with either laminoplasty or laminectomy & fusion between March 2000 and March 2009 were reviewed. Twenty eight patients who underwent laminectomy & fusion were matched with 30 patients who underwent laminoplasty. The laminoplasty group showed statistically significant improvements in the Japanese Orthopaedic Association (JOA) score and Visual analogue scale (VAS) score. The cervical lordosis for the preoperative and latest sagittal alignment in the laminoplasty group decreased from 14 degrees to 5 degrees and the cervical kyphosis in the laminectomy & fusion group increased from 10 degrees to 15 degrees with no statistically significant difference. However, 3 cases with less than 5 degrees of cervical lordosis in the laminoplasty group showed progression of kyphosis at the last follow-up. The clinical outcomes of laminoplasty for multilevel cervical spondylosis were better than those of laminectomy & fusion. However, it is considered that additional study for laminectomy & fusion is needed to prevent the long-term progress of cervical kyphosis in cases with preoperatively decreased cervical lordosis of less than 5 degrees, though it is impossible to make such comparisons with the small number of cases in our study.

Date: 2011-09-06

Session: Spine - Cervical Decompression & Fusion Techniques

Time: 13:30 - 15:00

Room: Club D

Abstract no.: 29732

A 3-D MOTION ANALYSIS STUDY COMPARING THE EFFECTIVENESS OF CERVICAL SPINE ORTHOSES IN RESTRICTING CERVICAL SPINE MOVEMENT DURING ACTIVITIES OF DAILY LIVING

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OBJECTIVE: To compare the effectiveness of the Aspen, Aspen Vista, Philadelphia, Miami-J and Miami-J Advanced collars in restricting functional range of movement during activities of daily living. **METHODS:** Nineteen healthy volunteers were recruited to the study. Collars were fitted by an approved physiotherapist. Eight ProReflex (Qualisys, Sweden) infra-red cameras were used to track the movement of retro reflective marker clusters placed in predetermined positions on the head and trunk. 3-D kinematic data was collected during 5 activities of daily living. The range of motion in the sagittal, coronal and transverse planes was analysed using the Qualisys Track manager system. **RESULTS:** The Aspen and Miami-J Advanced collars were the most effective in restricting flexion/extension. The Vista collar was the least effective and was significantly less effective than the Aspen ($p < 0.001$) and other collars ($p < 0.01$). The Aspen and Miami-J Advanced collars were also the most effective in restricting rotation and were significantly more effective than the Vista ($p < 0.01$) and Miami-J ($p < 0.05$) collars. The Philadelphia collar was the most effective at restricting lateral bending but the differences were not statistically significant. **CONCLUSION:** The Aspen and Miami-J Advanced collars were the most effective in restricting cervical spine motion during activities of daily living, particularly in the sagittal and axial planes, while the Aspen Vista collar was the least effective. The functional ranges of cervical spine motion observed during these activities are less than those observed through physiological ranges.

Date: 2011-09-06
Session: Thromboprophylaxis
Time: 16:00 - 17:30
Room: Club D

Abstract no.: 30267

A RANDOMISED CONTROLLED TRIAL OF INTERMITTENT PNEUMATIC COMPRESSION (IPC) VERSUS LOW MOLECULAR WEIGHT HEPARIN IN THE PREVENTION OF VENOUS THROMBOEMBOLISM (VTE) IN PATIENTS UNDERGOING ELECTIVE HIP AND KNEE SURGERY

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Experimental evidence indicates that the application of IPC to the leg provides significant protection against the development of venous thromboembolism in vulnerable patients. However, in high-risk groups, such as orthopaedic surgery, chemoprophylaxis is typically prescribed either alone or in combination with IPC. Unfortunately, unlike IPC, this modality is associated with side effects such as haematoma, surgical site oozing, blood loss requiring transfusion and heparin-induced thrombocytopenia which might be avoided if IPC alone was shown to be equally effective. This pilot phase, approved by the local Ethics Committee, investigates the null hypothesis that there is no difference in VTE outcome for subjects undergoing elective hip (THR) or knee (TKR) surgery and prescribed either Enoxaparin or IPC. The study will also determine the sample size required for a fully powered RCT. Consenting subjects were randomly assigned (closed envelope) to either treatment arm. Group 1: Enoxaparin 40mg per day until discharge. Group 2: Flowtron IPC with calf garment. All subjects had pre-operative Echo Duplex, repeated on Day 7 and D-Dimer on days 0, 5 and 10. A total of 103 subjects were recruited: 55 TKR and 46 THR; 45 subjects were randomised to Group 1 and 58 to Group 2. Both groups were similar in multiple parameters. All 103 patients completed the study. One subject in each group developed a distal VTE: Enoxaparin (2.2%); IPC (1.7%). Mean blood loss in both groups was similar (Group 1 = 295ml, Group 2 = 335ml). However more subjects in Group 1 required blood transfusion (n=5, 11%) compared to Group 2 (n=2, 3%). We conclude that the data don't reject the null hypothesis and prophylaxis with IPC alone is an effective and safe modality for patients undergoing elective hip and knee replacement. The study will be extended to 200 subjects when valid statistical analysis will be conducted.

Date: 2011-09-06
Session: Thromboprophylaxis
Time: 16:00 - 17:30
Room: Club D

Abstract no.: 30141

VENOUS THROMBOEMBOLISM AFTER TOTAL HIP AND KNEE ARTHROPLASTY AND PROXIMAL FEMORAL FRACTURES

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Background: Guidelines use historical data to estimate the incidence of symptomatic venous thromboembolism (VTE). Techniques have changed since the advent of joint replacement but there is little data on the current rate of VTE. Aim: To use the Patient Archiving Communication System (PACS) to find patients with symptomatic VTE occurring within 90 days of Hip Arthroplasty (HA), Knee Arthroplasty (KA) and surgery for Neck of Femur fractures (NOF#). Methods: PACS was used to view all Doppler ultrasound, Computed Tomographic Pulmonary Angiograms (CTPA) and Ventilation/Perfusion (V/Q) scans within a 3 year period. Positive results were checked using PACS to analyse whether they had undergone the index procedure in the preceding 90 days. All patients received Enoxaparin 20mg once daily until discharge, intra-operative mechanical calf pumps and graduated-compression stockings for 6 weeks. Results: There were 1954 HA, 1870 KA and 1451 NOF# during our study. Analysis of 5314 scans revealed 28 cases of PE and 24 cases of DVT that had the index procedures in the preceding 90 days. The incidence of symptomatic VTE was 1.2% for HA, 0.3% for KA and 1.5% for NOF#. Discussion: Our results were comparable to the lowest reported rates of VTE with the use of 20mg of Enoxaparin instead of the recommended 40mg and without extending prophylaxis beyond hospital stay. Guidelines often quote higher rates of VTE but this study demonstrates the incidence of VTE using modern joint replacement techniques and early mobilisation. PACS can be easily used to ascertain the rate of symptomatic VTE.

Date: 2011-09-06
Session: Thromboprophylaxis
Time: 16:00 - 17:30
Room: Club D

Abstract no.: 28928

**IMPLEMENTING NICE GUIDELINES ON RISK ASSESSMENT FOR
VENOUS THROMBOEMBOLISM: FAILURE, SUCCESS AND
CONTROVERSY**

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Introduction - Venous thromboembolism (VTE) prophylaxis guidelines were originally published by the National Institute of Clinical Excellence (NICE) in April 2007. Controversy eclipsed the guidelines release. Consequently, the VTE prophylaxis publication was reviewed and republished in January 2010. National Institute of Clinical Excellence recommend that: all patients are assessed for risk before pharmacological prophylaxis is offered; reassessed at 24 hours to check for adverse reactions; and to check that prophylaxis is appropriate. Methods - A prospective audit and re-audit in one orthopaedic department was completed to see how well the new guidelines were adhered to; find out first- hand what problems there were; and how the problems might be remedied. Limitations - The study was limited to one centre. Findings - Audit and re-audit highlighted that attaching an assessment tool to drug charts is plausible. Implications for research, practice and/or society - As a process, the clinical impact of risk assessment for venous thromboembolism is questionable as many patients will be high risk. Removing reassessment at 24 hours from the NICE guidance is recommended. Value – The authors put the NICE guideline into clinical practice, demonstrating how effectively it can work with the author’s method but also highlighting its flaws

Date: 2011-09-06
Session: Thromboprophylaxis
Time: 16:00 - 17:30
Room: Club D

Abstract no.: 29598

PROXIMAL INDENTATION IS A CLINICAL SIGN FOR INCREASED RISK OF DVT. ATTENTION TO ANTI-EMBOLISM STOCKING SIZING REDUCES THIS RISK

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Hip and Knee joint replacements carry a high risk of venous thromboembolism (VTE). Mechanical thromboprophylaxis avoids the bleeding associated with chemical agents. Surrogate endpoints are used to highlight VTE risk. We noticed that the elastic garter of below knee anti-embolism graded pressure stockings was indenting the proximal calves of patients after hip and knee replacement and feared this might be interrupting venous return, thus increasing VTE risk. The aim of the study was to establish whether proximal indentation caused higher proximal than distal pressures (reverse gradients) and whether it could be reduced by adopting the standardised protocol. We recruited 57 patients after THA or TKA in a regional orthopaedic centre, implemented a standardised protocol for sizing stockings and measured the pressures under them at three distinct anatomically defined places on the leg. After implementation of the standardised protocol, proximal indentation fell from 53% to 19% ($p<0.05$), incorrectly sized stockings from 74% to 34% ($p<0.05$) and removal of stockings by patients from 32% to 0% ($p<0.05$). 21% of patients had reverse gradients which occurred in 41% of legs with proximal indentation and 8% without. When reverse gradients or proximal indentation exist, the risk of DVT may exceed that of wearing no graded compression stockings. A standardised protocol of stocking sizing practice is critical to reducing the risk of DVT after hip and knee replacement.

Date: 2011-09-06

Session: Thromboprophylaxis

Time: 16:00 - 17:30

Room: Club D

Abstract no.: 28797

INCIDENCE OF VENOUS THROMBOEMBOLISM IN FRACTURES AROUND KNEE AND BELOW KNEE UNDER PHYSICAL AND MECHANICAL PROPHYLAXIS WITHOUT DRUG ADMINISTRATION

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The purpose of this study was to investigate the incidence of venous thromboembolism (VTE) in fractures around knee and below knee. 182 patients with fractures of pelvis and lower extremities were treated in our hospital from February 2004 to April 2009. Patients with fractures of pelvis, hip, and femoral shaft were excluded, and remaining 64 patients with fractures around knee and below knee were analyzed retrospectively. Physical and mechanical prophylaxis was performed for all cases. For VTE screening, the value of D-dimer was assayed. Contrast-enhanced computed tomography or ultrasonography was performed when the value of D-dimer did not decline predictably, exceeded 20 microg/ml even when 5 days passed after injury and surgery, or increased again from decline after injury and surgery. 14 patients were excluded due to incomplete follow-up of D-dimer leaving 50 cases in the study group. 50 cases were divided into two groups; 34 cases without associated injuries and 16 cases with associated injuries. Overall, 7 cases (14%) were diagnosed with VTE. The incidence of VTE was 8.8% (3/34) in cases without associated injuries, and 25% (4/16) in cases with associated injuries. We experienced one case of ankle fracture with asymptomatic pulmonary thromboembolism. A proximal type deep vein thrombosis was detected in a tibial shaft fracture patient. Surgeons should be vigilant for VTE even if the fracture occurs at the distal part of the lower extremities. Patients with associated injuries are more risky. Recently we perform ultrasonography routinely pre- and post-operatively irrespective of the D-dimer value.

Date: 2011-09-06
Session: Thromboprophylaxis
Time: 16:00 - 17:30
Room: Club D

Abstract no.: 28796

INCIDENCE OF VENOUS THROMBOEMBOLISM IN PELVIC FRACTURES UNDER PHYSICAL AND MECHANICAL PROPHYLAXIS WITHOUT DRUG ADMINISTRATION

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The purpose of this study was to investigate the incidence of venous thromboembolism (VTE) in pelvic fractures. 182 patients with fractures of pelvis and lower extremities were treated in our hospital from February 2004 to April 2009. Physical and mechanical prophylaxis was performed for all cases. For VTE screening, the value of D-dimer was assayed. Contrast-enhanced computed tomography or ultrasonography was performed when the value of D-dimer did not decline predictably, exceeded 20 microg/ml even when 5 days passed after injury and surgery, or increased again from decline after injury and surgery. Patients with pelvic fractures were analyzed retrospectively. Patients with incomplete follow-up of D-dimer were excluded, and remaining 31 cases were included in the study group. 24 pelvic ring fractures and 7 acetabular fractures were included. According to AO pelvic ring fracture classification, 24 fractures were classified to 6 for A2, 2 for B1, 12 for B2, 1 for B3, 1 for C1, and 2 for C2. Overall, 10 cases (32%) were diagnosed with VTE. We experienced 4 cases (13%) of asymptomatic pulmonary thromboembolism (PTE). Proximal type deep vein thrombosis (DVT) was detected in 4 cases. DVT in bilateral legs was detected in 4 cases. Surgeons should be vigilant for VTE in pelvic fracture patients which have high risk of PTE. Recently we perform ultrasonography and contrast-enhanced computed tomography routinely pre- and post-operatively irrespective of the D-dimer value for pelvic fracture patients.

Date: 2011-09-06
Session: Thromboprophylaxis
Time: 16:00 - 17:30
Room: Club D

Abstract no.: 29400

ACUTE PULMONARY EMBOLISM AS A RESULT OF LOWER LIMB EXSANGUINATION AND TOURNIQUET INFLATION: A CASE REPORT AND LITERATURE REVIEW

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Intra-operative pulmonary embolism is an unusual and rare complication of lower extremity surgeries. We report a case of acute, massive pulmonary emboli associated with exsanguination of lower limb and inflation of thigh tourniquet. A 64 year old female patient suffered comminuted fracture of right patella. She was due to have internal fixation of fracture 3 days following her injury. Shortly after lower limb exsanguination using the Rhys-Davies exsanguinator and inflation of pneumatic tourniquet, patient developed acute desaturation and tachycardia and signs of acute right ventricular failure. Clinical diagnosis of massive pulmonary emboli was made and surgery was abandoned. Patient was resuscitated and had CT pulmonary angiogram confirming bilateral large pulmonary emboli. Patient was transferred to intensive care unit, anti-coagulated and subsequently had IVC filter fitted. She made full recovery and had patella fixation performed 7 days later. She made uneventful recovery. After comparing the data from our case and the literature, it is recommended that the Rhys-Davies exsanguinator should not be used in trauma when there has been a delay in time for surgery. Authors discuss prevention and treatment of acute thrombosis in lower limb trauma.

Date: 2011-09-06
Session: Thromboprophylaxis
Time: 16:00 - 17:30
Room: Club D

Abstract no.: 28051

ARE WE COMPLETING VENOUS THROMBOEMBOLISM RISK ASSESSMENT PROFORMAS IN ORTHOPAEDIC PATIENTS?

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The risk of VTE is high in orthopaedics compared with other specialities. In 2005, the House of Commons Committee stated that around 25,000 patients die each year from VTE, which are preventable. They suggested that every patient should be risk assessed within 24 hours of admission to hospital; however this was poorly implemented at a subsequent review. In 2010 the Commission for Quality and Innovation set up a payment framework awarding hospitals a sum of £2-300,000 providing 90% of risk assessment proformas are completed. We audited 60 randomly selected orthopaedic patients. We closed the loop 3 months later. We assessed whether risk assessment forms were found in the notes and whether they were completed. The acceptable set standard was set at 90% completion rate. We found a very poor initial completion rate; elective (85%), trauma (3%). The forms were present in only 60% of notes. Following the audit, we notified the management who subsequently ensured that the publishers attached the risk-assessment-proformas to the admission-clerking-proformas, notified all admitting doctors of the forms and used new EXTRAMED IT software which notified nurses which patients had been risk-assessed. On re-auditing a similar group we found that 100% of admissions clerkings had the risk-assessment-forms attached and the completion rate to be 100%. We have demonstrated that a significant number of patients are not risk assessed, not only leaving them at higher risk of VTE but also causing lost funding for the trust. This can be avoided using the suggested implementations.

Date: 2011-09-06
Session: The Hip
Time: 08:30 - 17:30
Room: Club H

Abstract no.: 30300

RECONSTRUCTION OF THE ACETABULUM IN REVISION THA

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Acetabular bone defects are classified by AAOS and by Wayne Paprosky (1994). Both classifications are explained and the various types are demonstrated. The advantages and drawbacks will be elucidated. The various types of techniques of grafting the defects are demonstrated with various types of implants used. It is well agreed that paprosky type 1 can be revised using cementless cups, while type 2 & 3 do need grafting of the floor and the rim using either morselised, bulk allograft or both. Cementless and cemented cups can be used. Results of both types of fixation show that the cemented implants are better in the long term (Swedish JR 2008). Type 3b will need Bert Schneider ring to stabilise the pelvic discontinuity with the grafting of the floor and the rim. Reconstructing the rim using rim mesh and impacted morselised allograft will be demonstrated with its long term results (Welleum, Sloof, 2001, et al). The key points of this technique will be shown and focused upon. Long term results of cup fixation will be shown.

Date: 2011-09-07

Session: Hip - Complex Dysplasia

Time: 14:00 - 15:30

Room: Forum Hall

Abstract no.: 28006

**TOTAL HIP ARTHROPLASTY IN DEVELOPMENTAL DYSPLASTIC HIP,
5 YEARS EXPERIENCE**

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SAVADKOOHI, Mohammadreza GOLBAKHSH

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Introduction: In neglected or improper treated dysplastic hips, because of degenerative changes and pain and leg length discrepancy eventually joint replacement will be necessary. But it is a difficult arthroplasty with bone defects, small medulla, high rising head of femur, recurrent dislocations. There is a collection of cases of THA in DDH with different methods of treatment. Materials and methods: 18 consecutive cases of dysplastic hip are included in this study. Their preoperative Harris hip scores were documented. Duration of follow up was 5 year with radiography and Harris hip score. Results: 18 cases were studied (6 male and 12 female). Average age was 39 years (31 to 53 y). In all of them cups were inserted in true acetabulum but in 10 cases there were need for femoral shortening (3 from distal and 7 from proximal). In 2 cases for better coverage of cup we used allograft but in 5 other cases the native head were used for reconstruction of acetabulum. 1 peroneal nerve palsy were detected (temporary) and 3 periprosthetic fracture (nondisplaced managed only with wiring). Final Harris hip scores were increased from average 67 to average 93. Discussion: THA in DDH is a demanding operation which needs not only a set of complete devices and prosthesis, but also a well prepared surgeon which is expert in cup and stem revision and periprosthetic fractures. Regard to hip scores, there is a significant improves in life styles of patients so it is advised in selected cases.

Date: 2011-09-07
Session: Hip - Complex Dysplasia
Time: 14:00 - 15:30
Room: Forum Hall

Abstract no.: 29479

EARLY INDEPENDENT OUTCOME OF CUSTOM MADE STEMS FOR DYSPLASTIC FEMURS IN THE YOUNG PATIENT

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Introduction: Hip Replacement in young patients with dysplasia can be challenging. The femoral anatomy is often distorted either due to congenital or developmental pathologies or as a result of previous surgeries with indwelling metalwork. Therefore 'off the shelf' implants are unlikely to suit the requirements of adequate fill and fit proximally. Scandinavian Customised Prosthesis has developed a custom made titanium alloy prosthesis designed to provide optimal proximal fit and physiological load transfers. Most published results are from the stables of developers of the system. We present the early outcome of using this prosthesis from an independent centre. Materials and methods: We reviewed early results of 11 consecutive procedures in young patients with an age range of 18 to 42 carried out between 2007 and 2010. Patients have a minimum one year of follow up and pre and post operative oxford hip scores. Return to activities of daily living and independent radiological assessment by a senior arthroplasty consultant. Results: Statistically significant differences in objective scores as well as good to excellent satisfaction were recorded from all patients. Only one case resulted in significant increase in leg length and needed revision. All the stems demonstrated major signs of osteo-integration as per criteria set by Engh et al. At last follow up, there has been no loosening or subsidence of any of the stems. Conclusion: We recommend the use of an uncemented custom made prosthesis in young patients with distorted proximal femoral morphology.

Date: 2011-09-07

Session: Hip - Complex Dysplasia

Time: 14:00 - 15:30

Room: Forum Hall

Abstract no.: 28497

RESULTS OF PRIMARY TOTAL HIP ARTHROPLASTY FOR SEVERE DYSPLASTIC OSTEOARTHRITIS

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Purpose: The aim of this study was to present the results of total hip arthroplasty with shortening subtrochanteric osteotomy in patients with OA due to severe dysplasia Material and Methods: Number of cases-18(16 pats) The mean age-49 y. Type of dysplasia-Hartofilakidis-III. Surgical approach: Direct lateral-14 cases; Posterolateral-4 cases. All acetabular cups are cementless, placed in true acetabular region via medial protrusion technique. Femoral side: shortening subtrochanteric osteotomy with derotation. Cementless stems in all cases were used - Alloclassic Modular grit-blasted taper. Results: Mean Fup-12 months. HHS vastly improved at the FUp period. The complications are: splitting of the proximal femoral fragment (3), peroneal nerve palsy (1), early dislocation (2), Conclusions 1. In cases with arthritis of the hip due to H3 dysplasia, the subtrochanteric osteotomy is the option to fix the acetabular cup in the true center of rotation 2. Complications and failures are more common than with a routine hip arthroplasty.

Date: 2011-09-07

Session: Hip - Complex Dysplasia

Time: 14:00 - 15:30

Room: Forum Hall

Abstract no.: 28234

TOTAL HIP ARTHROPLASTY AFTER PREVIOUS ACETABULUM FRACTURE FIXATION

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Background: Acetabulum fracture is a high energy fracture of hip joint which even with secure fixation after good reduction of fragments, may ended in a damaged hip joint. The main cause of this late damage may be avascular necrosis of head of femur or arthrosis of hip joint. In the past, hip arthrodesis or resection arthroplasty (Girdle stone) were the only procedures to overcome this problem but today's, total hip arthroplasty is the procedure of choice. But it has some special problems in these patients which make it different from THA in other patients. This study is designed for evaluation of problems of THA after previous acetabulum fracture fixation. Materials and methods: Patients with history of acetabulum fracture and fixation of it who experienced destruction of joint with arthrosis or damage of head due to avascular necrosis are candidates for arthroplasty of hip joint if they have functional abductors and there are no signs of infection. They are studied 3 months for post operative infection, dislocation, sciatic nerve palsy, approach, periprosthetic fracture, blood loss, operation time, need for device removal for insertion of components . Results: 35 cases were entered in study. 24 cases had only posterior approach for fixation of their acetabulum fracture, 8 had both anterior and posterior approaches and 3 had only anterior approach. 6 periprosthetic fractures were seen which all of them were non displaced trochanteric fracture which treated with wiring. In 16 cases device removal were needed, in 13 cases complete or partial removal of acetabular fixation devices and 3 cases, screws for fixation of trochanteric osteotomy in the first operation were removed for insertion of femoral stem. For THA, in all of them posterior approach were used and no postoperative dislocation was seen. 1 infection was seen which lead to device removal and debridement.

Date: 2011-09-07
Session: Hip - Complex Dysplasia
Time: 14:00 - 15:30
Room: Forum Hall

Abstract no.: 28347

FIXATION OF PRESS-FIT CUPS IN THE PRESENCE OF ACETABULAR DEFECTS – DESIGN VS PRIMARY STABILITY

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Introduction: When performing THR in the presence of a contained acetabular defect, is it possible to provide adequate primary stability with a hemispheric press-fit cup? Material/ Method: Three acetabular cups of different designs (Ananova/ Intraplant, Exceed ABT/ Biomet, Plasmacup/ Aesculap) were tested under a ramped cyclic load in a composite surrogate model of the acetabulum. Different surrogates were fabricated simulating the normal socket and moderate (90° dorso-cranial rim defect; 10 mm depth), and severe defects (130° dorso-cranial rim defect; 15 mm depth). The cups were implanted in each surrogate under computer control and then subjected to cyclic edge loading. The peak load was increased by 50N per cycle to a maximum of 2000N. Cup micromotion and permanent displacement was continuously monitored with linear variable differential transducers (LVDTs). ANOVA and Fisher's PLSD post-hoc test were performed with level of significance set at $p < 0.05$. Results: 56 tests were performed. Resistance to spin-out averaged 790N in the normal acetabular surrogate, and varied by 35% as a function of implant design (Exceed ABT: 667 ± 19 N; Plasmacup: 758 ± 9 N; Ananova 946 ± 11 N). Similar results were achieved with a moderate defect. In the presence of the severe defect, cups without secondary stabilizing features failed at lower applied loads (Exceed ABT: 639 ± 20 N; Plasmacup: 616 ± 10 N), compared to the design with supplementary fixation (Ananova: 993 ± 20 N). Conclusion: The design of cementless acetabular cups significantly affects the stability achieved at initial implantation. Hemispherical cups augmented with external fixation features can achieve adequate fixation even in the presence of significant acetabular defects.

Date: 2011-09-07

Session: Hip - Complex Dysplasia

Time: 14:00 - 15:30

Room: Forum Hall

Abstract no.: 28168

RESULTS OF THR IN ARTRHODESED HIPS

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33 conversions of an arthrodesis into hip arthroplasty. Results: 85% painfree, 45% walking stick and 15 % complications. Quality of the abductors muscles guarantees stability. We reported our experience concerning 33 conversions of a hip arthrodesis into a total hip arthroplasty (THA) performed in the years 1976-2005. Thirty-three patients (11 men, 22 women) underwent total hip arthroplasty years after spontaneous or operative fusion of a hip joint. The primary indications of the conversion were: malposition, non fusion, severe low-back or contra lateral knee pain. To analyze the improvement of their quality of life, we carried out a retrospective evaluation of hip pain, walking ability and patient satisfaction. At the mean follow-up of 7 years (1 -25 years), 79% of the patients were very satisfied or satisfied regarding the improvement of their hip function and their quality of life. At the last-follow-up, 28 hips (85%) were pain free and 15 patients (45%) needed a walking stick. Leg length discrepancy was 2, 3 cm on average. Seven major complications (15%) were noted during the postoperative period: one infection, one deep infection, two nerve damage, 3 dislocations and 3 implant loosening. The 10-years survivorship rate was 80%. Revision total hip arthroplasty (THA) after hip arthrodesis is an uncommon and challenging operation. Good quality of the abductors muscles guarantee good implant stability and a better walk. The risk, morbidity and the results that can be attended must being explained to the patient. The success rates of this surgery are much lower than those of a primary THA even if the hip pain and the other joint pain are relieved.

Date: 2011-09-07

Session: Hip - Complex Dysplasia

Time: 14:00 - 15:30

Room: Forum Hall

Abstract no.: 29095

TOTAL HIP ARTHROPLASTY IN ANKYLOSED HIP: A SURGICAL CHALLENGE: RETROSPECTIVE STUDY

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Background: Total hip arthroplasty in ankylosed hips remains a surgical challenge. Retrospective study was done to evaluate the results and factors affecting the outcomes of total hips in ankylosed hip joints. Materials & Methods: Twenty ankylosed hips were converted in to mobile hips by cementless arthroplasty over a period of last 8 years. Average age was 29 years (25- 52), there were 17 male & 3 female patients and minimum follow up was 4 years. Indications of surgery included hip pain, fusion in abnormal position, persistent back or ipsilateral knee pain. Causes of ankylosis included surgery (5 patients), ankylosing spondylitis (13 patients) & sequel of infective arthritis (2 patients). All were treated with cementless total hip arthroplasty by posterior approach. Results: Nineteen patients had improved postoperative mobility and functions. The Harris Hip Score improved from 72 to 86 post-operatively. Average limb length discrepancy was 1.5 cms. One patient required revision surgery due to aseptic loosening of femoral & acetabular components at 5 years of follow up. This patient had septic arthritis and underwent multiple surgeries before the bony fusion of the joint. Nineteen patients had shown improvement in postoperative strength of the abductors muscles of the hip at 3 years followup. No periprosthetic fracture, reactivation of infection or dislocation was observed in this study. Conclusion: Total hip in ankylosed hips is relatively difficult. Optimum outcome requires adequate training & accurate planning to restore limb length & abductor functions.

Date: 2011-09-07

Session: Hip - Complex Dysplasia

Time: 14:00 - 15:30

Room: Forum Hall

Abstract no.: 27471

A 15-YEAR COMPARISON OF CEMENTLESS TOTAL HIP ARTHROPLASTY PLACED AT ANATOMICAL HIP CENTER WITH BULK BONE GRAFTING OR HIGH HIP CENTER FOR DEVELOPMENTAL DYSPLASIA OF THE HIP

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Purpose: The aim of this study was to compare clinical and radiological outcomes in cementless total hip arthroplasty (THA) for patients with osteoarthritis secondary to developmental dysplasia of the hip (DDH) with bulk bone grafting by anatomical cup placing (BG group) or without bulk bone grafting by placing a cup at high hip (less than 25mm from inter tear drop line) center (non-BG group). **Methods:** We divided 43 hip-cases who underwent identical cementless THA (Mallory-Head: Biomet Inc.) to two groups: ten BG group and 33 non-BG group. The mean follow-up period was 15.3 years. Cup instability was defined as radiolucent line (>2mm) or migration (>4mm). Stem instability was defined as progressive subsidence (>2 years) or radiolucent line (>2mm). **Results:** No acetabular or femoral component showed loosening in both groups. One polyethylene liner in non-BG group was revised due to unknown excessive wear at 11-year period. The average Harris hip score improved from preoperative 38 points to 82 points in BG group and 40 to 88 in non-BG group respectively at final follow-up period. **Conclusion:** Fifteen years performance of cementless THA for DDH was satisfied in 100% cases with bulk bone graft and 97 % cases without bulk bone graft.

Date: 2011-09-07

Session: Hip - Complex Dysplasia

Time: 14:00 - 15:30

Room: Forum Hall

Abstract no.: 28297

COMPLEX PRIMARY HIP REPLACEMENT IN POST TUBERCULOSIS ARTHRITIS

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Post tubercular arthritis of hip was traditionally treated with girdle stone arthroplasty. Total hip replacement is sought with complications such as distorted acetabulum, scaring of soft tissues, limb length discrepancy, young age of the patients and risk of reactivation of the infection. Twenty two patients with post tb arthritis were treated with THR.14 male and 8 female. Average age 42 years. Av time of surgery 3 yrs 11 months after start of ATT(range 10 months to 10 years).15 patients presented after girdlestone arthroplasty.In 17 patients hybrid THR was done and cemented in 5 patients. Av follow-up was 5.2 years. Problems encountered were acetabulum exposure, cup orientation, restoration of centre and acetabular bone defects. ATT was started minimum 6 weeks pre-operatively and continued for 9 months post-operatively. Complications seen were deep infection in one, superficial infection in three, average shortening 1 cm and lengthening in one. One patient had reactivation for which implants were removed and girdle stone was done. Functional evaluation was done using Harris Hip score that increased from 39 to 90 postoperatively. Two-stage operation is probably safe along with ATT cover although risk of reactivation remains life long.

Date: 2011-09-07

Session: Hip - Positioning of Implant

Time: 16:30 - 18:00

Room: Forum Hall

Abstract no.: 29544

IMAGE-FREE COMPUTER-ASSISTED CAP POSITIONING IN HIP RESURFACING – A RANDOMIZED PROSPECTIVE STUDY

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INTRODUCTION: Hip resurfacing (HR) represents a bone-conserving total joint replacement option for young and active patients. The aim of the study was to evaluate the effects of image-free computer-assisted surgery (CAS) on the accuracy of cap positioning and on the short-term clinical outcome in HR using a randomized prospective study design. **MATERIALS & METHODS:** A total of N=73 consecutive patients undergoing HR were randomly allocated to CAS (n=36; Navitrack®, ORTHOsoft Inc.) and conventional (n=37) group. Preoperatively and at 6 months postoperatively algofunctional scores (WOMAC, HHS, EQ-5D, UCLA) were registered and standardized pelvic anteroposterior x-rays were analysed. Cap malpositioning was defined as >5° deviation from the planned stem shaft angle in the frontal plane. **RESULTS:** Sex, age, body mass index, operative time, CCD angle, and cap size did not differ between CAS and conventional group. Using CAS significantly fewer caps were malpositioned (12/37 vs. 4/36, p=0.046). All algofunctional scores had significantly improved 6 months postoperatively (p<0.0001) without any intergroup differences. Two conversions to stemmed prostheses (both CAS) were performed due to femoral neck fracture and symptomatic implant-bone impingement. Radiological signs of femoral neck notching without clinical relevance were observed for 2 of the conventionally implanted caps. **CONCLUSION:** Using a randomized prospective study design we observed that the rate of malpositioned femoral hip resurfacing components was significantly reduced by use of CAS. However, the clinical significance of this finding is uncertain. Future studies need to address the clinical long-term relevance of CAS in HR.

Date: 2011-09-07

Session: Hip - Positioning of Implant

Time: 16:30 - 18:00

Room: Forum Hall

Abstract no.: 28782

THE OPERATING TABLE PLANE – TRUSTY GUIDANCE FOR PROPER CUP PLACEMENT IN TOTAL HIP ARTHROPLASTY?

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Clinical Problem: Cup alignment in relation to the plane of the operating table represents a simple facility, but does not reflect the appearance of pelvic tilting at the table within supine position of the patient. Unrecognized pelvic tilting may result in cup malpositioning and consequently in mechanic complications. To date it is unknown, how strong the variance of this pelvic tilt is in reality. Methods: CT raw datasets of 125 patients (ø59 years, ø172 cm, ø76 kg) were post processed using the Amira 4.2 software to generate 3-D pelvic reconstructions. The acetabular entry plane and the frontal pelvis plane are defined automatically by a custom made program code using marked reliable anatomical landmarks. The tilt of the pelvis related to the table, anteversion and abduction of the acetabular entry planes respectively to the table plane and the pelvis plane were measured. A confidence interval of 95% was assumed ($p < 0.05$). Results: The pelvic plane differs marginally from the table plane (anteversion: $1.4^\circ \pm 6.3^\circ$, inclination: $0.5^\circ \pm 3.1^\circ$, rotation: $0.4^\circ \pm 1.9^\circ$). In respect to the acetabular entry plane no significant differences in relation to the pelvis plane (anteversion: $24.4^\circ \pm 7.0^\circ$ left, $25.4^\circ \pm 6.7^\circ$ right abduction: $43.4^\circ \pm 4.0^\circ$ left, $44.0^\circ \pm 3.8^\circ$ right) and table plane (anteversion: $25.4^\circ \pm 6.7^\circ$ left, $27.1^\circ \pm 4.6^\circ$ right, abduction: $44.1^\circ \pm 4.6^\circ$ left, $43.8^\circ \pm 4.0^\circ$ right) for both sides were observed. Conclusion: The conventional intraoperative alignment of the cup using the operating table as orientation still represents a convenient and simple method in assuring a proper placement of the acetabular component in total hip arthroplasty.

Date: 2011-09-07

Session: Hip - Positioning of Implant

Time: 16:30 - 18:00

Room: Forum Hall

Abstract no.: 28270

USE OF AN ULTRASOUND BASED NAVIGATION SYSTEM FOR AN ACCURATE ACETABULAR POSITIONING IN TOTAL HIP ARTHROPLASTY. A PROSPECTIVE, RANDOMIZED, CONTROLLED STUDY

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Precise identification of bony landmarks by use of pointer based navigation systems is influenced by the thickness of soft tissue. Ultrasound-based navigation systems try to overcome the problems of positional deviation associated with soft tissue. The purpose of this study was to compare an ultrasound-based navigation system with an imageless navigation system with surface registration in the postoperative acetabular cup position. Additionally, we investigated the influence of the body mass index on the accuracy of both navigations systems. A prospective randomized controlled study of two groups of 40 patients each was performed. In the first group, cup positioning was assisted by an ultrasound-based navigation system and the second group, the cup was assisted by imageless navigation system with surface registration. Cup abduction and anteversion angles were measured on three-dimensional computed tomography reconstructions postoperatively. One of the 40 cups (2.5%) in the ultrasound-based group and 12 of the 40 cups (30%) in the imageless navigation group were outside of the defined safe zone (outlier). This was statistically significant ($p = 0.001$). We observed a statistical significance in the anteversion angles and in the anteversion error ($p = 0.001$) between the imageless navigation and ultrasound-based navigation groups. In addition, we observed a significant correlation between the body mass index and the anteversion imageless navigation system group. Ultrasound-based navigation improves cup positioning in total hip arthroplasty better than imageless navigation system with surface registration by reducing the percentage of outliers, achieving a higher accuracy of anteversion, reducing the mean and the range anteversion error between intraoperative displayed and postoperative measured cup orientation. The higher precision seemed to be dependent on the correctness of evaluation of landmarks, and is therefore influenced by thickness of soft tissues.

Date: 2011-09-07

Session: Hip - Positioning of Implant

Time: 16:30 - 18:00

Room: Forum Hall

Abstract no.: 30028

EVALUATION OF ACETABULAR CUP ORIENTATION IN TOTAL HIP REPLACEMENT – COMPARISON OF FREEHAND VS MECHANICAL JIG ASSISTED VS NAVIGATION ASSISTED CUP PLACEMENT: AN INDIAN EXPERIENCE

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Acetabular cup placement is an important determinant for the success of total hip replacement (THR). To meet the optimal position of cup placement various modes have been developed from the traditional free hand to jig to the present computer assisted navigation system. With this study we compared the free-hand, mechanical jig assisted and the navigation assisted cup placement and evaluated which method gives the least variation. In a prospective study 75 patients were enrolled who underwent primary total hip replacements from July 2008 to October 2010 were included. These were randomly divided into groups of 25 each for free-hand, jig assisted and navigation assisted cup placement. Intra-operative the target inclination was 40° - 45° of anteversion and 15° anteversion. Postoperatively CT evaluation of the cup was done. On postoperative C.T. evaluation the freehand group showed a mean inclination angle of 44.7° ± 9.8° and anteversion of 12.1° ± 7.8°. Jig assisted group showed a mean inclination angle of 44.7° ± 10.6° and anteversion of 11.7° ± 8.1° variation. The navigation assisted group's mean inclination was 43.7° ± 7.2° and anteversion was 14.4° ± 4.3°. There was no significant difference in mean component orientation between the 3 groups, but the standard deviation was significantly smaller in the navigation group as compared to the jig and the freehand group. Our study confirms that consistent acetabular component orientation in primary THR is possible using navigation assisted cup placement. It is highly reproducible and much closer to the safe zone than traditional methods.

Date: 2011-09-07

Session: Hip - Positioning of Implant

Time: 16:30 - 18:00

Room: Forum Hall

Abstract no.: 29992

UTILITY OF JOINT REGISTRY DATA IN IMPROVING ACETABULAR CUP POSITIONING IN TOTAL HIP REPLACEMENT

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Introduction: Malpositioning of the acetabular component in THR has been correlated with increased rate of dislocation, liner fracture, increased wear and adverse soft tissue reactions in metal-on-metal bearings. The aim of the study was two-fold: 1) to evaluate the utility of longitudinal surgeon-specific feedback information based on joint registry data in improving acetabular cup positioning; and 2) to utilize a hospital-based joint registry to document the ranges of acetabular cup orientation following primary total hip replacement in a community hospital and compare to the published results from a tertiary academic hospital. Methods: A joint registry data at an academic hospital was utilized to generate a monthly report pertaining to surgeon's cup positioning. The accuracy of cup positioning pre-feedback was compared with post-feedback information. A local joint registry at the community hospital was used to analyze the cup positioning of 1621 primary THA's. Results: The overall accuracy of the cup abduction has significantly improved in all surgeons following surgeon-specific feedback information. The prevalence of cup malpositioning was found to be significantly higher in a community hospital compared to an academic hospital, especially with metal-on-metal bearing THR. Conclusion: A joint registry-based regular analysis report which surgeons receive from data collected in a nearly real time fashion, is an efficient tool in improving the accuracy of cup positioning, thereby improving quality of outcomes in patients with THR. Higher prevalence of cup malpositioning in a community hospital suggests a potentially greater need and utility of joint registry-based feedback in the community hospital setting.

Date: 2011-09-07

Session: Hip - Positioning of Implant

Time: 16:30 - 18:00

Room: Forum Hall

Abstract no.: 29633

A NEW ACCURATE METHOD OF MEASURING ACETABULAR CUP ANTEVERSION ON SIMULATED RADIOGRAPHS

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INTRODUCTION: Optimal position of acetabular component is crucial for maintaining stability of THA. Postoperative assessment of acetabular anteversion is vital but difficult task. Various methods have been devised with good results for measuring anteversion on plain radiographs but these methods are either too complicated or require special objects like scientific calculator, special protectors, tables etc. A new simplified method of measuring anteversion on plain radiographs was created. **MATERIALS AND METHODS:** Anteversion of acetabular component was estimated on computer generated images of acetabular cup and compared with two previously established methods of Liaw and Pardhan. Measurement was done at 400 different positions of acetabular cup. Another analysis was done after adding femoral head to acetabular component thus obscuring some of acetabular rim. This method was then used to measure anteversion on 40 real radiographs. **RESULTS:** Mean and standard deviation of error for our method was $0.77^{\circ} \pm 0.75^{\circ}$ as compared to $0.93^{\circ} \pm 0.86^{\circ}$ and $0.72^{\circ} \pm 0.68^{\circ}$ for method of Liaw and Pardhan respectively with no significant difference. Maximal errors for our method, Liaw's and Pardhan's method was 3° , 4° , and 2.91° respectively. On analysis after adding femoral head there was a significant difference in error with our or Pardhan's method and Liaw's method. Anteversion measured on real radiographs averaged $17.25^{\circ} \pm 7.5^{\circ}$. **CONCLUSION:** Our new simplified method of measuring acetabular anteversion on plain radiographs is acceptable in comparison to other established methods and requires only routinely used goniometer and calliper.

Date: 2011-09-07

Session: Hip - Positioning of Implant

Time: 16:30 - 18:00

Room: Forum Hall

Abstract no.: 28295

ULTRASOUND BASED COMPUTER NAVIGATION OF THE ACETABULAR COMPONENT: A FEASIBILITY STUDY

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This feasibility study investigated the accuracy of APP registration and acetabular cup orientation in 2 cadavers with different BMI. Five observers each registered the APP five times in both cadavers (BMIs: 32 kg/m² and 25 kg/m²), using an ultrasound based navigation system. By comparison against the CT derived ground truth, the errors in determination of the individual landmarks defining the APP, as well as the resulting errors in the orientation of the APP and the acetabular cup orientation were determined. Across all measurements with the ultrasound navigation system, the errors in rotation and version in determining the APP were $0.5^{\circ} \pm 1.0^{\circ}$ and $-0.4^{\circ} \pm 2.0^{\circ}$, respectively. The cup abduction and anteversion errors determined from all measurements of the five investigators for both cadavers together were $-0.1^{\circ} \pm 1.0^{\circ}$ and $-0.4^{\circ} \pm 2.7^{\circ}$, respectively. While the measurement errors were not dependent upon the experience of the observer with the navigation system, the errors in the cadaver with the higher BMI were found to be reduced compared to the one with the lower BMI. The data further demonstrated a high repeatability of the measurements with an ICC of 0.963 (95% CI: 0.936 to 0.981) for the resulting cup adduction and an ICC of 0.968 (95% CI: 0.943 to 0.983) for the resulting cup anteversion angle. Our preliminary results confirm that ultrasound navigation is a highly accurate tool that allows a reproducible registration of the APP and thereby enables accurate and precise intraoperative determination of the acetabular cup orientation also in patients with increased BMI.

Date: 2011-09-07

Session: Hip - Positioning of Implant

Time: 16:30 - 18:00

Room: Forum Hall

Abstract no.: 27260

PROXIMAL FEMORAL ANATOMY IN TOTAL HIP ARTHROPLASTY A TRI-PLANAR COMPUTERIZED TOMOGRAPHIC ASSESSMENT

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Introduction: Limb length discrepancy is one of the most common surgical complications following total hip arthroplasty. A commonly used surgical reference point is the tip of greater trochanter as a reference for the rotation centre of the femoral head to align the femoral component. Prior studies have suggested that a considerable variation may exist in this relationship. Methods: We used tri-planar computerized tomography analysis of the proximal femoral anatomy in a consecutive series of 150 patients (n=150) to accurately delineate the relationship between the tip of the greater trochanter to the centre of the femoral head. CT scans included the full length images of the patients from pelvis to ankle. Results: The mean location for the centre of the femoral head was 8.64mm (95% confidence interval, 9.44-7.83) distal to tip of the greater trochanter. The centre of the femoral head was found to be distal to the tip of the tip of the GT in 90.6% of cases. Conclusion: Based on our study we would suggest caution in using the tip of the greater trochanter as a reference point during total hip arthroplasty as it could be associated with an inadvertent intraoperative leg lengthening.

Date: 2011-09-07

Session: Hip - Positioning of Implant

Time: 16:30 - 18:00

Room: Forum Hall

Abstract no.: 29059

DOUBLE ACETABULAR WALL: A MISLEADING POINT FOR HIP ARTHROPLASTY

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Despite the great attention focused on cup positioning in primary total hip arthroplasty (PTHA), it is surprising to find so few studies that have dealt with cup placement. One common problem thwarting the correct cup placement during PTHA is the existence of osteophytes which obscure the anatomical landmarks. We evaluated 276 patients with hip complaints, using their plain x-rays and CT-scans. Among these, 57 underwent surgery. We developed a staging system for central osteophytes in hip osteoarthritis based on the radiographic and anatomical findings of our patients. In cases where multiple consecutive radiographies fail to reveal the geography of acetabulum, it is helpful to obtain pre-operative CT-scan especially by the young inexperienced surgeon, thus reducing the risk of failure resulting from the interrupted acetabular landmarks.

Date: 2011-09-07

Session: Trauma Committee - Fractures Around the Knee II: Patella

Time: 10:30 - 12:00

Room: Meeting Hall I

Abstract no.: 28425

NEGLECTED HOFFA'S FRACTURE

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Hoffa fractures are unstable fractures due to bony instability as well as muscular pull. The recommended treatment is open reduction and internal fixation. The nonunion of Hoffa fracture is reported in case reports only. We report six cases of nonunion of Hoffa fracture and discuss their management along with a review of literature. Materials and methods: A retrospective record between 2006 and 2009 was retrieved. Inclusion criteria were coronal fracture of femoral condyle, fractures more than 3 weeks old and fixation failures resulting in nonunion. 6 patients were included in the study. Corticocancellous autologous graft (ipsilateral iliac crest) used in all cases. 4.5 mm Herbert screws (n=2)/ cannulated cancellous screws (n=4) used. For smaller articular fragments 2.7 mm miniscrews (n=2). Reconstruction plates contoured on posteromedial nonarticular surface used (n=3) - additional stability. Results: Union was present clinically and radiologically in all cases at a mean of 16 weeks. Mean follow up was 2.2 years (1-3 years). Mean extension was 60 (range 0-10) and mean flexion was 1150 (100-125). There was no varus and valgus instability. Preoperative varus in two cases was corrected with residual 3 degrees of varus in follow up. There was no case of avascular necrosis and osteoarthritis. There were no superficial and deep infections. Conclusion: non-union Hoffa is rare condition. Every possible chance should be given for refixation. Freshening of the bone ends, bone grafting, stable fixation (plate fixation) with early mobilization gives good results. The patients should be cautioned regarding the suboptimal functional outcome. Even in cases a large defect is created if future replacement surgery is required bone stock would be available.

Date: 2011-09-07

Session: Trauma Committee - Fractures Around the Knee II: Patella

Time: 10:30 - 12:00

Room: Meeting Hall I

Abstract no.: 28737

IMPACTION BONE GRAFTING FOR THE TREATMENT OF SEGMENTAL BONE DEFECTS IN FEMORAL NON-UNIONS: TECHNIQUE AND PRELIMINARY RESULTS

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Femoral non-unions with associated segmental defects are difficult to treat. Impaction bone grafting is an established technique to restore bone stock while providing immediate stability in revision THA. We propose this method can also be successfully used to reconstruct segmental bone defects in femoral non-unions while allowing immediate postoperative weight-bearing. Three patients with segmental bone defects of between 2.5 and 5cm at the site of a femoral shaft non-union were treated with open reduction, intramedullary fixation and impaction bone grafting. All defects were contained with wire mesh and cerclage wires and reconstructed with 100-120cm³ of impacted irradiated coarsely milled bone allograft. Postoperatively the patients were allowed to mobilize as tolerated. All revised femoral defects were monitored with radiographs, RSA and CT scanning for a minimum of 1 year. There were no postoperative complications with all patients returning to full weight bearing within three months. Plain radiographs demonstrated maintenance of reduction in all three cases and union in one case. The metal mesh and intramedullary nail did not allow RSA analysis to be undertaken in two of the cases. In the third case RSA demonstrated 0.5mm migration of the distal femoral segment relative to the proximal femoral segments at six months. CT scans of the grafted area suggested progressive integration at 1 year. All patients are satisfied with the result. Impaction bone grafting shows encouraging results as a method to restore leg length acutely, while allowing immediate weight bearing, in the treatment of segmental femoral defects after femoral shaft non-unions.

Date: 2011-09-07

Session: Trauma Committee - Fractures Around the Knee II: Patella

Time: 10:30 - 12:00

Room: Meeting Hall I

Abstract no.: 29702

**EXTRA-ARTICULAR PROXIMAL THIRD TIBIAL FRACTURES:
INTRAMEDULLARY NAILING VERSUS PLATING – AN ANALYSIS OF 60
CASES**

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Deforming forces created by the extensor mechanism around the knee and comminution has made plating the preferred method of treatment. The development of percutaneous locked plating (PLP) has allowed surgeons to treat these complex fractures without the need for large incisions or the fear of soft tissue stripping, with subsequent failure due to infection and nonunion. The purpose of this study was to compare these 2 treatment methods as regards union, malunion rates, infection rates, need for implant removal, and other possible complications. A retrospective study was done to include 60 cases. Following modifications were done for nailing the proximal tibia. 1) Semi extended knee position for the nail to be passed without damaging the patella, and neutralizing the quadriceps force. 2) Locking bolts 3) Indirect reduction by femoral distracters and special clamps 4) Newer design of nails with proximal Herzog's bend multi level, multi directional and multiple locking screws. There was no loss of fixation by IMN in our studies. The union rate in this group was 94%. The union rate for PLP in closed fracture was 97%. Infection rate in our series was about 3% in closed cases and 20% in open fractures. Our comparison of intramedullary nailing and PLP for the treatment of extra articular proximal tibial fractures showed no clear advantage of either technique. Both forms of treatment provide adequate stability of the fractures. Modifications described above are needed to treat these fractures with IMN. Plating needs newer design of locking plates, minimally invasive technique.

Date: 2011-09-07

Session: Trauma Committee - Fractures Around the Knee II: Patella

Time: 10:30 - 12:00

Room: Meeting Hall I

Abstract no.: 27115

MANAGEMENT OF PROXIMAL THIRD TIBIAL FRACTURES BY INTERLOCK NAIL AND POLLER SCREW ALONG WITH POSSIBLE EXTENDED IMPLICATIONS OF POLLER SCREW

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Objective: To test the efficacy of combination of interlock nail and poller screw in the management of proximal third tibial fractures along with possible extended implications of poller screw. Material and methods: 20 patients of proximal third tibial fractures, 5 patients of delayed union proximal third tibia fracture, 5 patients of distal third femur fracture and 2 patients with long oblique humerus shaft fracture were studied retrospectively from February 2008-June 2009. Patients were treated with closed reduction and internal fixation with interlock nail along with poller screw. Results: All fractures except one of proximal tibia fracture united on an average of 6 months. Tibial fracture series-18 cases had < 5 degree malalignment, 2 cases had 7 degrees of varus malalignment, 3 cases had < 5 degree procurvatum. 1 case in delayed union tibia fracture series had 10 varus malalignment. None of case of femur fracture series had malunion. 8 degrees of varus was observed in 1 case of humerus fracture series. 3 patients had superficial infection. Statistical analysis showed results similar to studies done by krettek et al and ricci et al. Conclusion: Use of poller screw and interlock nail is almost a gold standard for proximal third tibial fractures and the use of poller screw can be very well extended in treatment of difficult fractures of femur, humerus and non union tibia where getting reduction and alignment along with construct stability can be a problem. Hence poller screws are not just blocking screws but an effective tool for reduction.

Date: 2011-09-07

Session: Trauma Committee - Fractures Around the Knee II: Patella

Time: 10:30 - 12:00

Room: Meeting Hall I

Abstract no.: 28728

EVALUATION OF TREATMENT MODALITIES OF MANAGEMENT OF FLOATING KNEE

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Introduction: Floating knee injuries focus more on the articular and vasculonervous plane of the knee, complications are more frequent with very few reviews in literature on the outcome and management. We in our study have tried to analyse the cases of floating knee with respect to the pre operative factor, treatment modality and the effect on outcome of these difficult injuries Methods: we performed a prospective study of 25 cases with floating knee injuries classified according to Fraser's classification and operated. Different modalities of treatment were used as dictated by the soft tissue and the bone condition. The patients were assessed clinically using Karlstorm-Olerud criteria and radiologically till 2 years. The p value was calculated using ANOVA test. Results- fractures of 17 patients united with single surgery while 8 patients required repeat surgery. Total average union time was 8.4 ± 3.9 months with 8 excellent, 11 good, 4 fair and 2 poor results. All patients were walking full weight bearing at the end of average 8.7 ± 3.8 months. In the comparison based on fracture type, p value was significant for union time (i.e. $p=0.001$), however no significant difference between hip and knee range of motion was found. There was no significant difference in either hip range of motion or knee range of motion in fractures with different grades on compounding. Also we found no significant difference in cases of union time with respect to degree of compounding. Final functional results: As per Karlstorm and Olerud criteria there were 8 excellent, 11 good, 4 fair and 2 poor results. Conclusion: Surgical management of floating knee gives acceptable results and complications arising are treatable with achievement of union and acceptable functional outcome.

Date: 2011-09-07

Session: Trauma Committee - Fractures Around the Knee III: Proximal Tibia

Time: 14:00 - 15:30

Room: Meeting Hall I

Abstract no.: 27192

MANAGEMENT OF COMPLEX INTRA-ARTICULAR PROXIMAL TIBIA FRACTURES – IS LOCKING COMPRESSION PLATE {LCP} THE ANSWER?

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Complex intra-articular proximal tibia fractures {#} are challenging to treat. Restoring anatomy of articular surface and alignment are the keystones for treating this #s. Material and methods: 30 patients with intra-articular # tibia were studied prospectively from June 2007-August 2010 with an average follow-up of 8 months. X-rays along with c-t scan and 3-d reconstruction were done. According to schatzker classification there were 16 #s in type 6,6 in type 5,4 in type 4 and type3 each. Compound #s were classified according to gustilo Anderson classification. Pre-operative paper planning for fixation was done. All the #s were treated after skin condition permitted, with minimally invasive reduction of articular surface and alignment of tibia by different methods. Emphasis was given to reduce posteromedial/posterolateral fragment. After restoring the articular surface and alignment LCP was fixed by MINIMALLY INVASIVE PLATE OSTEOSYNTHESIS {MIPO} technique. Fracture geometry dictated the approach taken and type of system {either compression or splinting} used. Results: Of 30,2 patients lost to follow-up. Results were evaluated according to knee society score which was excellent in 62% cases and good in 18% cases. Union was seen in all cases at average of 12 weeks. Complications: 2 patients developed varus, 1 patient developed superficial infection which did not require implant removal, 2 patients had backed out lag screw. Conclusion: LCP seems to be the answer for the treatment of complex intra-articular tibia #s though more long term follow-up studies with large study sample are required for a concrete conclusion.

Date: 2011-09-07

Session: Trauma Committee - Fractures Around the Knee III: Proximal Tibia

Time: 14:00 - 15:30

Room: Meeting Hall I

Abstract no.: 28735

TREATMENT OF TIBIAL PLATEAU FRACTURE – COMPARISON OF ARTHROSCOPICALLY ASSISTED FIXATION WITH DIRECT PERCUTANEOUS FIXATION

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Tibial plateau fracture is a significant surgical challenge. Arthroscopically assisted fixation of this complex fracture is a reliable method. The object is to evaluate Arthroscopically assisted fixation compared to Percutaneous Fixation with 'L' buttress plate or partially thread 6.5mm screw, at a follow up in one year. Method In 2008 to 2009, reviewed 30 Arthroscopically assisted cases (28 Male and 2 Female). Mean age 40.6 yrs and compared them with 37 Percutaneous Fixation cases (30 Male and 7 Female). Mean age 41.2 yrs, with L Buttress plate or partially threaded 6.5mm screw under the guidance of an Image Intensifier. Subjects were randomly selected. Arthroscopically assisted group -TypeI 10 cases, TypeII 7 cases, TypeIII 7 cases, TypeIV 6 cases. Percutaneous Fixation group- TypeI 7 cases, TypeII 8 cases, TypeIII 5 cases, TypeIV 8 cases, TypeV 8 cases. Results: All cases were followed up for a minimum of 1 year, after surgery. Patients in Arthroscopically assisted group had lower hospital stay, which is insignificant with a similar post Operative management protocol. Radiological reduction and alignment was considered good in 94 % cases in Arthroscopically assisted group and 91% in Percutaneous Fixation group. KSS in arthroscopy assisted group KS 80+/- 5, Functional Score 90+/- 5. Percutaneous Group KS 75+/-5, FS 85+/- 5. Conclusion Treatment of Tibial Plateau assisted with arthroscopy offers a good option to treat this complex fracture. It offers better results with very expertise hand. But not significant difference in Type I, II and Arthroscopically assisted is better in III, IV type. Clinically range of movement was nearly the same in both the groups. In this short study it is difficult to show the advantage of one over the other. But now Arthroscopically assisted is considered as a better option in an advance trauma centre for treatment of Tibial Plateau fracture.

Date: 2011-09-07

Session: Trauma Committee - Fractures Around the Knee III: Proximal Tibia

Time: 14:00 - 15:30

Room: Meeting Hall I

Abstract no.: 27850

NEW COMBINED TECHNOLOGIES FOR TREATMENT OF PATIENTS WITH CLOSED TIBIAL PLATEAU FRACTURES

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Since 2002 operative treatment including combination of arthroscopic technologies and improved Ilizarov modules has been performed for 62 patients aged from 22 to 63 years with tibial plateau fractures. Injury to soft tissue structures of the knee was arthroscopically diagnosed in 35 (55.5%) cases. Tibial plateau was reduced under arthroscopic control either simultaneously or gradually using Ilizarov techniques of osteosynthesis. Tibial plateau was reduced gradually in multiplanar bone displacement using reposition device offered with Ilizarov fixation to be followed. MRT scan reconfirmed that accurate reduction of tibial plateau was shown to reduce remodeling period, and complete radiomorphological union at the fracture site was not found to occur within a long period of time in case of a poor reduction. Exercising of the joint commenced on the second postoperative day. With damaged ligaments of the knee hinges were mounted to allow for motion with simultaneous unloading as a measure to prevent posttraumatic gonarthrosis. Functional loading on the operated limb was allowed from the second to third postoperative day. Fixation of the tibial plateau fragments was produced during 55.9 ± 1.1 days; a course of rehabilitation was conducted after the frame came off. Long-term follow-ups of one to seven years were studied in 48 (76%) patients. The bone result was good for 78.9% observations, fair for 18.4%, and poor for 2.7% of the cases.

Date: 2011-09-07

Session: Trauma Committee - Fractures Around the Knee III: Proximal Tibia

Time: 14:00 - 15:30

Room: Meeting Hall I

Abstract no.: 27814

ROLE OF FIBULA IN MANAGEMENT OF TIBIAL PLATEAU FRACTURE AND ITS FUNCTIONAL OUTCOMES

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We studied the role of fibula in development of deformities and its affect on overall functional outcome under weight bearing conditions in management of Tibial condyle fractures in 92 patients grouped as I (lateral condyle fracture), II (medial condylar fracture) and III(bicondylar fracture) subdivided as A (intact fibula) and B (fibula fracture) treated conservatively as well as operatively and evaluated and compared at final follow up for residual deformity (varus/valgus), range of motion and functional outcome using Rasmussen's functional scoring system. In type 1A almost 95% patients had deformity less than 10 and operative group having slightly superior functional results. In type 1B all patients had deformity less than 10 and both conservative and operative group had excellent to good results. Both IA and IB had valgus deformity but less than 10. In type 2 A although none have deformity more than 10, but only operative group had deformity less than 5. Buttress plating group had better functional results. In type 2 B all conservative treated had more than 10 deformities. In type 3 A 33% had deformity more than 5 and these had worst prognosis as compared to others and buttress plating proved to be superior option. In type 3 B 44% had deformity more than 5 and more viable option is buttress plating. FIBULA is an important determinant in deformity development and functional out come in tibial plateau fracture, and hence should be included in classification, pre-operative planning, mobilization and weight bearing protocols.

Date: 2011-09-07

Session: Trauma Committee - Fractures Around the Knee III: Proximal Tibia

Time: 14:00 - 15:30

Room: Meeting Hall I

Abstract no.: 28285

THE RISK OF INJURY TO THE ANTERIOR TIBIAL ARTERY IN THE POSTEROLATERAL APPROACH TO THE TIBIAL PLATEAU: A CADAVER STUDY

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Introduction: Posterolateral tibial plateau fractures account for 7 % of all proximal tibial fractures. Their fixation often requires posterolateral buttress plating. Approaches for the posterolateral corner are not extensible beyond the perforation of the anterior tibial artery through the interosseous membrane. This study aims to provide accurate data about the inferior limit of dissection by providing measurements of the anterior tibial artery from the lateral joint line as it pierces the interosseous membrane. Materials and Methods: Forty unpaired adult lower limbs cadavers were used. The posterolateral approach to the proximal tibia was performed as described by Frosch et al. Perpendicular measurements were made from the posterior limit of the articular surface of the lateral tibial plateau and fibula head to the perforation of the anterior tibial artery through the interosseous membrane. Results: The anterior tibial artery coursed through the interosseous membrane at 46.3 +/- 9.0 mm (range 27 – 62 mm) distal to the lateral tibial plateau and 35.7 +/- 9.0 mm (range 17 – 50 mm) distal to the fibula head. There was no significant difference between right or left sided knees. Discussion: This cadaveric study demonstrates the safe zone (min 27 mm, mean 45mm) up to which distal exposure can be performed for fracture manipulation and safe application of a buttress plate for displaced posterolateral tibial plateau fractures. Evidence demonstrates quality of reduction correlates with clinical outcome and the surgeon can expect to be able to use a small fragment buttress plate of up to 45mm as this is the mean.

Date: 2011-09-07

Session: Trauma Committee - Fractures Around the Knee III: Proximal Tibia

Time: 14:00 - 15:30

Room: Meeting Hall I

Abstract no.: 28469

OPEN REDUCTION AND INTERNAL FIXATION OF ISOLATED PCL FOSSA AVULSION FRACTURES: AN INDIAN EXPERIENCE WITH 42 PATIENTS

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PCL avulsion fracture of tibia is not a rare injury in countries like India where motorcycle accidents are common. Arthroscopic fixation of such an avulsed bony fragment is technically demanding and might not be feasible in all set ups. We assessed 42 patients (30 males and 12 females) with a mean age of 27.45 years who underwent open reduction and internal fixation of such fracture through a modified posterior approach. In 30 patients surgery was performed within 3 weeks of injury. A note was made of occult intrasubstance tear of the PCL (15 patients) as seen in MRI in all the patients. Objective, subjective and functional assessment of patients was made based on Hughston criteria. The average follow up consisted of 19.33 months (range 10-42 months). The statistical analysis demonstrated significant difference ($p < 0.05$) in the outcomes between acutely treated patients and patients with chronic injury; patients with acute fixation were found to fare better. Nevertheless the results were fair or good in majority of the patients (9 out of 12) with treatment delays. A statistically significant difference in the outcomes was also seen in patients with occult injury to PCL as seen on MRI who had poorer outcomes. To conclude, we believe that fixation using the modified posterior approach should be attempted in all the cases of PCL avulsion injuries whatever might have been the delay in treatment. We also believe that the patients with occult PCL injury are better treated with PCL reconstruction at the primary setting.

Date: 2011-09-07

Session: Trauma - Shaft of Tibia

Time: 16:30 - 18:00

Room: Meeting Hall I

Abstract no.: 28220

MANAGEMENT OF OPEN GRADE III TIBIAL FRACTURES WITH UNREAMED INTERLOCKING NAIL

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Open grade III fractures of tibia are challenging therapeutic problem. External fixator has been the mainstay of stabilization of these fractures but they are associated with high incidence of complications like pin tract infection, malunion, nonunion, need for multiple surgeries and poor patient compliance. This study was undertaken to analyze the lesser studied role of ILN in management of these fractures. 102 patients with 103 fractures who were admitted in Dayanand Medical College, Ludhiana (India) over a period of 3 years and treated with unreamed interlocking nail within 12 hours were included in this study. An aggressive soft tissue management with repeated debridements till the wound became healthy was undertaken. 48% patients were managed with SSG, 22% with flap coverage and in remaining 30% primary or secondary suturing was done. Ninety (88%) fractures united within 36 weeks with mean time of union being 35 weeks. Bone grafting was done in 22(26%) patients having extensive comminution, bone gap and delayed union. Six patients had nonunion. Twelve (14%) patients developed infection out of which fractures united in six with debridements only. In remaining six nail was removed and union was achieved with renailing in three and Ilizarov fixator in other three. Majority of patients had range of motion more than 120 degrees. In conclusion, early unreamed intramedullary nailing for these fractures after managing soft tissue injury gives good outcome with proper alignment, good range of motion, short rehabilitation period, low infection and nonunion rate.

Date: 2011-09-07
Session: Trauma - Shaft of Tibia
Time: 16:30 - 18:00
Room: Meeting Hall I

Abstract no.: 29475

OPEN TIBIA FRACTURES IN SOKOTO, NIGERIA: A REVIEW OF 71 CASES

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Background: Open tibia fractures remain a challenging fracture to manage especially in our region. Efforts are usually geared towards converting the fractures to a close one through appropriate measures aimed at wound care. Objective: To examine the management outlook with regard to open tibia fractures. Methodology: This is a retrospective study that involved 71 cases of open tibia fractures. Medical records of patients with open tibia fractures were studied for mechanism of injury, treatment types and outcome. Results: There were 71 cases of open tibia fractures with males accounting for 57 (80%) and females 14 (20%). The age range was 5 to 70 years with a mean age of 34 and standard deviation of 18. Road Traffic accidents was the commonest cause of open tibia fractures accounting for 65 (92%), followed by Gunshots injuries 2 (3%), Assault 2 (3%), amongst others. 51 (72%) of the cases were isolated injuries while 20 (28%) were components of polytrauma. 38 cases were Gustilo-Anderson 1, 9 were type 11 and 24 were type 111. Cast application was done in 15 (21%), External fixation and casting 12 (17%). Amputation was done in 1 case and another case was referred. 42 (59%) cases left against medical advice. All patients had antibiotics while 38 had irrigation and debridement. 4 cases of wound infection were recorded. Conclusion: Road Traffic injuries remain an important cause of open fractures and external fixation with casting has been found to be a useful treatment modality in reducing wound infections.

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Session: Trauma - Shaft of Tibia

Time: 16:30 - 18:00

Room: Meeting Hall I

Abstract no.: 28470

OPERATIVE MANAGEMENT OF TYPE II AND TYPE IIIA OPEN TIBIAL FRACTURES PRESENTING FROM 6 TO 24 HOURS AFTER INJURY: AN INDIAN EXPERIENCE

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INTRODUCTION: Despite better management options available today, treatment of open tibial fractures presenting late still remains controversial. Delays ranging from 6 hours to 24 hours prior to presentation are quite common in developing countries like India. This study evaluated the comparative outcomes of operative treatment in such patients. **METHODS:** 142 open (type 2 and type 3a) fractures of the tibial shaft (age group 16- 40), presenting with treatment delays were alternatively managed with external fixator (EF) and unreamed tibial nail (UTN). Exclusion criteria included patients with fracture extending into articular surfaces of either end of the tibia, patients with open Type 1 or Type 3b/c fractures where we universally used UTN and EF respectively, patients with comminuted fractures (Winqvist Hansen type 3 or type 4), time of injury <6 hours or >24 hours and polytrauma patients. A total of 114 patients (who completed a minimum follow up of 1 year) were assessed at a mean follow up of 84.5 weeks. Evaluation was based on time to union, evidence of nonunion, presence of malunion or malalignment, presence of deep infection or osteomyelitis. **RESULTS:** Union time and infection rates were less for EF group (p value: 0.047 and 0.000 respectively) while malunion and nonunion was lesser in UTN group (p value: 0.013 and 0.012 respectively). After repeated surgeries, all these fractures ultimately united, but 4 patients in the UTN group were left with a persistent discharging sinus. **CONCLUSIONS:** UTN may not be the implant of choice for patients presenting after 6 hours of injury. EF is a better alternative in developing countries when patients reach late to the hospital. Although initial union rates may be lower with EF as compared to UTN, these fractures ultimately unite if a second staged reamed nailing is carried out.

Date: 2011-09-07
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Time: 16:30 - 18:00
Room: Meeting Hall I

Abstract no.: 28821

EPIDEMIOLOGICAL ANALYSIS OF 323 OPEN TIBIAL DIAPHYSEAL FRACTURE OUTCOMES – A 10-YEAR EXPERIENCE

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Joseph THAMBIAH
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Background: Open fractures of the tibial shaft pose a therapeutic challenge to orthopaedic and plastic surgeons. The purpose of this study was to conduct a retrospective observational review to evaluate the epidemiological factors which influence fracture outcomes. Methods: A 10 year period of open tibial shaft fractures presenting to our institution was reviewed. Demographical and management data parameters were recorded. Statistical analysis was performed on outcomes of length of hospital stay, number of operations, time to union, rate of infection and cost of treatment. Results: 323 fractures met our inclusion criteria (Gustilo 1= 53, 2= 100, 3= 170). Mean age was 36.5 years and 91.3% were male. 69.3% of fractures occurred due to road traffic accidents and 21.7% as industrial accidents. Mean length of hospital stay was 28.7 days and mean number of operations was 4.29. Time to union was 10.7 months and overall infection rate was 21.5%. Infection rates were significantly higher in Gustilo 3b/3c vs Gustilo 3a (41.6% vs 19.0%). Overall amputation rate was 5% (16 amputations) and Gustilo 3c amputation rate was 57.1% (12 amputations). No significant reduction in infection rate was found between fractures operated on before and after 6 hours in our institution. The average cost exponentially increases from a Gustilo 1 fracture (SGD\$11,613) to a Gustilo 3c fracture (SGD\$102,499). Conclusion: High grade Gustilo- Anderson classification and AO Classification injuries positively correlate with high non union and infection rates, requiring multiple operations and long hospital stay. These fractures afflict young working adults, imposing a heavy economic burden on the individual and treating institution. A small proportion of these patients would be poly-traumatised, indirectly affecting fracture union.

Date: 2011-09-07

Session: Trauma - Shaft of Tibia

Time: 16:30 - 18:00

Room: Meeting Hall I

Abstract no.: 27941

DETERMINANTS OF QUALITY OF LIFE AFTER OPEN TIBIAL SHAFT FRACTURES: FINDINGS OF A MULTICENTER STUDY

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This study investigated to what extent quality of life four years or more after the fracture is determined by initial staging (Gustilo classification, time from injury to arrival at hospital), by the therapeutic course (length of hospital stay, number of operations), by complications (amputation, infection) and by demographic factors (gender, age). A total of 197 patients after type III open tibial shaft fractures (type IIIA 70, type B 85, type IIIC 42) from nine centers volunteered to participate in this study. During patient's follow-up appointments (mean duration of follow up 50 months), therapeutic course, pre-surgical staging and demographic data were recorded by the surgeon. Patients were asked to rate quality of life on the Nottingham Health Profile and on a visual analogue scale. Multiple regression analysis (stepwise) identified two predictors for reducing overall quality of life (F-test: $p=0.007$): number of operations (adjusted beta. -0.21) and age (adjusted beta: -0.17). Other factors showed no significant relationship with overall quality of life or with subscales of the Nottingham Health Profile. These findings indicate a dilemma between two therapeutic goals: good functional outcome, which often requires repeated operations, and quality of life, which suffers under prolonged surgical treatment.

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Time: 16:30 - 18:00

Room: Meeting Hall I

Abstract no.: 28974

CLINICAL OUTCOMES OF DEFINITIVE FIXATION AND SOFT TISSUE COVERAGE IN OPEN GRADE III TIBIA SHAFT FRACTURES

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Background: Management of Grade 3 open fractures is frequently challenging due to soft tissue compromise. With early presentation to the hospital, adequate debridement followed by primary fixation and soft tissue coverage may be advantages. Nevertheless, it may be done as a secondary procedure after initial stabilisation with an external fixator. Objective: The purpose of this retrospective review is to analyse the clinical outcomes of Gustilo Grade III open fractures managed with fixation and soft tissue coverage in a single institution. Materials and Methodology: Open fractures undergoing 'fix and flap' treatment, over a 30 month period (Jan, 2008 to June, 2010), were reviewed. All fractures were classified according to Gustilo - Anderson classification post surgical debridement. Demographic details, level of fracture, time to surgery (temporary and definitive), type of fixation, type of flap and complication at 6 months were documented. Results: Forty four cases were reviewed. Mean age was 41.4 years (19-72). Almost 50% of the fractures were at the level of shaft and the majority of the fractures were fixed and flapped between 24 and 72 hours. 78.5% were treated definitively with internal fixation (19-IM Nail, 14-Plate) and the remaining was managed with external fixation. 61% (27) required local flap and the remaining were free flaps (7 Latissimus Dorsi and 10 Gracillis). More than 50% of the cases had bony complication including delayed union, non- union and osteomyelitis. Five had flap related complications. Only 36% (16) achieved union with healthy soft tissue coverage. Conclusion: Bony complications are more prevalent in our cohort of open grade three fractures treated with internal fixation and soft tissue coverage. Hence, the decision for definitive fixation should be well thought-out keeping in view of the possibility of delayed fixation after soft tissue coverage has stabilised and bony conditions are optimised.

Date: 2011-09-07

Session: Trauma - Shaft of Tibia

Time: 16:30 - 18:00

Room: Meeting Hall I

Abstract no.: 27712

MINIMAL FIXATIONS FOR TREATMENT OF CLOSED SEGMENTAL FRACTURES OF TIBIAL SHAFT IN ADULTS

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Objective: Aim of the study is to evaluate the union rate, alignment and infection rate in treatment of closed segmental fractures of tibial shaft in adult by minimal internal and external fixations. Patients and Methods: From April 2005 to January 2010, we treated 91 patients with high-energy fractures of the tibial shaft. Twenty patients were suitable for our study who had closed segmental fractures of tibial shaft (C2 / AO classification), treated by minimal internal and external fixations, with follow up range from 6 months to 1 year. Results: The union rate was 85% with the expected time 12-24 weeks, 10% pass to delayed union and take average of 4 weeks more than the expected date; only 5% developed non-union and need bone graft to enhance union. The range of varus-valgus angulation was 0o-4o, while posterior-anterior angulation was 0o-3o. Two patients developed superficial pin tract infection and responded well to antibiotic therapy and local hygiene. No patient developed full picture of osteomyelitis, nor deep infection. Conclusion: Because of high rate of success and less invasive surgery, we concluded that using the minimal fixations (internal and external) in the treatment of closed segmental fractures of tibial shaft (C2) in adults is a good choice alternative to locked intramedullary nail fixation.

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Time: 16:30 - 18:00

Room: Meeting Hall I

Abstract no.: 29018

COMPARATIVE STUDY OF ILIZAROV METHOD OF EXTERNAL FIXATION AND UNREAMED INTERLOCKING NAILING IN COMPOUND FRACTURES OF TIBIA

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OBJECTIVE: To compare the results of treatment of compound fracture of tibia using Ilizarov external fixator and undreamed interlocking tibial nail. **METHODS:** Forty patients between 25 and 60 years having a compound tibia fracture (Gustilo type I,II,IIIA & IIIB) were divided into two groups by random number allocation and treated with either Ilizarov or undreamed tibial nailing. The patients were followed up regularly for an average period of 47 months and the functional outcome and results were assessed with the help of predefined criteria. **RESULTS:** Excellent functional results were seen in 90% patients treated with undreamed tibial nail and only 35% patients treated with Ilizarov ($p=0.004$). The average time to union of the fracture in Ilizarov group was 19.06 weeks and in nailing group was 17.3 weeks ($p= 0.463$). The mean wound healing time in Ilizarov group was 2.8 weeks and in nailing group was 1.75 weeks ($p= 0.65$). The rate of fracture non-union and preservation of range of motion of knee and ankle joint was comparable in two groups ($p=0.4$ and $p=0.3$ respectively). Infection occurred in only 5% of nailing patients and 70% of Ilizarov patients. **CONCLUSION:** Compound fractures of tibia not associated with massive bone loss can be better and more effectively treated by undreamed tibial interlocking nailing. Undreamed nailing is associated with better functional outcome, lesser chances of infections and lesser rates of non-union and mal-union. Management of soft tissue defects overlying the tibial fractures is better and more easily done with nailing compared to Ilizarov fixator.

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Session: Trauma - Shaft of Tibia

Time: 16:30 - 18:00

Room: Meeting Hall I

Abstract no.: 27154

TREATMENT OF INFECTED NON UNION TIBIA {ROSENS TYPE 2} BY INDIGENOUSLY DEVELOPED ANTIBIOTIC COATED NAIL, ANTIBIOTIC COATED BEADS AND ILIZAROV RING FIXATOR – A STUDY OF 200 CASES

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Infected non union tibia is one of the most difficult problems to treat which are encountered by orthopaedic surgeons on a day to day basis. Material and methods: 200 cases of infected non union tibia which were type 2 according to rosens classification with age range from 24 to 63 years were treated from 2002 to 2009. Duration of follow up was from 1 to 5 years. All patients were treated with debridement and insertion of indigenously developed antibiotic beads and fixation with indigenously developed antibiotic coated nail and ilizarov ring fixator. Ring fixator and beads were removed on an average of 7 weeks. Antibiotic nail was removed after 3 months. Cultures were obtained from non union site and when found negative the non union was fixed with definitive intramedullary interlock nail. When found positive redebridement was done and fixation was done again with antibiotic coated nail and ring fixator and when cultures were negative definitive fixation with intramedullary interlock nail was performed. Results and complications: Out of 184 cases which united 21 cases went into malunion, 12 cases went into delayed union, 2 cases remained un-united, 2 cases lost to follow-up. 65 patients developed shortening of < 2cm. Superficial pin tract infection was seen in 43 cases. Knee stiffness developed in 18 cases. Fixed equinus at ankle was seen in 26 cases. Conclusion: Rosens type 2 infected non-union can be very efficiently and effectively treated by our indigineously developed antibiotic coated nail, antibiotic coated beads and ilizarov ring fixator.

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Abstract no.: 28356

A RANDOMIZED PILOT TRIAL OF INTRAMEDULLARY NAILING VERSUS 'LOCKING-PLATE' FIXATION FOR EXTRA-ARTICULAR FRACTURES OF THE DISTAL TIBIA

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We performed a pragmatic, randomised, pilot trial to compare intramedullary nailing with 'locking-plate' fixation for extra-articular fracture of the distal tibia. Methods: Patients presenting with a closed or Gustillo1, extra-articular fracture of the distal tibia were offered the opportunity to participate. Consenting patients were randomised to either intramedullary nailing or 'locking-plate' fixation. Fractures too distal to achieve four cortex fixation with distal locking screws (IM nailing) or patients with other serious injuries were excluded from the study. The primary outcome measure was the patient-reported Disability Rating Index (DRI). We also recorded the American Orthopaedic Foot & Ankle Score (AOFAS), EuroQol (EQ-5D), and the Olerud & Molander Ankle score (OMA), at 3, 6 & 12 months post operatively. Mal-union, infection, rate of re-operation and non-union were recorded. Results: The study recruited 12 patients into each group. In this pilot study, there were no statistically significant differences between the intramedullary nail and the locking-plate group on any measure at any time-point: specifically the DRI at 12 months (Mann-Whitney test; $p=0.439$). At 6 months post-operation, there was a 10 point difference (SD=20) in the DRI in favour of the intramedullary nail group. This treatment difference, although not statistically significant, persisted after this time-point but began to diminish by the 12 month assessment as patients began to approach the ceiling of the DRI measure. Therefore, the study suggested that the six month assessment was likely to be the most sensitive to the treatment effects. More secondary procedures were required in the plate fixation group. Conclusion: This pilot study did not have the power to detect significant differences between the two methods of fixation. However, it provides compelling evidence to support the development of a definitive multi-centre randomised trial.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Upper Extremity, Limb Lengthening

Time: 08:00 - 09:30

Room: Meeting Hall IV

Abstract no.: 30262

LIMB LENGTHENING OF THE LOWER LIMBS IN SHORT STATURE PEOPLE, TEENAGERS AND YOUNG ADULTS

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Introduction: Our experience and the security afforded by present-day techniques of lengthening, prompted us to use these possibilities for subjects of short stature. These short statures are generally secondary to a growth disorder. The diagnostic procedure regarding short statures – whose definition is a stature minor to -2SD (163 cm for male and 151 cm for female) in relation to the standard growth of the normal population– with a question: is the short stature in proportion or out of proportion? Material and methods: This short stature will have a psychological and social repercussion giving rise to defence mechanisms with repercussions in adult age. The lengthening strategy depends on the initial stature, on the pathology (proportional or disproportional stature). 2 or 4 lengthenings can be performed, always at the end of growth using the Ilizarov technique for legs or lengthening of four limb segments by a crossed lengthenings (Callotasi for femorur and contro-lateral tibial lengthening with Ilizarov's technique). Complications are numerous and should be classified according to the Caton's classification (SOFOT 1991). Results: Between 1984 and 2005 we treated 44 subjects of short stature, 11 of whom were operated on by crossed lengthenings, the others with Ilizarov's technique on the two legs. The mean gain was 11cm (9-11cm for isolated tibial lenthenings and 16cm for crossed lengthening); and one or two subjects have no complications at the end of lengthenings. Discussion: The patients with the fewest complications were in achondroplasia and those with most complications were in Turner's syndrome. The 4 major indications are achondro and hypochondroplasia, Turner's, small constitutional statures. Today, the indications are as follows: isolated lengthening of the 2 legs (6 to 12cm) for harmonious subjects. For those whose stature is less than 1m40 or is disharmonious, lengthening of the 4 limb segments (femurs 6 to 10 cm and 7 to 15 cm on the tibias).

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Session: IFPOS/SICOT: Paediatrics - Upper Extremity, Limb Lengthening

Time: 08:00 - 09:30

Room: Meeting Hall IV

Abstract no.: 28239

ONE BONE FOREARM – A RECONSTRUCTIVE PROCEDURE FOR RADIO-ULNAR DEFECTS

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Introduction: In a child if large defect or gap in one of the forearm bones left untreated, secondary deformities develop resulting into a short and crooked fore-arm with limitation of movements of elbow and wrist. The usual treatment of gap grafting is not practicable in these cases due to extensive gap & missing of one articular end of the bone. Ulnar transposition (at the lower end) and radial transposition (at the upper end) resulting in a one bone forearm serves as a sound and excellent method of treatment in these cases where most of the radius except the lower end may be missing or most of the ulna except the upper end is absent or deformed. Review of literature: There are only a few reports in the literature of this procedure. Heygroves (1921) and Watson Jones (1934) transposed ulna to lower end of radius in one case each. Vitale (1952) performed radio-ulnar fusion in 2 Cases. Material & Method: We present a review of 09 patients treated in our Institute in last 6 years. 8 cases were males and 4 were females. The age incidence varied from 7 to 14 years. 7 cases were of post traumatic / post operative gap non-union and 2 were of pseudoarthrosis of ulna. The mean time for radiological union was 6 weeks. Movements of elbow and wrists were started with forearm guard at 6 weeks & function of hand achieved at 9 weeks. The longest follow-up was 6 years and the shortest 2 years. Conclusion: Radial / Ulnar transposition to produce One Bone Forearm is still a dependable, effective and economical procedure with lesser complication, good outcome, shorter hospital stay and easier post operative maintenance for radio-ulnar defect.

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Session: IFPOS/SICOT: Paediatrics - Upper Extremity, Limb Lengthening

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Room: Meeting Hall IV

Abstract no.: 29369

**OPTIMAL LOCATION OF MEDIAL HINGE FOR CLOSED WEDGE
OSTEOTOMY OF CUBITUS VARUS TO MINIMIZE LATERAL CONDYLAR
PROMINENCE**

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Lateral condylar prominence is a common problem after corrective osteotomy of cubitus varus which is believed to be resulted from unequal opposing cut surfaces of lateral-based wedge osteotomy using a medial hinge. This study investigated on this issue using the 3-dimensional CT data set of the deformed and the normal elbows of three patients with cubitus varus deformity who were scheduled for corrective osteotomy. The CT scan was performed with 3 mm slice thickness and reconstructed was done with 1 mm interpolated slice thickness in both sides of humerus. The CT-data set was then manipulated in reverse engineering software. The 3-dimensional models of both deformed and normal humeri were studied. Several locations of the medial hinge were then virtually performed. The degree of correction was considered from the varus angle plus normal carrying angle of the normal side. From the study of these three patients, it was found that: the level of the medial hinge from the joint line is a consistent factor with directly proportionate to the amount of the lateral condylar prominence. The optimal level of the medial hinge was found to be at the upper border of the medial epicondyle. At this level of medial hinge the lateral condylar prominence index will be closed to that of the normal elbow.

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Session: IFPOS/SICOT: Paediatrics - Upper Extremity, Limb Lengthening

Time: 08:00 - 09:30

Room: Meeting Hall IV

Abstract no.: 29340

DOME OSTEOTOMY STABILISED WITH JESS FOR CORRECTION OF CUBITUS VARUS DEFORMITY

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INTRODUCTION: Lateral closed-wedge osteotomy for cubitus varus correction is a simple and safe procedure; however it is fraught with technical difficulty of producing lateral condyle prominence. Dome osteotomy can overcome this problem by allowing translation alongwith angular correction and correction of deformity in both coronal and saggital plane. Stabilisation of osteotomy with internal fixation is standard but may need a second procedure for removal of implant at a later date. We undertook a prospective study cubitus varus deformity correction with dome osteotomy stabilised with JESS Fixator. **MATERIAL AND METHODS:** Dome osteotomy stabilised with JESS was performed in 33 patients with cubitus varus deformity. Radiographs of involved elbow were compared to opposite side both preoperatively and postoperatively. **RESULTS:** The average age of patients and duration of deformity was 12.1 and 5.6 years respectively. Osteotomy united after an average of 4.6 weeks and mean carrying angle changed from -14.3° to 9.7° . LPI averaged at 2.3% preoperatively and -4.5% at final follow up. There was no significant loss of correction or movements after an average follow up of 4.2 years. Complications were pin tract infection (4) and loss of reduction (1). According to Oppenheim's criterion modified for LPI, there were 21 good, 11 fair and 1 poor results. **CONCLUSION:** Dome osteotomy stabilised with JESS is an acceptable procedure for correction of cubitus varus deformity with relatively few complications and advantages of better cosmesis, early movements, and avoidance of second surgery for removal of implant.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Upper Extremity, Limb Lengthening

Time: 08:00 - 09:30

Room: Meeting Hall IV

Abstract no.: 27394

MODIFIED STEP CUT OSTEOTOMY FOR POST TRAUMATIC CUBITUS VARUS: OUR EXPERIENCE WITH 14 CHILDREN

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BACKGROUND: Lateral closing wedge osteotomy is a commonly described procedure for correcting cosmetically unacceptable posttraumatic cubitus varus deformity in children. However complications like residual deformity, lateral prominence, loss of fixation and ulnar nerve palsies commonly contribute to poor outcomes with such an osteotomy. **METHODS:** Fourteen children (11 boys and 3 girls) of malunited extension type supracondylar fracture of the humerus with an average age of 9.07 years (6-14 years) were operated around 3.6 years (1.5 to 7 years) after the injury by a modified step cut osteotomy. The average follow up period was 2.1 years (1-4 years). Objective assessment included measurement of preoperative and postoperative lateral prominence index, carrying angle and range of elbow motion. Results were graded excellent, good or poor as per the Oppenheim criteria. **RESULTS:** There were 8 excellent, 5 good and one poor result. A residual varus of more than 10 degrees was seen in the single patient with poor result. None of the patients showed a prominent lateral humeral condyle or formation of hypertrophic scar. Our results were comparable to the published results of the classical lateral closing-wedge osteotomy in terms of elbow motion and correction of deformity. However results were superior to those of the lateral closing-wedge osteotomy in terms of prominence of lateral humeral condyle, acceptability of scar, and cosmesis. **CONCLUSION:** A modified step cut osteotomy is a safe and simple procedure which prevents lateral prominence and leads to good or excellent outcomes in most of the patients.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Upper Extremity, Limb Lengthening

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Room: Meeting Hall IV

Abstract no.: 29692

LIMB LENGTHENING WITH A SUBMUSCULAR PLATE

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Patient's non acceptance of a bulky external fixator, the incidence of fractures of the regenerate muscle transfixion giving rise to contractures especially in the Tendo Achilles, increased index of consolidation and the frequency of infections has made Limb lengthening with external fixators alone unpopular. In a retrospective study, we evaluated the technique of limb lengthening over a submuscular plate combined with Ilizarov external fixator as an alternative to external fixator alone and whether the combined procedure is successful in reducing the external fixator period. A total of 16 limbs were lengthened over a submuscular plate fixed on the proximal segment followed by corticotomy and application of external fixator. Lengthening was achieved at 1 mm/day followed by distal segment fixation with three or four screws on reaching the target length. The pre operative target length was successfully achieved in all patients at a mean of 4.4 cm (2.2 to 6.5 cm). The mean duration of external fixation was 59.2 days (33 to 107 days) with the mean external fixation index at 16.7 days/cm (10.95 to 23.78). Infection complicated the procedure in two patients and one patient had Tendo Achilles contracture. Lengthening over plate drastically reduces the time external fixator needs to worn and is preferred by patients to limb lengthening over an external fixator alone. Patient lengthening over a plate provides an alternative method for limb lengthening, can be applied to children with open physes and to deformed bones.

Date: 2011-09-07

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Room: Meeting Hall IV

Abstract no.: 29046

THE AIM OF THIS STUDY IS TO EVALUATE CASES TREATED WITH GRADUAL FOOT LENGTHENING USING EXTERNAL FIXATION

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Material & Methods: From 1995 till 2009, 22 cases had been treated with osteotomy & gradual foot lengthening in our institution. Age of patients ranged from 9 to 17 years. The aetiology was congenital foot amputation stump in 5 cases, brachmetatarsia in 6 cases & residual foot deformities & shortening in 11 cases. There were 15 females. The lesion was on the left side in 13 cases. The patients were evaluated clinically & radiographically before treatment & during follow up. The presence of pain, functional level, magnitude of lengthening achieved & patient satisfaction were recorded. **Results:** The lengthening achieved ranged from 1.2 to 5.8 cm. The follow up ranged from 1 to 9 years. The patients were satisfied in all cases. There was improvement in functional activity level in all cases except 3. The average healing index was 51 days per cm. Duration of treatment ranged from 3 to 7.5 months. **Complications:** Some sort of pin track infection in 16 cases, joint subluxation in 2 cases, premature consolidation of the regenerate in one case. **Conclusion:** Shortening of the foot can be treated by lengthening using external fixation depending on the law of tension stress. There was no need for bone grafting. **Significance:** Many surgeons do not consider foot shortening while treating foot deformities. However, this problem is of utmost importance to many patients. We think gradual treatment & external fixation is a valid option for these patients.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Upper Extremity, Limb Lengthening

Time: 08:00 - 09:30

Room: Meeting Hall IV

Abstract no.: 29280

RESPONSE OF CHONDRO-PROGENITOR CELLS FROM THE HUMAN PHYSIS TO MECHANICAL STRAIN AD INTERLEUKIN-1 β

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Background: Mechanical loading (ML) and Interleukin-1 β (IL-1 β) play important roles in regulating the development, function, and repair of musculoskeletal tissue. Chondroprogenitor cells (CPC) of the human physis (HP) are responsible for longitudinal bone growth and may also be involved in growth disturbances after a traumatic lesion of the HP. Aim: The aim of the study was to investigate the influence of ML and IL-1 β on the proliferation and inflammatory response of CPC of the HP. Material and Methods: Cells were sorted via fluorescence activated cell sorting (FACS). The Flexcell Tension Plus system 3000® was used to apply cyclic mechanical stretching to either CPC treated with IL-1 β or untreated CPC. A BrdU Cell Proliferation Assay was performed for proliferation analysis. For analysis of inflammatory response NO concentration in the cell free supernatant was measured according to the Griess reaction. Data was evaluated by means of descriptive statistics and Friedman's test. A p-value<0.05 was considered statistically significant. Results: CPC stained CD73, CD90, CD105 positive and CD45 and CD34 negative. ML showed an antiproliferative effect on CPC, whereas IL-1 β promoted CPC proliferation. NO production was significantly increased in mechanical loaded CPC after 48h compared to the untreated negative control (p=0,014). IL-1 β did not show any significant influence on CPC NO production. Discussion: CPC of the HP are highly sensitive to ML and IL-1 β . The ability to manipulate CPC from the HP may provide a powerful tool to secondary influence growth disturbances in children after traumatic lesion of the HP.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Upper Extremity, Limb Lengthening

Time: 08:00 - 09:30

Room: Meeting Hall IV

Abstract no.: 29381

CORRECTION OF SEVERE BLOUNTS DISEASE IN OLDER CHILDREN WITH DISTRACTION OSTEOGENESIS

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Introduction: Untreated or recurred Blount disease has been shown to progress to early osteoarthritis. Studies on older children with genu varum deformities were very few. We decided to study outcome of severe Blount disease in older children treated with distraction osteogenesis of the proximal tibia using external fixator. Method: A prospective cohort study was conducted over a period of two years. Patients were treated with distraction osteogenesis with Ilizarov external fixator and Taylor spatial frame. Physical outcome of correction was obtained using clinical and radiological assessment. Functional outcome were also compared for both pre and one year after frame removal. Results: 11 patients (mean age 15.3 years) with 14 knees. The mean FTA were corrected from a mean of 26.7 11.9 degrees to 6.8 2.5 degrees and MAD from 83.9 26.8 mm to 2.6 7.7 mm. The rotational and varus deformity of proximal tibia were corrected to normal alignment in 78.6% and 85.7% of patients respectively. Our physical outcome is closer to the normal values compared to other reported series. One year after frame removal, the WOMAC score improved from a mean of 76.5 to 84.7 and the SF-36 score improved in 4 of its component ($p < 0.05$). Complications of treatment were similar to that of other studies. Conclusion: Distraction osteogenesis with external fixator can provide good short term physical and functional improvement for older children with Blount disease. (230 words)

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Upper Extremity, Limb Lengthening

Time: 08:00 - 09:30

Room: Meeting Hall IV

Abstract no.: 29831

LIMB RECONSTRUCTION FOR CHILDREN WITH CONGENITAL TIBIAL HEMIMELIA

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Limb reconstruction for congenital tibial hemimelia has three steps. They are the reconstruction of knee, the reconstruction of foot, and the repeated limb lengthening. For the reconstruction of ankle, we put the distal end of fibula into the calcaneus in a slight equinus position after radical release. For the reconstruction of the knee we performed the centralization of the fibula in the total absence of the tibia, and the tibiofibular fusion in the partial absence of the tibia. The materials were 27 limbs out of 17 children. They were 13 legs with distal partial absence of tibia, and 14 legs with total absence of tibia. The average age at the first surgery was 2 years. The average age at the follow-up was 10 years. Leg lengthening was repeated for two to four times. At the follow-up, all the patients were ambulating with AFOs and going to school without crutches. Knees after tibiofibular fusion were stable and had good ROM, but knees after centralization of fibula showed limited ROM. All the feet showed ankylosis in a slight equinus position with supple Chopart joints. In conclusion, the limb reconstruction for congenital tibial hemimelia was demanding, but had great possibility to achieve better ADL of children.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Upper Extremity, Limb Lengthening

Time: 08:00 - 09:30

Room: Meeting Hall IV

Abstract no.: 29215

TO EVALUATE THE FUNCTIONAL RESULTS OF SURGICAL RECONSTRUCTION OF UPPER EXTREMITY IN TETRAPLEGICS

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Introduction: For the people living with the disability of tetraplegia, their level of independence often is related to the function of the upper extremity. Reconstructive procedures can reasonably improve the use of the upper limb. Multiple case series have shown benefit from these procedures for appropriate candidates. This study was conducted to evaluate the functional results of surgical reconstruction of upper extremity in tetraplegics. Material and Methods: Various procedures for upper extremity reconstruction done by means of various soft tissue (tendon transfers, tenodesis, capsulodesis, capsulotomy etc), bony (corrective osteotomy, arthrodesis etc) or combined soft tissue and bony reconstructive methods in 20 upper limbs were studied. Patients were followed for six months or more and evaluated, taking into account the change in the performance of activities of daily living (ADL), the patient's satisfaction, and the fulfilment of their expectations. Results: A good or excellent result was obtained in most of our patients, 85.7% were satisfied with the operation and 14.3% said that the surgery did not meet their expectations. There was an average increase of 1 kg in pinch strength and 3 kg in grasp after various suitable procedures. Poor results occurred in patients with previous joint rigidity, sensory deficiency, pain, and lack of motivation. Conclusion: Hand surgery improved the function of tetraplegics and should be performed more frequently. Patients should be provided with realistic information and must be motivated for preoperative and postoperative physiotherapy.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Neuromuscular, Knee, Infections

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 29879

DEGA OSTEOTOMY: A SHORT TO MEDIUM TERM REVIEW OUTCOME OF 23 DISLOCATED HIPs IN CHILDREN WITH NEUROMUSCULAR CONDITIONS

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Background: In recent years, Dega, a tran-iliac osteotomy has gained popularity for treating acetabular dysplasia in patients with neuromuscular conditions. Methods: We prospectively analysed patients with neuromuscular conditions who underwent Dega osteotomy between 2003 and 2010. The hip range of movement, the presence of hip pain, and limitation of activity were measured both pre-operatively and 1 year post-operatively. Radiological features were also analysed. Results: 19 patients (23 hips) underwent Dega osteotomy due to either hip subluxation or dislocation. Most of them suffered from spastic quadriplegic cerebral palsy. Their mean age was 7.1 +/- 4.2 years old. 19 hips had concomitant procedures including open reduction and femoral osteotomies. 18 patients had a minimum follow-up of 1 year. The mean follow-up period was 49 +/- 25.6 months. At 1 year follow-up, all patients had no pain and an improvement in their sitting posture. The average acetabular index changed from 34.40 pre-operatively to 15.90 (p value: < 0.0001) while the migration percentage changed from 72.1% pre-operatively to 14.0% at one year follow-up (p value: < 0.0001). Both of these values were maintained at the final follow-up. None of the patient had premature closure of the cartilage. Discussion: Children suffering from neuromuscular conditions may have dysplastic acetabular. They often have posterior wall deficiencies. Dega osteotomy improves the lateral coverage of the acetabulum without jeopardizing the posterior coverage. The preliminary review has shown that Dega osteotomy is highly effective in treating these patients in short to medium term follow-up.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Neuromuscular, Knee, Infections

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 29304

PROXIMAL FEMUR EXTENSION OSTEOTOMY FOR TREATMENT OF FLEXION CONTRACTURE OF THE HIP

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Severe hip flexion contracture with lumbar lordosis poses significant adverse effect on posture and gait. We have been treating this condition using a proximal femur extension osteotomy. The purpose of the study is to introduce the surgical procedure and to study the clinical outcomes. This is a retrospective study of 8 patients who were operated on with proximal femur extension osteotomy for severe hip flexion contractures (>45 degrees). The procedure is a posteriorly based closing wedge osteotomy at the intertrochanteric level, which is stabilized using a blade plate. Medical records of the cases were reviewed for main diagnosis, surgical indications, the correction of sacrofemoral angle (radiographic angle between the upper surface of the sacrum and the shaft of the femur), and the improvement of standing posture and ambulation, and peri-operative complications. The mean follow-up time is 14 (3-40) months. The primary diagnoses include 2 spastic cerebral palsy, 2 arthrogyrosis, 1 metaphyseal dysplasia, 1 neuromuscular scoliosis, 1 septic hip, and 1 spinal dysraphism. The average age of the patients at surgery was 14 (7-22) years. All patients were doing well at their last follow-up. Their standing posture and ambulation had all improved. They had the sacrofemoral angle improved from -2.7 degrees to 30.3 degrees (total correction 33.0 degrees) on average. There were no complications directly related to the osteotomy. In conclusion, the proximal femur extension osteotomy benefits the patients who have difficulty of standing and ambulating due to severe hip flexion contracture and lumbar lordosis.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Neuromuscular, Knee, Infections

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 29680

IS THERE ANY BENEFIT TO USING BOTULINUM TOXIN TYPE A IN THE TREATMENT OF LOWER LIMB SPASTICITY IN YOUNGER AGE CHILDREN WITH CEREBRAL PALSY?

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This prospective comparative clinical trial examined the effectiveness of Botulinum toxin type A treatment for lower limb spasticity in younger age (< 3 years) children compared with older-age children (> 3 years) with cerebral palsy (CP). 27 children with CP were grouped according to age and treatment- one younger age group treated with BoNT-A and physiotherapy, a second younger age group treated with physiotherapy alone, and a third group of older aged children treated with BoNT-A and physiotherapy. Outcomes were evaluated - spasticity using the Modified Tardieu Scale, activity limitation using the Gross Motor Function Measure, a condition specific Pediatric Quality of Life InventoryTM and a parental questionnaire of perceived satisfaction with their child's performance. Significant reduction in spasticity noted for the younger age children treated with BoNT-A compared to controls retained at 6 month follow up but not accompanied by greater improvements in gross motor function. For the primary outcome there were significant gains in gross motor function for the younger age treated children compared to older children at one month follow up (difference in means=7.27, 95%CI 0.05,14.49, p=0.019) and three months (difference in means=7.86, 95%CI 1.04,14.68, p=0.012) post-injection. A relationship between younger age BoNT-A treatment and improved parental perceptions was identified, attaining significance at three (p=0.038) and six months (p=0.029) post-injection. This controlled trial suggests that there were additional benefits in treating younger age patients with intramuscular BoNT-A

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Neuromuscular, Knee, Infections

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 28937

DEVELOPMENT AND INITIAL VALIDATION OF THE ASSESSMENT OF CAREGIVER EXPERIENCE WITH NEUROMUSCULAR DISEASE (ACEND)

David ROYE, Hiroko MATSUMOTO, Debra KRASINSKI, Stephen A. KLINGE, Jaime A. GOMEZ, Whitney A. BOOKER, Nicholas D. COLACCHIO, David P. ROYE, Michael G. VITALE, Joshua E. HYMAN
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Background: Orthopaedic interventions have wide-ranging functional and psychosocial effects on children with neuromuscular disease (NMD) and their families. However, validated instruments to assess these outcomes are lacking. The purpose of this study is to report the development and initial validation of an instrument specifically-designed to assess caregiver experience in raising NMD children: the Assessment of Caregiver Experience with Neuromuscular Disease (ACEND). Methods: 61 children with NMD and their parents were administered several previously-validated pediatric health-measures. A framework-technique was utilized to select appropriate questions, and sensitivity analyses guided development of a master question-list measuring caregiver impact. The resulting ACEND was administered to caregivers of 46 children with moderate-severe NMD. Statistical analyses were conducted to determine validity, and the ability of items to differentiate impact states. Results: ACEND included 2-domains, 7-subdomains, and 41-items. Domain-1, examining physical impact, includes 4-subdomains: feeding/grooming/dressing (6-items), sitting/play (5-items), transfers (5-items) and mobility (7-items). Domain-2, which examines general caregiver impact, included 3-subdomains: time (4-items), emotion (9-items), and finance (5-items). Mean overall relevance rating was 6.21 ± 0.37 and clarity rating was 6.68 ± 0.52 (Scale 0-7). Standard total scores as well as 6/7 subdomain scores decreased significantly across GMFCS-level. Although sensitivity analyses revealed multiple limiting effects, particularly in motor-based items, no item had effects across severity groups. Conclusions: ACEND is a valid, disease-specific measure to quantify aspects of caregiver impact. Larger patient-groups are currently being tested to strengthen validity findings. Additionally, ACEND is being administered before/after orthopaedic interventions to determine responsiveness.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Neuromuscular, Knee, Infections

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 29639

**TREATMENT OF FIXED KNEE DEFORMITY IN CEREBRAL PALSY,
USING DISTAL FEMORAL EXTENSION OSTEOTOMY WITH PATELLAR
TENDON SHORTENING**

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Intro: Patients with cerebral palsy commonly exhibit crouched gait patterns as a result of muscular weakness, spasticity, and musculoskeletal malalignment. The purpose of this study was to evaluate the effectiveness of distal femoral extension osteotomy with patellar tendon shortening with soft tissue anchor system, for treatment of fixed knee deformity in patients with cerebral palsy and fixed knee flexion deformity. Material & Methods: A retrospective, non-randomized study was done, including a group of 25 surgeries between years 2004 and 2010, made in 18 consecutive patients, with cerebral palsy, mean age: 13 years (8-20) with diagnosis of fixed knee flexion deformity and crouched gait. Distal femoral extension osteotomy with patellar tendon shortening, using soft tissue anchor system applied below the anterior tibial tuberosity. Analytical review of outcomes was performed in order to evaluate gait, function, images, and complications with a mean follow up of 29 months (6–56). Conclusions: Patellar tendon shortening using soft tissue anchor systems, improves the outcome of distal femoral extension osteotomy.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Neuromuscular, Knee, Infections

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 29412

BOTULINUM TOXIN A TREATMENT IN CEREBRAL PALSY: RESULTS OF SURVEY IN 46 PATIENTS

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Botulinum toxin A treatment in cerebral palsy is a significant addition to the established therapeutic methods. The purpose of this study was to evaluate the acceptability and the functional outcome of Botulinum toxin A treatment for spasticity by using a special questionnaire for parents. The parents of 57 children diagnosed with infantile cerebral palsy and who received Botulinum toxin A were invited to fill in a 58-item questionnaire regarding the outcome of Botulinum toxin treatment. The results from spastic hemiplegic and diplegic patients were compared with results from spastic tetraplegic patients. The local effects were evaluated by using range of motion and the modified Ashworth scale. A total of 46 questionnaires were returned (81%). Parents of patients with hemiplegia and diplegia noted statistically greater improvements in their children's functional abilities like walking, standing or sitting than parents of patients with tetraplegia. Moderate to high levels of satisfaction were reported. The modified Ashworth scale and range of motion showed minor improvements without significant evidence. In this study the questionnaire provided preliminary evidence that parents considered Botulinum toxin A treatment to be an acceptable form of therapy. We found out that children with moderate involvement (hemiplegic and diplegic) seem to derive the greatest benefit. Excellent therapeutic success is attained by designating an appropriate individual and functional goal prior to intervention, with agreement amongst all team members, including the family or care providers.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Neuromuscular, Knee, Infections

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 28898

**CRUCIATE LIGAMENTS IN PROXIMAL FEMORAL FOCAL DEFICIENCY:
ARTHROSCOPIC ASSESSMENT AND CLINICAL RELEVANCE**

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Background: Knee arthroscopy was used to identify the changes of cruciate ligaments in proximal femoral focal deficiency (PFFD) and their relation to the knee stability. Methods: Knee arthroscopy was performed in 21 consecutive patients (11 boys, 10 girls, age range 4 – 18 years) with deficiency types III, IV, VII-IX using the Pappas classification. A new classification of the knee was created according to arthroscopic examination. The patients were treated by different methods and in 2010 the sagittal knee stability was evaluated using knee ligaments arthrometer KT 1000 and radiographically using lateral stress views in 19 patients. Results: The changes of the cruciate ligaments were found in all but one patient, more often of the anterior cruciate ligament. Absence of both cruciate ligaments was found in eight patients. In stability measurement, anterior drawer sign increased in 5 of 10 patients. In radiographic measurement the anterior drawer sign increased in 15 of 19 patients whereas in four patients this sign decreased in comparison to the non-affected side. The posterior drawer sign increased in 11 of 19 patients. Posterior shift of the tibia was found in neutral position in all but one patient (2-18 mm, average 8 mm). Conclusions: Variable changes of the cruciate ligaments were not related to the type of Pappas classification. The sagittal stability of the knee is not only influenced due to the absence of cruciate ligaments but also due to anatomical shape of the femur and tibia and contractures of the soft tissues, mostly after lengthening procedures.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Neuromuscular, Knee, Infections

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 28333

MANAGEMENT OF NEGLECTED HABITUAL DISLOCATION OF PATELLA: A CASE SERIES

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Habitual dislocation of patella is not very common. Most of the cases present late, especially in the developing world. The management of these cases is surgical. The literature describes extensive proximal lateral release as the treatment of this condition. We have treated 15 cases of habitual dislocation of patella who presented to us late (mean age at presentation was 12 years) by a combination of extensive proximal lateral release, advancement of vastus medialis obliquus and distal realignment. 80% of the patients showed excellent or good results at a mean follow up of 2 years. 20 % patients showed fair functional results. The results were better in younger patients as compared to the older patients. We conclude that a combination of surgical procedures is required to correct the mal-alignment of patella in such cases and the results are better in younger patients.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Neuromuscular, Knee, Infections

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 29671

POST SEPTIC HIP DISLOCATION IN CHILDREN WITH PRESENCE OF CAPITAL FEMORAL EPIPHYSIS – A STUDY OF 21 HIPS

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Delayed diagnosis of septic arthritis of hip in children results in various sequelae. There is a group of post septic hip dislocations where the capital femoral epiphysis (CFE) is present which neither Hunka nor Choi have discussed in their classification which is the subject of this study. This is a retrospective series of 21 hips with sequelae of hip dislocations with the CFE present. The presence of the CFE was confirmed radiologically. The mean follow-up after intervention was 5.5 years. Our intervention included closed reduction +/- adductor tenotomy (20 hips), open reduction +/- supplementary femoral and acetabular procedures (14 hips) and for subluxations included femoral +/- acetabular procedures (3 hips) Results were evaluated clinically with Ponseti hip scoring, shortening and lurch; and radiologically for changes in the CFE, acetabular dysplasia, triradiate cartilage fusion, centre edge angle, neck shaft angle and articulothrochanteric distance. Closed reduction was successful in 7/20 hips (35%) and open reduction in 13/14 hips. At follow-up, clinically there was shortening and lurch in 50%. A good clinical result (Ponseti score of 1 / 2) was seen in 9/18 cases (50%). Radiological findings were flattened capital femoral epiphysis (8), avascular necrosis changes (8), acetabular dysplasia (5), premature triradiate cartilage fusion (2). The mean neck shaft angle was 125°. There was 1 redislocation and 3 extrusions. Factors associated with poor results were; changes of the capital femoral epiphysis – flattening, loss of sphericity and coxa magna, premature fusion of the triradiate cartilage and cartilage thinning and erosions.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Neuromuscular, Knee, Infections

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 28879

NONVASCULARISED FIBULAR GRAFTING IN POST OSTEOMYELITIC GAP NON UNION IN CHILDREN LESS THAN 10 YEARS – OUR SURGICAL EXPERIENCE

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(INDIA)

Purpose: Management of infected nonunion of long bones with a large gap is a difficult challenge. The aim of our study was to evaluate the results of non vascularised fibular grafting in this age group. Methods: Over a period of five years, 16 patients younger than 10 years (range 2–9 years) with post osteomyelitic gap non-union of long bones were operated on with sequestrectomy and later on by nonvascularised fibular grafting with internal fixation. Results: The most commonly affected bone was tibia followed by humerus, femur, radius and ulna. At an average follow-up of around 2 years (range 1–5 years), satisfactory results were noted in all patients. All patients achieved union within 4.5 months (3–6) despite a mean bone gap of 55 mm (15–100) after debridement. Of the 16 patients treated, 3 required reoperation. Postoperative improvements in range of motion were noted in all patients. No surgery-related complications or recurrences requiring surgery occurred in any of the patients. Conclusions: This study concluded that non vascularised fibular bone grafting is an adequate and complication-free method for children with postosteomyelitic gap non-union of long bones in developing countries.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Spine, DDH and Hip

Time: 14:00 - 15:30

Room: Meeting Hall IV

Abstract no.: 29272

SINGLE STAGE VERTEBRAL COLUMN RESECTION (VCR) OF HEMIVERTEBRAE IN CHILDREN UNDER THE AGE OF 10 YEARS

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Introduction: A single lumbar hemivertebra can result in a progressive spinal deformity with devastating consequences. Total resection of these hemivertebrae is ideal for correcting these deformities and several alternatives were suggested including anterior and/or posterior approaches. The aim of this study is to evaluate the clinical and radiographic outcome of single stage VCR in children less than 10 years old. **Methods:** This prospective study included 29 patients with a lumbar hemivertebra. The average age was 8.5 y (range 6 - 9.5y). Vertebral Column Resection (VCR) involved laminectomy, excision of the pedicle and hemivertebra, and curettage of both end plates; the gap created was filled with morselized cancellous bone. Short segment posterior instrumentation was performed; the gap was gently closed by compression over the pedicle screws and the remaining bone was placed in the posterolateral gutter. **Results:** Patients were followed-up for an average of 4.5y. The operative time had an average of 215min and the average blood loss was 410cc. The scoliotic deformity corrected from an average of 41° to an average of 5° postoperatively and an average of 7° at final follow up; kyphosis corrected from an average of 32° to an average of 4° postoperatively and an average of 6° at final follow up. There were no vascular injuries, neurologic insult, implant failure or crank shafting. **Conclusion:** Single stage VCR with short segment pedicle screw instrumentation is a safe, efficient alternative that offers excellent correction in both planes without the need for anterior surgery.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Spine, DDH and Hip

Time: 14:00 - 15:30

Room: Meeting Hall IV

Abstract no.: 30124

THE 4 RIB CONSTRUCT FOR KYPHOTIC EARLY ONSET SPINAL DEFORMITY

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Current standard methods used for management of early onset scoliosis have a higher failure rate when the spine is kyphotic. We present results of an alternate method. Deformity resulted from congenital, syndromic, or neuromuscular origin. Method: The superior fixation is via a bilateral "claw" configuration with 2 downgoing hooks on ribs 2 and 3, and 2 upgoing hooks on ribs 4 and 5. Surgery was performed at the Medical University of South Carolina and Nablus Specialty Hospital, Nablus, West Bank, Palestine Results: 8 patients with thoracic deformity - preop scoliosis 98 (degrees), postop 55. Preop kyphosis 98 degrees, postop 55. 17 patients with thoracolumbar scoliosis - preop scoliosis 83 (degrees), postop 52. Preop kyphosis 63, postop 24. All were less than age 18 at surgery, followup for minimum of 1 year for all except one 6 months. Complications included 1 pneumothorax, 1 superior mesenteric artery syndrome, 2 delayed wound infection (16 mos) resulting in removal and secondary replacement of instrumentation, 1 fatigue failure of 4.5 rods requiring replacement of 5.5 rods, 1 superior hook displacement, 3 distal fixation dislodgments. There were no neurologic complications. Discussion: The 4 rib construct has proven to be reliable in both a developed country and a developing country. The construct can be assembled with easily available instrumentation. We submit the results presented are superior to other currently used methods for treatment of early onset deformity accompanied by kyphosis.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Spine, DDH and Hip

Time: 14:00 - 15:30

Room: Meeting Hall IV

Abstract no.: 29322

NEW ULTRASOUND SCREENING PROTOCOL FOR DETECTION OF DEVELOPMENTAL DYSPLASIA OF THE HIP (DDH) WITH BETTER COST-BENEFIT RATIO

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Ultrasound based screening for DDH appeared to be most sensitive and effective but is associated with false positive screening results, overtreatment and insufficient cost-benefit ratio. The aim of the present study was to assess the effectiveness of the new screening protocol with delayed first US examination at 4th-6th week after birth. A total of 73.154 hip sonograms were evaluated according to Graf classification within first two weeks after birth during 18 year period (1993-2010). Immediate institution of treatment was prescribed for dislocated hip type (III-IV), whereas dysplastic (IIc,D) hip type was re-examined at 4th-6th week and thereafter treated in the case of persistent pathology. Hence, treatment rate, overall need of follow-up and total number of surgical procedures was evaluated in the respect to the new screening protocol. The treatment rate decreased significantly in the new screening protocol (from 2.1% to 1.2%). Normalization of pathological hip type was detected in 25% on re-examination. Additionally, the rate of follow-up decreased two folds ($p < 0.05$). The number of surgical procedures remained stable (0.2/1000) during last 10 years. New screening protocol minimizes the risk of unnecessary follow-up and overtreatment due to false positive cases and therefore promises better cost-benefit ratio. Additionally, delayed US examination enables detection of spontaneous normalization or deterioration and still provides treatment early enough to achieve optimal healing. However, reorganization of screening program is mandatory since estimated risk of missed pathological cases due to nonattendance to US-control was extrapolated at 0.57/1000 newborns.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Spine, DDH and Hip

Time: 14:00 - 15:30

Room: Meeting Hall IV

Abstract no.: 28402

GRAF TYPE IIA HIPS NEEDS MORE CONSIDERATION IN FEMALE BABIES

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Graf type Ila hip is a physiologically immature hip and may require treatment. Among 1690 ultrasonographically screened newborns (mean age 27 days), 431 type Ila hips were determined in 321 newborns. These babies' parents were accurately informed about the prognosis and invited for ultrasonographic reexamination at 6-7 weeks of age. A risk factor for DDH was initially observed in 44 babies (14%). An apparent or doubtful clinical finding was present in 29 hips (7%). Type Ila hip was nearly three times more common in female babies ($p < 0.001$). Among 431 hips, 225 (52%) became type I, 25 (6%) type Ila+, 35 (8%) type II a- and 146 (34%) were lost to follow-up at reexamination. All but one type II a+ hips became type I without treatment by the end of 12 weeks. According to our management protocol 35 type Ila- hips and one type Ila+ hip, which became type IIb at 12 weeks of age, underwent abduction brace treatment. All treated hips became type I within 4-8 weeks. The rate of treatment was nearly four times higher in hips of female babies ($p = 0.019$). A risk factor for DDH was seen in 4 treated babies (14%). A positive clinical finding was present in 6 treated hips (17%). In conclusion, Graf type Ila hip is more common and has higher rate of treatment in female babies. Babies with type Ila hips mostly have neither risk factors nor positive clinical findings. The rate of missing the required follow-up is unacceptably high.

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Abstract no.: 28569

DOES AN INTERTROCHANTERIC OSTEOTOMY ACCELERATE THE REMODELING OF FEMORAL HEAD AFTER SLIPPED CAPITAL FEMORAL EPIPHYSIS?

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Satisfactory remodeling of femoral head after SCFE could prevent cam type femoroacetabular impingement. Degrees of remodeling depend on slip severity, fused or open of triradiate cartilage, and others. Intertrochanteric osteotomy (ITO) has been an option to improve ROM and limping not to accelerate remodeling. The purpose of this study is to clarify whether ITO influences remodeling or not and to discuss the indication and the timing for ITO. Between 1997 and 2009, 56 patients with 69 affected hips were treated in our institute. Seven hips were excluded because of collapse in femoral head after avascular necrosis. Of remaining 62 hips, we performed ITO for 16 hips without radiological sign of remodeling after in-situ fixation (ISF). Our osteotomy had been newly developed to correct the alignment between epiphysis and femoral shaft on the axis of capital slip based on 3D-CT. Remodeling of femoral head was evaluated using Jones classification on Lauenstein lateral radiographs immediately osteotomy and at final examination. Nine of 16 hips were improved in classification of remodeling, while 7 hips remained in the same classification after osteotomy. We compared the parameters concerned between two groups. Head-shaft angle after ISF was 38 degrees in the unimproved group, while 50 degrees in the improved group. Duration from ISF to osteotomy was 22.7 months in the unimproved group, while 12.1 months in the improved group. ITO for SCFE with higher head-shaft angle within one year after ISF had effect on progress in remodeling of femoral head until physal closure.

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Session: IFPOS/SICOT: Paediatrics - Spine, DDH and Hip

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Room: Meeting Hall IV

Abstract no.: 27700

EVALUATION OF DECISIONS OF EXPERIENCED SURGEONS REGARDING THE NEED FOR SECONDARY SURGERY IN DEVELOPMENTAL DYSPLASIA OF THE HIP

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We aimed to evaluate the surgeons' decisions regarding the need of secondary surgery in developmental hip dysplasia (DDH) at 5-7 years of age. We selected 21 hips from 17 patients who had mid-term and skeletally mature radiographs, and who had had neither complications nor secondary surgery until skeletal maturity after having an initial soft tissue surgery for DDH. Twenty experienced orthopaedic surgeons evaluated the mid-term follow-up radiographs of these hips in terms of their need for secondary surgery. Based on the management grading of the observers at mid-term follow-up, the risk of unnecessary surgical management was 12% in hips, which would eventually be normal at skeletal maturity. The risk of not performing needed surgery was 40% in hips, which would eventually become dysplastic at skeletal maturity. The center-edge angle, acetabular index angle, percentage of femoral head coverage, Shenton's line and acetabular angle of Sharp were the five most commonly used radiographic parameters at mid-term follow-up to assess whether a secondary surgery would be needed or not. In conclusion, experienced surgeons are more prone to non-operative management in hips, which have no ischemic changes and instability at 5-7 years of age even in the presence of slightly abnormal radiographic measurements.

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Session: IFPOS/SICOT: Paediatrics - Spine, DDH and Hip

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Room: Meeting Hall IV

Abstract no.: 28472

PEDIATRIC FEMORAL NECK FRACTURES: OUR 10 YEARS OF EXPERIENCE IN MANAGEMENT

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Background: The aim of this retrospective study was to analyze the clinical outcomes of pediatric neck of femur fractures that were managed over a period of 10 years by us. Methods: The study included 36 children (20 boys and 16 girls) who sustained femoral neck fracture and completed a minimum follow up of 1 year. The children were treated either conservatively, or by open reduction and internal fixation (ORIF) or closed reduction and internal fixation (CRIF). The outcomes were analyzed using Ratliff criteria. Results: The mean age of patients was 10 yrs (range 3-16 yrs) and the average follow up was 3.2 years (1.1-8.5 years). According to Delbet's classification system, there were no type I (transepiphyseal) fractures and 16 type II, 11 type III, and 9 type IV fractures. There were 8 undisplaced fractures, 4 of which later displaced after being managed initially in a hip spica. A satisfactory outcome was obtained in 27 (75%) children. Avascular necrosis (AVN) was the commonest complication, seen in 7 of our patients and all these had an unsatisfactory outcome. Other complications included three cases each of coxa-vara, non-union and arthritic changes; and one case each of infection, primary screw perforation of head and premature epiphyseal closure. Complications were least in the group treated by ORIF while only 2 patients managed exclusively by conservative treatment ultimately achieved a satisfactory outcome. Conclusion: Internal fixation of these fractures should be preferred whenever feasible as conservative treatment carries high risk of failure of reduction. Aggressive operative treatment aimed at anatomical reduction should be the goal and there should be no hesitation in choosing ORIF over CRIF. Outcome of patients is primarily influenced by development of AVN which occurs as an independent entity without much relation to the mode of treatment carried out.

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Session: IFPOS/SICOT: Paediatrics - Spine, DDH and Hip

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Room: Meeting Hall IV

Abstract no.: 28290

SALTER INNOMINATE OSTEOTOMY FOR TREATMENT OF DEVELOPMENTAL DYSPLASIA OF THE HIP IN DIFFERENT WALKING AGED CHILDREN

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Objective: To compare the results of Salter innominate osteotomy (SIO) for treatment of developmental dysplasia of the hip (DDH) in different aged children. Methods: Between 1994 and 2004, 53 girls and 8 boys with DDH underwent open reduction, proximal femoral osteotomy and SIO; 21 were on the left side, 22 on the right side, 18 bilateral. They were divided into 2 groups: group 1 included 35 patients aged younger than 4.5 years (46 hips) and group 2 included 26 patients aged 4.5 years or older (33 hips). Clinical outcomes were assessed using the modified McKay criteria to measure pain symptoms, gait pattern, Trendelenburg sign status, and the range of hip joint movement. Radiographic outcomes were evaluated using the Severin method to comparatively measure the acetabular index and the centre-edge angle. Results: Group-1 children achieved better reduction and stabilisation of the hip joint empirically, and the radiographic results were better in the group-1 than group-2, but the short-term clinical results and complication rates in the 2 groups were not significantly different. Conclusion: Open reduction, proximal femoral osteotomy and SIO is one of the effective one-stage surgical procedure for the management of DDH in walking aged children, especially those younger than 4.5 years.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Spine, DDH and Hip

Time: 14:00 - 15:30

Room: Meeting Hall IV

Abstract no.: 30031

RETURN TO PLAY FOLLOWING PERIACETABULAR OSTEOTOMY FOR TREATMENT OF ACETABULAR DYSPLASIA IN YOUNG ATHLETES

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Acetabular dysplasia can be debilitating to active adolescents and young adults. The Bernese periacetabular osteotomy (PAO) has emerged as an effective surgical option for hip dysplasia. We investigated results of PAOs and return to function, specifically in an athletic population. A comprehensive hip surgical database identified patients on whom a PAO was performed, with inclusion criteria of recent involvement in competitive athletic play and pre/post-op completion of validated outcome measures: Modified Harris Hip Scores (MHHS), pain domain of the Hip Outcome Score (HOS-pain), UCLA (UCLA-AS) and Marx activity scores (MAS). Demographic data, return to competitive athletics (RTP), and pre/post-op radiographic metrics (e.g. Tonnis (sourcil) angle (TA), anterior and lateral center-edge-angle (A-CEA, L-CEA)) were also analyzed. Of 245 PAOs performed over a 5-year period, 13 (5.3%) patients (1 male, 12 females) with mean age of 19 (range 12-38) years-old and mean follow-up of 1.9 (range, 0.9-4.0) years showed significant improvement from mean pre- to post-operative MHHS (62.5 to 72.2, $p=0.05$) and pain (HOS-pain: 7.0 to 4.2, $p=0.04$), and no difference in the activity scores (UCLA-AS: 8.4 to 8.8, $p=0.7$; MAS: 10.4 to 9.6, $p=0.7$). RTP was achieved for 10 out of 12 patients (83%). Radiographs showed significant improvement in pre- to post-operative values for TA (19.8° to 11.8° , $p=0.04$), A-CEA (14.8° to 27.9° , $p<0.005$), and L-CEA (14.1° to 27.6° , $p<0.001$). In this series, the majority of active, athletic patients undergoing PAO for debilitating pain due to acetabular dysplasia were female and showed improvements in pain, function, and return to athletic play.

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Abstract no.: 28871

3D ANALYSIS AFTER QUADRUPLE OSTEOTOMY OF PELVIS IN OLDER CHILDREN

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Aim: The quadruple osteotomy of the pelvis (QOP) is performed in children over 10 years-old. It allows important displacement of the acetabular fragment to obtain the normalisation of the hip's dysplasia. **Method:** The QOP is carried out with a single anterior approach, after the osteotomies of the ischium, the ilio-pubic and the iliac bone an osteotomy of the ischial spine is performed to release the sacrospinal ligament. 10 osteotomies in 8 patients between 10 and 15 years-old have had a CT scan of the pelvis before surgery and a control between 1 and 5 years after. Pathologies were LPC disease (3cases) severe dysplasia (7cases) **Result:** Anterior acetabular index 45° normal hip (NH) 51° operated hip(preop), 41° post. Posterior acetabular index 51° (N), 57,2° (preop) 55,2° (postop). Retroversion 3° (N), 3,1° retroversion (preop), 7,1° retro (postop). Anterior coverage 27,2° (N), 37,12° (preop) 29° (postop). Posterior coverage 12.4° (N), 20,41° (preop) 17,2° (postop). 3D views: Anterolateral Inclinaison 43.83° (N), 50,33° (preop) 35,38° (postop). Posterolateral Inclination 55.8° (N), 56,62° (preop) 43° (postop). Internal Rotation of the acetabulum 2.25° (N), 3° anteversion (preop) 0° anteversion (postop). Anterior Inclination on lateral view 18° (N), 21.33° (preop) 15.65° (postop). **Conclusion:** The QOP is a solution to important dysplasia in children over 10 years-old where the the sacrospinal ligament is a real obstacle to move the acetabulum. The anterior coverage is improved 8°, the anterolaterale inclinaison 15°, anterior Inclination on lateral view 6°avoiding the retroversion or decreasing posterior coverage.

Date: 2011-09-07

Session: IFPOS/SICOT: Paediatrics - Hip, Perthes, Fractures

Time: 16:30 - 18:00

Room: Meeting Hall IV

Abstract no.: 30082

ACETABULAR RETROVERSION IN TRISOMY 21

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Background: The unstable Down Syndrome hip is challenging. We observed that children with Trisomy 21 often have deficiency of the posterior acetabular wall and acetabular retroversion. This could be responsible for the posterior direction of their instability. This study's purpose was to determine acetabular version in Trisomy 21 patients and to compare them with normal controls and DDH patients. Methods: A cohort of Down's patients treated surgically for acetabular dysplasia and/or instability was matched by age, gender, and side to a group of normal controls and to a group which had undergone PAO for DDH. For all patients, preoperative CT scans or MRI's were used to measure acetabular version. Statistical differences were determined using ANOVA with alpha=0.05. We identified 16 patients in each cohort. Results: The average acetabular version in the control group was 13 +/-5 degrees and in the DDH cohort 21 +/-7 degrees. In contrast, mean version in Down's patients was 2 +/-11 degrees. According to Toennis's criteria for CT-measured version, 11/16 Down's patients were severely retroverted compared to 4/16 controls and 2/16 DDH patients (p=0.02). Conclusion: Patients with Trisomy 21 have more retroverted acetabula compared to normal controls and DDH patients. This factor should be considered when performing corrective osteotomies for instability and/or acetabular deficiency.

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Session: IFPOS/SICOT: Paediatrics - Hip, Perthes, Fractures

Time: 16:30 - 18:00

Room: Meeting Hall IV

Abstract no.: 29688

**ARTHRODIASTASIS IN LATE ONSET PERTHES' DISEASE
– AN ANALYSIS OF 11 CASES**

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Late onset Perthes' has age of onset after 10 years. Patients have a stiff hip with extrusion of head and bad prognosis with conventional surgeries. The main goals of treatment are to prevent femoral head from getting deformed and preventing secondary degenerative arthritis. Arthrodiastasis describes a regime of articulated hip distraction. Our aim is to assess the effect of arthrodiastasis in a select group of such older patients, the primary outcome measure of which is an improved range of motion, maintaining the epiphyseal height and attaining better congruity in the long term 11 cases in the fragmentation or early reossification stages with stiff hips with no improvement inspite of a trial of traction were included. It included 7 boys and 4 girls. Majority of the hips were in Catteral stages 3 or 4. The mean follow-up of these cases is 1.5 years. Distraction discontinued when shenton line was corrected. The fixation lasted from 4 to 5 months. Shenton line breakage improved from 7mm to 2 mm at the last follow up. We had 5 good results, 5 fair and 1 poor result. The advantages of arthrodiastasis are containment without deformation of femur or pelvis and unloading of the hip. Our results suggest that soft tissue release with unloading of femoral head and restoration of joint space can improve the epiphyseal height. With follow-up to skeletal maturity, we hope that it will become apparent whether this technique gives better long-term results in older children. Our preliminary results show considerable potential.

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Abstract no.: 28999

DOES THE FEMORAL INTERTROCHANTERIC OPEN WEDGE VARUS OSTEOTOMY FOR LEGG-CALVES-PERTHES' DISEASE CHANGE LOW EXTREMITY AXIS AFTER LONG-TERM FOLLOW-UP?

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The femoral intertrochanteric open wedge varus osteotomy (FIOWVO) has been used as a treatment modality for LCPD. The objective of FLOWVO is to minimize the development of hip deformities by containing the femoral head within the acetabulum. The advantages of this procedure are that it can decrease and change forces on the femoral epiphysis and improve circulation. The disadvantages are the possible persistence of coxa vara, trochanteric prominence, leg-length discrepancy (LLD), and lateral axis deviation of axis of low extremity. The purpose of this study was to investigate the axis of lower extremity after long term follow-up after FLOWVO. We analyzed the results of 77 skeletally mature hips. The average follow-up period is 6.5 years. The mechanical axis deviation was determined, and a value less than 50% was indicative of lateral MAD or valgus and greater than 50% was indicative of medial MAD or varus. Patients with a difference between the diseased side and the normal side with respect to lower limb alignment were defined as having altered alignment. When examining the outcome using the Stulberg classification system, there were 13 Stulberg class I hips (16.9%), 32 Stulberg class II hips (41.6%), 15 Stulberg class III hips (19.5%), 13 Stulberg class IV hips (16.9%), and 4 Stulberg class V hips (5.2%). Lower limb alignment has not changed (74%) after the osteotomy after long term follow-up. The FLOWVO also would be changed the lower limb alignment in early post-op period. However, proximal femur and head have been remodelling progressively, lower limb alignment return back to normal.

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Abstract no.: 30296

EVIDENCE BASED TREATMENT OF PERTHES DISEASE

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In spite of 100 years of research, the evidence base for treatment of Perthes disease is tenuous. Legg–Calvé–Perthes disease being a self-limiting condition of the hip joint, treatment is largely the treating surgeon's choice. The literature offers little scientific evidence to suggest superiority of one treatment over another or even to conclusively establish the efficacy of any treatment over the natural history of the disease. The ideal outcome in Perthes disease is a congruent, pain-free hip with a full range of movement. Translated radiologically, this means a spherical femoral head well contained within the acetabulum. In the studies published to date, there is a lack of uniformity of criteria for selection, treatment, and evaluation, and, more important, there are few control studies. In addition, no studies reported to date have been prospective or randomized, although multicenter prospective studies are ongoing. Surgical management of Perthes disease could be considered in terms of prophylaxis, remedial or salvage. It has been shown that factors which affect the end results in Perthes patients are age of onset, the stage of the disease, presence of femoral head extrusion and its extent of involvement. In terms of prophylaxis, poor prognostic factors are identified esp. the age of onset. Knowing that these cases are prognostically poor, containment treatment can be applied early on in the evolution of Perthes disease. Such treatments, though standing to reason, are controversial and lack a valid evidence base. On the remedial side, while there are many reports of treatment of Perthes disease, there have been few controlled studies and, only one randomized study. A comparative study of varus-derotation osteotomy and ambulation-abduction bracing in children over 6 years revealed no difference in results. Surgical containment can be achieved by femoral or acetabular osteotomies or a combination of these. One review of 72 patients treated with a femoral or innominate osteotomy disclosed no difference in results at follow-up.

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Abstract no.: 30034

DISTAL METAPHYSEAL RADIUS FRACTURES IN CHILDREN: CAN LOSS OF REDUCTION BE PREDICTED?

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Introduction: The causes of re-displacement in patients with a displaced distal metaphyseal radius fracture treated with closed reduction and casting is multifactorial and controversial. The aim of this study was to retrospectively analyze the factors which contribute to loss of reduction. **Methods:** We identified children with displaced distal radial metaphyseal fractures that required closed reduction and casting from January 2008–June 2010. Demographic factors, fracture characteristics (obliquity, comminution, intact ulna), initial fracture displacement, residual displacement and 3 point cast index were reviewed. Loss of reduction was defined as angulation $\geq 15^\circ$ in the coronal plane for all ages and/or angulation $\geq 20^\circ$ in the sagittal plane for patients ≥ 11 years of age and $\geq 30^\circ$ for children < 11 years of age. Re-manipulation or closed reduction/percutaneously pinning were also considered loss of reduction. **Results:** 166 patients (123 boys and 43 girls) were included. 69/166 patients met criteria for loss of reduction (42%). Demographic factors, fracture characteristics, 3 point cast index and initial angulation in the sagittal plane were not significantly different. Univariate analysis revealed that initial translation in the coronal ($p < 0.001$) and sagittal ($p = 0.002$) planes; initial angulation in the coronal plane ($p = 0.008$); initial shortening ($p = 0.003$); residual translation in the coronal ($p = 0.004$) and sagittal ($p = 0.003$) planes were all risk factors for loss of reduction. **Conclusion:** Our study, the largest series of pediatric distal radial metaphyseal fractures, indicates that loss of reduction is common. Important risk factors include initial and residual translation in both planes, initial shortening and initial coronal angulation.

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Room: Meeting Hall IV

Abstract no.: 29847

TORUS/BUCKLE FRACTURE – ARE WE OVER TREATING?

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Aim: The aim of this audit was to evaluate the management of Torus fractures in our unit. **Methods:** A retrospective review of case notes of children who sustained Torus/Buckle and visited fracture clinic in the month of July and August 2009 was performed. Case notes were sifted through to evaluate the treatment received in Accident & Emergency, fracture clinic and subsequent clinics. The essence of research evidence from several randomised control trial were considered as standard and compared with current clinical practice. **Results:** Out of 79 patients, 44 (55.69%) were boys and 35 (44.3%) girls. There were 60 (76 %) children who were reviewed again in the subsequent clinics. Only 4 (5%) children received soft cast were discharged in the first clinic. Furthermore, 29 patients were re-x-rayed in the without a valid clinical reason documented in the notes. When analysed, the average cost of running a review clinic is £810.00. Overall, the estimated extra cost of seeing these 60 children were £1620.00. There were no complications or re-interventions noted. **Conclusions:** Our study confirms that Torus fracture is a benign injury. Furthermore, the study highlights the fact that despite the abundance of evidence, many practitioners find it difficult to alter their ways of management. As a result, a local protocol has been developed which provides guidance and managing Torus fracture and hence encourage early discharge of these patients. We also recommend the other orthopaedic departments across the country to review their management strategy while dealing with Torus fractures.

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Session: IFPOS/SICOT: Paediatrics - Hip, Perthes, Fractures

Time: 16:30 - 18:00

Room: Meeting Hall IV

Abstract no.: 28721

BIOLOGICAL INTERNAL FIXATION OF FEMUR SHAFT FRACTURES BY LOCKED PLATE IN CHILDREN AND ADOLESCENTS

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Background: Unstable femur fractures, particularly in larger children or in polytrauma patients, are less suited for elastic nails, as they cannot prevent angulation or shortening in these instances. Biological internal fixation by locked plate offers advantages of increased stability, avoidance of pin tract infections, and avoidance of the growth plates and preservation of proximal femoral blood supply. It also offers advantages over traditional compressive plating owing to less extensive surgical exposure and soft-tissue dissection, and a smaller scar. Methods: We conducted a prospective study, at Mansoura Emergency Hospital, of twenty one patients with closed unstable femur shaft fractures. They were treated with a locking plate in the period between 2007 and 2010. Average age at the time of injury was 11.2 years (range 8.3 years to 15.5 years). Pathological fractures and fractures associated with neuromuscular diseases were excluded from this study. Ten patients had head injuries and/or multiple injuries. Clinical and radiological assessment of the patients included duration of healing, alignment, presence or absence of postoperative infection, hip and knee motion, leg length discrepancy. Results: There were no intraoperative complications related to this technology. Average follow-up was 38 months (range, 12 to 46 months). All fractures united with anatomical alignment within an average of 12 weeks (range 8 to 16 weeks). There were no deep infections and no significant limb length discrepancies. At the latest follow-up, no patient had any restriction of activities. Conclusions: Locking plates are safe and effective treatment for children and adolescents with unstable femur fractures.

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Room: Meeting Hall IV

Abstract no.: 30175

APPLICATION OF ELASTIC STABLE INTRAMEDULLARY NAILING (ESIN) TECHNIQUE IN PEDIATRIC HUMERAL FRACTURES

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Background: The humerus is a common site where fractures occur in children. Most patients can be treated conservatively. Surgical stabilization should be indicated in some cases. The purpose of this study is to introduce our experience in application of elastic stable intramedullary nailing (ESIN) technique in pediatric humeral fractures. Methods: Totally 22 pediatric humeral fractures (12 diaphyseal, 8 supracondylar, and 2 proximal pathologic fractures) were treated with ESIN technique. An antegrade approach was performed in 20 of 22 patients, whereas a retrograde approach in the left 2 patients suffered from pathologic fracture. A long arm cast or plastic splint was applied postoperatively for 3 to 6 weeks according to the age and site of the patient. X-ray film was used to evaluate the healing process. Results: Good union was obtained in all patients without any delay. A transient ulnar nerve irritation symptom was noted in one case after operation. No any infectious or nail migration complication was observed in this series. Full recovery of the shoulder and elbow joints motion was demonstrated in all patients. Concerning for cosmetic problem, all patients and their parents were satisfied with the small incision, especially in those by the antegrade approach. Conclusion: ESIN technique is a preferred option for treatment in pediatric humeral fractures. Neurovascular complication should be concerned when an antegrade approach is selected.

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Session: Paediatrics & Trauma - Miscellaneous

Time: 10:30 - 12:00

Room: Meeting Hall V

Abstract no.: 28626

LONG-TERM FOLLOW-UP OF FLEXIBLE INTRAMEDULLARY NAILING IN PAEDIATRIC FEMORAL SHAFT FRACTURES

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Background: Flexible intramedullary nailing has emerged as an accepted procedure for paediatric femoral fractures. Present indications of FIN include all patients with femoral shaft fractures and open physis. Despite its popularity there have been few studies showing long term results in these patients. We thus undertook a retrospective long term study of paediatric femoral fractures treated with flexible nails. Material and Methods: We included 73 femoral shaft fractures in 69 patients treated with retrograde flexible intramedullary nailing with a minimum follow up of 5 years. Final limb length discrepancy and any angular or rotational deformities were determined. Results: Mean age at final follow up was 15.5 years (10-21 years). Mean follow up was 7.16 years (5.0-8.6 years). Titanium elastic nails were used in 47 fractures while stainless steel nails in 26 fractures. There were 51 midshaft, 17 proximal, and 5 distal fractures. Fracture patterns included transverse (49), oblique (21), and comminuted (3) fractures. All fractures united at an average of 11 weeks without further intervention but asymptomatic malalignment and LLD were seen in 24% and 58% fractures respectively. Rotational malalignment was present in 17.5% fractures while 11% patients had malalignment in either coronal or saggital plane. LLD ranged from -3 cm to 1.5 cm. Other complications included proximal migration of nail in 3 patients leading to one periprosthetic fracture. There was no case of physeal damage. There was no case of long term knee or hip stiffness although 55.4% cases had some degree of restriction of knee movements before removal of nails which was done at an average of 12 months postoperatively. Conclusion: Flexible intramedullary nailing is reliable and safe for treating paediatric femoral shaft fractures. It is relatively free of serious complications despite asymptomatic malalignment and LLD in significant percentage of fractures.

Date: 2011-09-07

Session: Paediatrics & Trauma - Miscellaneous

Time: 10:30 - 12:00

Room: Meeting Hall V

Abstract no.: 28394

DELAYED FIXATION OF FRACTURE NECK FEMUR IN CHILDREN: HOW MUCH DELAYED IS DELAYED?

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Material and Method: Retrospectively reviewed was done for the results of delayed fixation (> 24 hrs) of displaced fracture neck of femur in 21 children treated over 9.5 years. All the fractures were fixed extraphyseally using two or three 4 mm partially threaded cannulated cancellous screws after closed or open reduction of the fractures. Patients were allowed full weight bearing after twelve to 18 weeks of treatment. Results were assessed on the basis of modified Ratliff criteria at an average follow-up of 60 months. Results: The mean age at the time of treatment was 12.2 years (5-15 years). Two patients had type Ib, thirteen had type II, and six patients had type III fracture based on Delbet-Colonna classification. The Mean follow-up period was 60 months (44 - 90 months). The average time for radiological union was 11.2 weeks (10.5 to 14 weeks). Eleven patients had good, 7 had fair and 3 had poor results. Two patients had shortening of the affected limb and 3 had avascular necrosis of the hip. Conclusion: We conclude that delayed fixation of fracture neck femur in children even outside the golden period has a good prognosis. Results of delayed fixation are mainly affected by the avascular necrosis of femoral head and the type of fracture or method of internal fixation plays a secondary role.

Date: 2011-09-07

Session: Paediatrics & Trauma - Miscellaneous

Time: 10:30 - 12:00

Room: Meeting Hall V

Abstract no.: 29631

ELASTIC NAILING FOR FEMUR FRACTURES IN PRESCHOOL CHILDREN

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Titanium Elastic Nail (TEN) as an alternative to traction and spica cast for femur fractures in young children has not been specifically studied. 37 children with femur fractures were retrospectively examined. Their mean age was 4.9 ± 1.09 years; mean time to surgery was 3.1 ± 2.8 days; mean surgical time was 50.08 ± 17.8 minutes; mean follow-up was of 66.2 ± 23.8 months, mean hospital stay was 0.41 ± 1.04 day; mean time to union was 8.49 ± 0.86 weeks; and mean time to nail removal was 14.2 ± 1.07 weeks. Shortening of 1.0cm occurred in 2 cases. Lengthening of 1cm was evident in 2 cases. Lengthening of over 1cm was evident in 2 cases. Mean lengthening was 1.05cm. Varus angulation of 3-10° occurred in 4 cases and posterior angulation of 5° in one case. A clinically detectable rotational deformity of 10° was seen in 2 cases (5.4%). Painful one nail end occurred in 5 cases (13.5%). Nail exteriorization occurred in one. TEN is a dependable, safe, and cost-effective alternative to traction and cast in young children.

Date: 2011-09-07

Session: Paediatrics & Trauma - Miscellaneous

Time: 10:30 - 12:00

Room: Meeting Hall V

Abstract no.: 28884

DISPLACED FRACTURES OF SHAFT OF RADIUS AND ULNA IN PAEDIATRIC POPULATION – OUTCOME OF SURGICAL AND CONSERVATIVE MANAGEMENT

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Royal Glamorgan Hospital, Poole Hospital, Llantrisant (UNITED KINGDOM)

Background: Displaced fractures of shaft of radius and ulna are frequent in pediatric population. Those fractures are occasionally difficult to reduce and to treat with close methods. We compare the outcome of surgical and conservative management of such injuries. Methods: We reviewed retrospectively x-rays and clinical notes of all children who had intervention (MUA or fixation) to shaft of radius or ulna fracture in 2008 in our hospital. Results: We identified 56 children with displaced fractures of forearm bones. The age varied from 23 months to 15 years. Angulation of forearm bones ranged from 30 to 95 degree. 26 patients (46.5%) were treated with internal fixation as a definitive measure (20 patients had flexible nailing, 6- plating to their fractures), remaining 30 fractures were manipulated and treated in above elbow cast. 27% of patients who had MUA required further intervention. 13% of fractures healed with angulation greater than 25 degree. There was 1 post-operative superficial infection following flexible nailing. Out of 4 patients who had single nail to their ulna, 3 patients (75%) suffered significant angulation to their radius. None of fractures treated with both bones nail re-displaced. There were no growth problems following internal fixation. Discussion: We believe that internal fixation of forearm bones in pediatric population is safe and acceptable method of treatment displaced fractures. The complications are rare and could be related to inadequate fixation. Authors recommend fixation of both bones rather than ulna alone when attempted surgical intervention, as there is significant chance of fracture re-displacement.

Date: 2011-09-07

Session: Paediatrics & Trauma - Miscellaneous

Time: 10:30 - 12:00

Room: Meeting Hall V

Abstract no.: 29715

KIRSCHNER WIRE FIXATION FOR COMPOUND FRACTURES OF THE ANKLE IN UNDERPRIVILEGED PATIENTS

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Kirschner Wire Fixation for Compound Fractures of the Ankle in underprivileged patients
Ankle fractures are the most common entity among the bone joint injuries. However, the compounding of the ankle fractures are not common but present special problems in the management. These problems become even more complex when presentation is late. When such patients come from underserved population prevailing in large parts of a country, the management becomes even more difficult. During last twenty years, thirty one such cases were treated with open reduction, intensive surgical toilet, K wire fixation, a prolonged course of antimicrobials combined with delayed mobilization. The results are comparable to other methods of treatment of fractured ankle components

Date: 2011-09-07

Session: Paediatrics & Trauma - Miscellaneous

Time: 10:30 - 12:00

Room: Meeting Hall V

Abstract no.: 28248

A MULTICENTRIC STUDY OF OPERATIVE FIXATION OF TIBIAL PLATEAU FRACTURES

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Introduction: Regarding Tibial plateau fracture Schatzker has stated "slightly more than 50% of the patients are satisfied after the treatment". We present our not-so-discouraging result of operative fixation. Material & Methods: Thirty four patients, (30 male, 4 female), with a mean age of 46.28 years & average follow up of 47.1 month, were pooled from three surgeons of Kolkata. There were 12 patients each of Schatzker Type I & II; 4 of Type IV and 3 each of Type V & Type VI. All were treated by operative fixation. Minimally displaced Type I fractures were fixed by percutaneous screws; rest all with L or T buttress plates. Type II fractures were generally treated by elevation of the depressed fragment, bone grafting and fixation. The fractures were exposed by single incisions, either inverted 'L' in type I, II & IV and mid-axial in type V & VI, and fixed with single or dual buttress plates, according to the type of fractures. Result: Results were assessed according to Rasmussen's criteria. In Type I & II, 18 had excellent results (75%), 5 good (20.8%) and 1 poor (4.16%). In Type IV, V & VI, 5 good (50%) and 5 (50%) fair. Discussion: Operative fixation of tibial plateau fracture gives reasonably satisfactory result. In Type I & II fractures, the results are generally excellent to good. In types IV, V & VI fractures, wound dehiscence after single midaxial incision, is a major cause of concern. But after skin grafting they usually have good to fair results.

Date: 2011-09-07

Session: Paediatrics & Trauma - Miscellaneous

Time: 10:30 - 12:00

Room: Meeting Hall V

Abstract no.: 28231

DOES MODIFIED KUNTSCHER NAIL EFFECTIVELY ADDRESS TIBIAL DIAPHYSEAL FRACTURES?

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Background: We evaluated a series of diaphyseal fractures of the tibia using low-cost, Indian-made modified Kuntscher nail (Daga nail) with the provision of distal locking screw for the management of the tibial diaphyseal fractures. Materials and Methods: One hundred and fifty one consecutive patients with diaphyseal fractures of tibia with 151 fractures who were treated by Daga nail were enrolled. Data of 148 patients with one hundred and fortyeight fractures was available. One hundred twenty closed fractures, 20 open Grade I fractures, and eight open Grade II fractures were included in this study. One hundred fourteen men and 34 women, with a mean age of 38.4 years, were studied. Results: The follow-up period averaged 15 months (range, 6-26 months). Union occurred in 140 cases (94.6%). The mean time to union was 13 weeks for closed fractures, 17.8 weeks for Grade I open fractures, and 21.6 weeks for Grade II open fractures. Compartment syndrome occurred in two patients. Superficial infection occurred in five cases of Grade I and II compound fractures. Three closed fractures and one case of Grade I compound fracture required bone grafting for delayed union. Two cases of Grade II compound fracture with nonunion required revision surgery and bone grafting. Twelve cases resulted in acceptable malalignment due to operative technical error. In four cases, the distal screw breakage was seen. Conclusion: Unreamed distally locked dynamic tibial nailing has the advantages of technical simplicity, minimal cost, user-friendly instrumentation, and a short learning curve.

Date: 2011-09-07
Session: Osteonecrosis
Time: 14:00 - 15:30
Room: Meeting Hall V

Abstract no.: 27438

NON TRAUMATIC CAUSES OF BILATERAL AVASCULAR OSTEONECROSIS OF THE FEMORAL HEAD: HEPATITIS C AND PEGYLATED INTERFERON THERAPY RELATIONSHIP

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The avascular osteonecrosis of the femoral head is a frequent pathology in traumatic cases where there is a bloody supply interruption at the femoral neck and head. There are also some non traumatic causes associated to hypercoagulable states such as oncologic, vascular, or autoimmune diseases and to the administration of high dose steroids. We observed patients that had bilateral osteonecrosis of the femoral head and did not had any of this known risk factors. However we observed that these patients had history of hepatitis C and had been treated with Ribavirin plus Pegylated interferon. All of these patients had a good clinical evolution regarding the hepatic pathology, but they started to show clinical and radiographic manifestations of osteonecrosis, six months after the standard treatment. After analyzing the cases and reviewing the literature. We found that hepatitis B and C can produce some kind of vasculitis that could be the cause of the osteonecrosis, or they can produce cryoglobulinemia that would diminish the blood supply of the femoral head. However any of these patients had clinical symptoms compatible with these entities. The Pegylated interferon has a biological activity that inhibits angiogenesis secondary reducing the primary irrigation to the femoral head producing osteonecrosis. There are some cases reported in the literature that could show that the therapy with Pegylated Interferon and some other inmuno modulators or oncogenic drugs produce this specific pathology. We believe that more specific studies are needed to demonstrate the direct influence of this medication and its complications.

Date: 2011-09-07
Session: Osteonecrosis
Time: 14:00 - 15:30
Room: Meeting Hall V

Abstract no.: 27064

SURVIVORSHIP OF REVISION HIP ARTHROPLASTY IN PATIENTS WITH SICKLE CELL DISEASE

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LACHANIETTE
Hopital Henri Mondor, Creteil (FRANCE)

Hip arthroplasty in sickle cell disease (SCD) has a high risk of failure. There is no report about results after revision arthroplasty in this population. Among 1254 primary arthroplasties performed in patients with SCD during the last 30 years, we evaluated 64 hips (34 men and 30 women; mean age of 36 years) with hip revision before the year 1999 (1985 to 1999). 39 were hemoglobin SS, 21 had hemoglobin S/hemoglobin C and 4 had S beta thalassemia. The mean duration of follow-up was 15 years (range 10 to 20). Medical complications were observed in 30 patients (47%). Twelve patients had posteroperatively painful sickling crises despite intra operation and postoperation transfusion. Minor complications of transfusions were observed in 15 cases. Major transfusion reactions were encountered in 3 cases despite the use of extended Ag-matched blood. An acute chest syndrome was observed in one patient. 14 orthopedic complications were observed: 5 perforations or fracture of the femur; Two transient (3 months) peroneal nerve palsy; 3 early dislocations; 4 heterotopic ossifications. Considering revisions for infections and aseptic loosening the probability of survival of both of the original components after revision in patients with SCD were 90% at five years, 54% at ten years, 54% at fifteen years, and 27% at twenty years. In conclusion, revision hip arthroplasty in SCD involves a higher complications rate and incidence of failure (with iterative revision) than revision arthroplasty in osteonecrosis related to other conditions.

Date: 2011-09-07
Session: Osteonecrosis
Time: 14:00 - 15:30
Room: Meeting Hall V

Abstract no.: 27635

EFFECT OF CORE DECOMPRESSION AND AUTOLOGOUS BONE MARROW MONONUCLEAR CELLS INSTILLATION IN EARLY STAGES OSTEONECROSIS OF FEMORAL HEAD: A RANDOMIZED CONTROL STUDY

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Fifty-one osteonecrotic hips (Association Research Circulation Osseous stages I and II) in forty patients were randomly divided into two treatment groups. Group A (25 hips) were treated with core decompression (CD) and group B (26 hips) received autologous bone marrow mononuclear cells (BMNC) instillation in the core tract after CD. Outcome between the two groups were compared clinically (Harris Hip Score, HHS), radiologically (x-ray and magnetic resonance imaging) and by Kaplan Meier survival curves, after 12 and 24 months. The improvement in HHS and its domain was significantly better ($p < 0.05$) in group B than A. Radiographic changes and MRI alterations was not significant in both the groups after 12 and 24 months of follow up; however Kaplan Meier survival curves showed mean hip survival of 46.72 ± 2.34 (S.E) in group A compared to 51.85 ± 0.15 (S.E) in group B. Similarly patients having low HHS, x-ray changes, Mitchell type C lesions, edema and effusion on MRI scan, central lesions and involvement of $>30\%$ of femoral head had better outcome in group B than A, as seen in survival curves. Instillation of autologous bone marrow derived MNC along with core decompression surgery show better outcome in AVN if treated in early stages, particularly in patients having poor prognostic factors i.e; low HHS, x-ray changes, edema and effusion on MRI, Mitchell C lesions and involvement of $>30\%$ femoral head. This method is simple, safe and cost effective.

Date: 2011-09-07
Session: Osteonecrosis
Time: 14:00 - 15:30
Room: Meeting Hall V

Abstract no.: 28447

EVALUATION OF BIPOLAR HEMIARTHROPLASTY FOR THE TREATMENT OF STEROID-INDUCED OSTEONECROSIS OF THE FEMORAL HEAD

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Background: Surgeries for osteonecrosis of the femoral head (less than Ficat Stage III) and osteotomy for preservation of the femoral head have been performed at our institute. However, in some cases, bipolar hemiarthroplasty (BHA) has been performed as the last resort. The purpose of this study was to evaluate clinical and radiographical findings after BHA for the treatment of steroid-induced osteonecrosis of the femoral head. Materials and Methods: Between 1995 and 2005, 43 hips of 32 patients (8 men and 24 women; average age at the time of surgery 42.9 years) were included in this study. The average duration for follow-up was 10.3 years. Two types of the uncemented BHAs were performed. The patients were evaluated according to the Japan Orthopaedic Association (JOA) hip score. Kaplan-Meier survivorship was calculated to examine the revision rate for failure of the arthroplasty. Radiographic images of loosening included radiolucent lines and showed osteolysis of the acetabulum or femur. Result: The average JOA hip score before surgery was 45 points and at the time of final follow-up was 85 points, indicating significant improvement. The survival rate with revision at final follow-up was 97 % at 10 years, 75.3 % at 15 years. Loosening around the acetabulum was noticed in 5 hips (12.8%), and 3 of them required revision surgery. Conclusion: The mid-term results of BHA for the treatment of steroid-induced osteonecrosis are not favourable. Total hip replacement should be considered in patients who are young or long-term steroid users.

Date: 2011-09-07
Session: Osteonecrosis
Time: 14:00 - 15:30
Room: Meeting Hall V

Abstract no.: 28616

IS COMBINATION OF CORE DECOMPRESSION WITH HYPERBARIC OXYGEN BENEFICIAL FOR EARLY STAGE AVASCULAR NECROSIS OF THE FEMORAL HEAD?

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Avascular necrosis of the femoral head is a disabling disease mainly affecting the young age population. Hyperbaric oxygen treatment (HBO) was shown to be effective at early stages of the avascular necrosis. Purpose of the study was to show the enhanced effect of the core decompression combined with HBO and then compare to the core decompression alone. 17 patients were evaluated retrospectively. 12 hips (eight patients) received the core decompression treatment, 12 hips (nine patients) received HBO in addition to the core decompression. Daily HBO treatment was given at multiplace chamber for 20 sessions. The evaluations included clinical assessment (Harris hip score, VAS score, Womac score, Steinberg classification) and radiological assessment. Mean follow-up of the patients was 49 months (minimum 24 months). Mean age of the patients was 38 years. Age, smoke status, gender, steroid usage was not different between groups ($p > .05$). Preoperative Harris, VAS, Womac scores and radiographic stages (stage 1 or 2) were similar ($p > .05$). At the latest follow-up, gain at the scores were not different between groups ($p > .05$) with only the Womac score gain at the HBO group approached the statistical significance ($p:0.06$). This study failed to show beneficial effects of the HBO therapy when combined with core decompression. Larger patient groups are needed to show the synergistic effects of the HBO and core decompression over core decompression alone in the early hip osteonecrosis.

Date: 2011-09-07
Session: Osteonecrosis
Time: 14:00 - 15:30
Room: Meeting Hall V

Abstract no.: 29224

NOVEL SURGICAL PROCEDURES IN AVASCULAR NECROSIS OF FEMORAL HEAD WITH COLLAPSE OF FEMORAL HEAD – PROSPECTIVE CONSECUTIVE SERIES WITH A 10-YEAR FOLLOW-UP PERIOD

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5200 Kihara Kiyotake, Miyazaki (JAPAN)

Background: Treatment for necrosis of femoral head with femoral head collapse has been less successful, especially in young patients. The purpose of this study was to examine the results of femoral head plasty using hydroxyapatite cement injection in patients with necrosis of femoral head with femoral head collapse. Methods: We prospectively analyzed ten hips (stage III) in ten patients who underwent a novel surgical procedure (femoral head plasty such as vertebroplasty). The Ganz surgical hip dislocation approach is used. The hole is created at the head-neck junction. This allows access for debridement of necrotic bone and injection of cement. The collapsed femoral head is elevated automatically after cement injection. The average age of the patients at the time of surgery was 35.9 years, and the average duration of clinical follow-up was 10 years. The Japanese Orthopaedic Association (JOA) hip score was used to assess hip function and clinical results. Radiographic evaluation was done preoperatively and postoperatively. Results: The mean pain score and the mean JOA hip scores improved postoperatively. However, the symptoms and hip functions gradually deteriorated. Decreased range of motion and progression of degenerative arthritis were found in all cases. Four cases (40%) had bipolar or total hip arthroplasty. However, other six patients do not want their hip replaced. Conclusions: Femoral head plasty using hydroxyapatite cement injection in young patients with necrosis of femoral head (stage III) is a simple, safe, and relatively effective method.

Date: 2011-09-07
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Room: Meeting Hall V

Abstract no.: 30132

EFFECTS OF EXTRACORPOREAL SHOCK WAVE THERAPY (ESWT) ON REFRACTORY TO CONSERVATIVE TREATMENT PATIENT WITH OSTEONECROSIS(ON) AND OSTEOARTHRITIS(OA) OF THE KNEE

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Background: We try to investigate the effect of application of ESWT to osteonecrosis (ON) and osteoarthritis (OA) of the knee. Material & Method: A total of 39 knees of 38 patients were treated for osteonecrosis (Group A) and OA (group B). Group A included 14knees of 13patients. Group B included 24knees of 24 patients. The mean follow-up period was 16.14 months(ranging from 7 to 25 months) in group A and 12.52 months(ranging from 8 to 25 months) in group B. Results: In group A, there were significant differences in knee function score (35.6 Vs 68.1; p=0.00) and knee score(58.2 Vs 79.5; p=0.01) before and after treatment. VAS was shown to be statistically significant in as (p=0.00 at final follow-up.) In group B, knee function score (52.8 Vs 60.6; p=0.18) and knee score (51.2 Vs 61.2; p=0.12) increased after treatment but there was no statistical significance. VAS was improved but it was not statistically significant, too (p=0.25 at final follow-up). Conclusion: In our study, ESWT showed significant improvement of pain and knee function in ON. However, this study did not demonstrate any effect of ESWT in OA. ESWT showed immediate effect on remission of pain and function secondary to ON. It appears that ESWT might have a role of immediate pain relief as well as neo-angiogenesis in ON. Given the small number of patients included in our study, further research and adequate guidelines on the treatment are required to be made.

Date: 2011-09-07
Session: Osteonecrosis
Time: 14:00 - 15:30
Room: Meeting Hall V

Abstract no.: 29780

RARE CASE OF BILATERAL KNEE OSTEONECROSIS

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This is a case report of a young lady (age 26) who presented at the out-patient clinic with bilateral knee pain. The initial x-ray examinations did not show any pathological signs. The patient had no preceding trauma. Since, conservative treatment was unsuccessful MRI examinations were conducted of both knees. The MRI revealed precollapse necrotic subchondral lesions in both tibia and on one side the medial femoral condyle. In all areas the cartilage cover was intact. The following nontraumatic risk factors were excluded: alcohol, asthma, blood-clotting disorders (such as systemic lupus erythematosus with antiphospholipid antibodies or high levels of blood platelets), chemotherapy, corticosteroids, cushing's syndrome, decompression sickness, diabetes, gaucher's disease, gout, high level of lipids in the blood (hyperlipidemia), liver disease, chronic kidney, organ transplantation, pancreatitis, radiation, sickle cell disease, systemic lupus erythematosus and connective tissue disorders, and tumors. Nonoperative treatment with restricted weight-bearing was ineffective; therefore core decompression was performed in all areas of osteonecrosis. Biopsy was also taken. Histological studies confirmed the diagnosis of osteonecrosis. During the follow-up examinations a regression of the lesion was seen. In about 20% of people with osteonecrosis, the cause is unknown, and these people are thus said to have idiopathic osteonecrosis. This case can not be classified as spontaneous osteonecrosis of the knee, since it can only occur in older women who have no specific risk factors for the disorder. The authors conclude that core decompression was successful due to early-stage of the disease.

Date: 2011-09-07
Session: Osteonecrosis
Time: 14:00 - 15:30
Room: Meeting Hall V

Abstract no.: 28445

TREATMENT OF PAINFUL BONE MARROW EDEMA BY OPEN WEDGE OSTEOTOMY

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We evaluated the results of patients who had been undergone medial open wedge proximal tibial osteotomy, which have painful bone marrow edema in the medial tibial plateau. The study included 21 patients who had presented with knee pain and whose MRIs showed bone marrow edema in medial plateau. The degree of osteoarthritis was evaluated radiologically according to the Kellgren-Lawrence criteria; 6 cases were Grade 1, 11 cases were Grade 2, and 3 cases were Grade 3. Preoperative varus angle was a mean of 2.19° (0-4). The bone marrow edema was classified according to the width of the lesions extending into the joint surface subchondral area on MRI T2 sequences. Open wedge osteotomy was performed in all patients. The postoperative results were evaluated by x-ray, MRI, and WOMAC (Western Ontario and McMaster Universities) knee scores. The preoperative 2.19° varus angle was evaluated postoperatively as valgus 6.57° (4-8°) (p<0.05). The postoperative WOMAC knee scores revealed a significant decrease in pain (p<0.05). In conclusion, we are of the opinion that medial open wedge proximal tibial osteotomy is an affect treatment in the patients have painful bone marrow edema in medial tibia plateau

Date: 2011-09-07
Session: Osteonecrosis
Time: 14:00 - 15:30
Room: Meeting Hall V

Abstract no.: 30180

**SURGICAL HIP DISLOCATION APPROACH IS NONARTHROPLASTY
SURGICAL OPTIONS IN FEMORAL-ACETABULAR IMPINGEMENT
TREATMENT**

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Surgical hip dislocation is useful in the management of severe hip diseases, providing an unobstructed view of the femoral head and acetabulum. Femoroacetabular impingement is most prevalent in young, active patients. We present our early experience with this approach in FAI and femoral head osteonecrosis diseases. Between October 2009 and December 2010, twelve hips of 12 patients with FAI and femoral head osteonecrosis diseases treated using the surgical hip dislocation approach were the subjects of this study. The average age at the time of surgery was 34.2 years. There were 7 male and 5 female patients who were followed for an average of 9 months (range, 3 to 15 months). Diagnoses included femoral-acetabular impingement in 8 hips, free body in the joint in 2, femoral head osteonecrosis disease in 2. Medical records were reviewed to record diagnoses, principal surgical procedures, postoperative changes in the range of hip joint motion, and complications. Surgical hip dislocation provides wide exposure of the femoral head and neck, which enables complete evaluation of the femoral head and neck contour. The SHD procedure was useful in severe FAI and many different diseases and allowed for quick rehabilitation with fewer complications. Surgical hip dislocation was the new method for the treatment of FAI allows patients to normal life and unprofessional sports.

Date: 2011-09-07

Session: CSOT: Czech Orthopaedics & Traumatology

Time: 16:30 - 18:00

Room: Meeting Hall V

Abstract no.: 30312

**THE CZECH NATIONAL REGISTER OF JOINT REPLACEMENTS
– STRUCTURE AND SELECTED OUTPUTS**

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The National Register of Joint Replacements of the Czech Republic was established as part of the National Health Information System in 2002. It was launched into full operation in 2003 and it currently focuses on hip joint replacements. Register of knee and shoulder joint replacements is being prepared. In years 2003-2009 there were 72 hospitals participating in the register's activities, 63037 primary implantations and 8931 revision surgeries were registered. In terms of gender share there is a prevalence of females amounting to 59,9% in primary implantations and to 64,7% in revision surgeries. The age structure covers the entire range of adult population; however, more than 50% of the replacements are being implanted between 60-74 years of age. Most frequent indications for primary implantation are idiopathic osteoarthritis 68,6%, post-traumatic conditions 13,53% and post-dysplasia arthritis 9,39%. The most frequent indications for revision surgery are aseptic loosening of acetabular component - 40,9%, aseptic loosening of femoral component - 21,65% and recurrent luxation - 6,37%. 29650 (47,04%) of primary implantations were cemented, 22028 (34,94%) non-cemented, 10924 (17,33%) hybrid with cemented femur and 435 (0,69%) were hybrid with cemented acetabulum. Most widely used is the classic anterolateral approach -77,76% in primary implantations and 52,35% in revision surgeries. Bone grafts were used in 24,37% of primary implantations and 43,03% of revisions. The cumulated survival probability (Kaplan-Meier) in year 8 of the monitoring represent 97,27% for cemented implants, 96,53% for non-cemented, 96,73% for hybrid with cemented femur and 95,08% for hybrid with cemented cup.

Date: 2011-09-07
Session: ESSKA: Athlete's Ankle
Time: 14:00 - 15:30
Room: Terrace I

Abstract no.: 30306

ACUTE INSTABILITY IN THE ATHLETE'S ANKLE

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Acute Instability in the Athletes Ankle Diagnosis of ankle sprain: history and physical examination. In an overview of the literature Kannus and Renström determined that there is no difference in treatment result between a single and a multiple lateral ligament rupture. The diagnostic strategy therefore must differentiate between a rupture and no rupture. Delayed physical examination 4 to 5 days after trauma has a high accuracy for detection of an acute ankle ligament rupture. Findings at physical examination 1. Single findings related to presence of a lateral ligament rupture: a. swelling b. pain on palpation on the ATFL 2. Combination of findings related to the diagnosis of a rupture: The combination of pain on palpation on the ATFL, positive haematoma discoloration and a positive anterior drawer-test gives a good prediction of acute lateral ankle ligament rupture. These results are not surpassed by the result of arthrography or MRI. Treatment of acute lesions: The conclusion from a large prospective randomized trial with 5-8 year follow-up (Pijnenburg 2003) was that operative treatment leads to the best results on longtime follow-up with respect to giving way, recurrent sprains, pain, anterior drawer test and the combined Povacz score. The authors question if operative treatment is the treatment of choice. Randomized clinical trials in which one experienced surgeon performs the operative repair give a better outcome. The majority of the ISAKOS consensus panel agrees on the positive outcome of acute repair when performed by an experienced surgeon. In a recent meeting of ESSKA-AFAS a guideline was created. Concerning conservative treatment, a meta-analysis by Kerkhoffs demonstrated that functional treatment gives better results than plaster. The conclusion is that when functional treatment is chosen the best choice is a lace-up brace or a semi-ridged brace. For high demand patients, including athletes, acute repair is advocated.

Date: 2011-09-07
Session: ESSKA: Athlete's Ankle
Time: 14:00 - 15:30
Room: Terrace I

Abstract no.: 30307

CHRONIC ANKLE INSTABILITY

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Introduction: Recurrent instability of the ankle is a frequent sequel following inversion injuries and has been estimated to occur in approximately 10 to 20% of patients. Surgical treatment is indicated when conservative treatment fails and when ligament laxity is present. Surgical methods can be divided into two main groups; non-anatomical reconstructions using tenodesis or anatomical reconstructions with either direct repair or imbrication of the lateral ankle ligaments. Results and discussion: In 1998, we conducted a European multicenter study in which the results of anatomical reconstruction and tenodesis were compared. A tenodesis is a non-anatomical reconstruction and will lead to disturbed joint kinematics. In the short-term (2-10 year) this leads to a restricted range of ankle motion and an increased risk for re-operation. Furthermore, it leads to insufficient mechanical stability when compared with anatomical reconstruction. In the mid-term (10-15 years), the tenodesis stretches out which leads to an unstable ankle joint. Due to the instability the risk for recurrent inversion injuries will be higher in the long-term (15-30 years). This leads to an increased risk for the development of degenerative changes, chronic ankle pain and the need for arthroscopic interventions in order to remove bony spurs. A lower number of patients with a high level of sports activity are able to return to their previous activity level and more patients suffer from the impaired joint function after tenodesis than after anatomical reconstruction. Therefore, we conclude that there is no place for tenodesis in the treatment of chronic antero-lateral instability of the ankle joint. In case of insufficient remnants we perform a reconstruction of the ATFL using a freegraft of the plantaris tendon (Weber reconstruction) which has demonstrated excellent long term results. In case of mild instability we perform arthroscopic capsular shrinkage for chronic ankle instability with thermal radiofrequency.

Date: 2011-09-07

Session: ESSKA: Hip Arthroscopy - Basic Concept, Current Indications and Future Perspective

Time: 16:30 - 18:00

Room: Terrace I

Abstract no.: 30443

ARTHROSCOPY AND HIP TRAUMATOLOGY

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(ITALY)

Introduction: After a fracture or and hip dislocation chondral or osteocondral fragmnets, acetabular labral tears and teres legamentum disruption can be found. Arthroscopy in these situations can represent a possible and useful tool for therapeutic treatment. The arthroscopic treatment of a post-traumatic hip gives the chance to remove intra-articular fragments which could otherwise rapresent an important arthrogenic factor. Fragments smaller than 5 mm are in fact not detectable with MRI or CT scan; for this reason, even after a simple hip dislocation, the arthroscopic approach permits an intrarticular washout to prevent a future osteoarthritis. Indications: Free fragments after hip trauma can originate from the acetabular edge and/or from the femoral head. The Thompson-Epstein is a commonly used classification based on which part of the joint has been damaged. When the bone loss involves the femoral head, the Pipkin classification is usually used to better define this sub-gruop of fractures. Indication for an arthroscopy treatment is possible in cases where fragments are too little and they don't require osteosynthesis; this condition is very common in a Thompson-Epstein type 3 and a Pipkin type 1 fracture. Moreover, since many fragments are not detectable with MRI or CT, even the Thompson-Epstein type 1 fracture can benefit from an arthroscopy treatment. Surgical technique and complications: A conventional hip arthroscopy is performed, with the patient in supine position and distraction of the injured limb. The articular capsule is always damaged because of the trauma: for this reason distraction should be used very carefully to avoid dislocation. Intraabdominal fluid extravasation may be a concern and if difficulties are encountered and extravasation becomes a problem, it is better to terminate the procedure. More frequent complications due to distraction are perineal, pudental and sciatic neuropraxias. Standard portals are commonly used, but fragments in some particular positions

Date: 2011-09-07
Session: Trauma - Elbow
Time: 10:30 - 12:00
Room: Club A

Abstract no.: 30275

TOTAL ELBOW REPLACEMENT TREATMENT FOR COMPLEX DISTAL HUMERUS FRACTURES

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We retrospectively reviewed our cases with a comminuted distal humeral fracture, or simple fracture pattern with destroyed articular surface, such as rheumatoid arthritis, which was treated with total elbow replacement. We think complex fracture includes two concept. First is comminuted distal humeral fracture, such as Type C2 or C3, associated with osteoporosis in elderly patients. Second is simple fracture pattern, but with destroyed articular surface which result from rheumatoid arthritis, hemophilia arthritis, traumatic arthritis, or elbow instability. Our cases include 5 cases with distal humeral fracture and rheumatoid arthritis, 6 cases with distal humeral fracture and severe osteoporosis, 1 case with hemophilia arthritis, 1 case with traumatic arthritis, 1 case with ulna coronoid process fracture combined with rheumatoid arthritis and elbow instability, 1 case with olecranon fracture nonunion and elbow instability. We apply Coonrad-Morrey prosthesis to treat all patients. At the latest follow-up examination, the average flexion arc was 25o to 110o and the Mayo elbow performance score averaged 88 points. Complications include 1 case with wound delayed union, 1 case with ulna fracture during operation, 1 case with ulnar nerve paralysis, 1 cases with obvious reduced strength of triceps, and 1 case with obvious limited flexion arc. We think complex distal humeral fractures with osteoporosis, and some simple fracture pattern with obvious destroyed articular surface, such as rheumatoid arthritis, traumatic arthritis, can be treated with total elbow replacement, especially in patients who are physiologically older and place lower demands on the joint.

Date: 2011-09-07
Session: Trauma - Elbow
Time: 10:30 - 12:00
Room: Club A

Abstract no.: 29437

THE CLINICAL RESULTS OF TOTAL ELBOW ARTHROPLASTY FOR AO TYPE C3 DISTAL HUMERAL FRACTURE IN ELDERLY

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Background: To analyze the clinical results of total elbow arthroplasty (TEA) for the surgical treatment of AO type C3 distal humerus fracture in patients over 65 years old. Methods: Authors have followed up the patients for over 24 months after performing total elbow arthroplasty for 12 cases that were diagnosed AO type C3 distal humerus fracture over 65 years old from February 2002 to June 2008. Results: The average operation time was 54.5(51-62) minutes, and the Mean T-score for BMD was -4.525. In 12 cases, 5 were males and 7 were females. It showed significant decrease of Visual Analogue Scale score (VAS score) in the early stage after the surgery. In terms of elbow function performance score (Mayo Elbow Performance Score; MEPS), the mean MEPS was 62 at 4 weeks after operation, the mean MEPS was 85 at 1 year after operation. Conclusion: Since the total elbow arthroplasty showed to the operation time, decrease of pain in early stage after the surgery, and outcomes in terms of elbow function recovery, it may be considered for the primary treatment of the elderly patients. Key Words: humeral fracture, total elbow arthroplasty, elderly

Date: 2011-09-07
Session: Trauma - Elbow
Time: 10:30 - 12:00
Room: Club A

Abstract no.: 29047

IS INVASIVE K-PIN ESSENTIAL FOR THE USE OF ELBOW HINGED FIXATORS WITH ARTHRODIATASIS? – KINEMATIC ANALYSIS

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The dynamic distraction and joint motion with a hinged external fixator is a well established treatment for articular and periarticular disease to preserve both elbow stability and mobility. The hinge alignment of the elbow and external fixator is one of the difficult steps of this procedure. However, to the authors' knowledge, there are few studies to numerically evaluate the kinematic influence of some device and joint factors on coaxially aligning rotation axes of elbow and fixator. The Denavit-Hartenberg method with the principle of homogeneous transformation matrix was applied to perform the kinematic analysis of the humeroulnar-fixator linkage system. The parameters with different pin placements and elbow angle were analyzed to investigate their kinematic effects on hinge alignment of elbow and fixator. The predicted results of the elbow-fixator linkage system were further validated by the trigonometric models. If only a unique solution exists for hinge alignment, the arthrodiatasis inevitably becomes a highly technique-demanding surgery for setting the initial configuration of the bone-pin-fixator construct. Hence, without the use of invasive K-pin and radiographic target, the degree-of-freedom of the fixator center is a core factor for multiple solutions in kinematic analysis of hinge alignment. However, the gradual locking of the relevant joints to constrain the fixator system was necessary in the more advanced functionality of self-aligning the bridged elbow-fixator construct. The concurrent of hinge alignment and concentric distraction is interactive and sensitive to the initial conditions of the bridged elbow-fixator construct. Hence, the conscientious planning is necessary for such highly technically demanding surgery.

Date: 2011-09-07
Session: Trauma - Elbow
Time: 10:30 - 12:00
Room: Club A

Abstract no.: 28697

THE OPERATIVE TREATMENT USING TRANSOLECRANON APPROACH WITH DUAL LOCKING PLATE FOR UNSTABLE INTERCONDYLAR FRACTURES OF HUMERUS

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Introduction: This study was performed retrospectively to evaluate the clinical outcomes of operative treatment using transolecranon approach with dual locking plate for unstable intercondylar fractures of humerus. Material & Methods: Sixteen patients were followed up for more than 1 year after operative treatment for unstable intercondylar fractures of humerus. The mean age was 39.6 years, and the mean follow-up period was 14.2 months. All cases were applied the anterior transpositioning of ulnar nerve, tension band wiring fixation for olecranon reattachment, early rehabilitation program to allow ROM (range of motion) exercise from postoperative week 2. The clinical and functional evaluation was performed according to the Mayo elbow performane index, Cassebaum's classification of ROM, the Riseborough & Radin scale. The period to union was calculated through postoperative radiographs. Results: The range of elbow joint motion was flexion contracture mean 12.8 degrees to further flexion mean 118.3 degrees at the last follow-up. Mayo elbow performane index was average 86.3 points. There were 6 excellent, 7 good, 2 fair, and 1 poor results according to the Cassebaum's classification. Therefore, 13 cases (81%) achieved satisfactory results. All cases achieved bone union, and the interval to union was average 14.2 weeks. As postoperative complications, there were two cases of ulnar nerve palsy and one case of heterotopic ossification, one case of superficial wound necrosis. Conclusion: Dual locking plate fixation through transolecranon approach seems to be one of effective treatment methods for unstable intercondylar fractures of humerus, because of enabling the anatomical reduction and rigid fixation of elbow articulation, and early ROM exercise.

Date: 2011-09-07
Session: Trauma - Elbow
Time: 10:30 - 12:00
Room: Club A

Abstract no.: 28602

**ONE-STAGE RECONSTRUCTION THE STABILITY OF ELBOW WITH
BILATERAL APPROACHES IN THE TREATMENT OF ELBOW TERRIBLE
TRIAD**

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Objective: to study the effect of one-stage reconstructing the stability of elbow in the treatment of elbow terrible triad. Method: We treated 54 patients suffering elbow terrible triad with bilateral approaches during Aug. 2007-Oct. 2009. The etiology included 28 falls, 10 traffic accidents and 16 sports injuries. Operation techniques: 1. Z-figure incision at the anterior-medial side was adopted and Hebert screws were used to fix big fragments. On the cases which the fragments were too small or comminuted, 3.5mm suture anchor were used for the fixation. Suture anchor were used to repair the medial collateral ligament (MCL) and the anterior joint capsule. 2. Kocher incision was used for the reduction and fixation of the radial head fracture. Suture anchor was used for the repair of the lateral ulnar collateral ligament (LUCL) and the lateral joint capsule. After the operation, the elbow was immobilized at the full extension position and the excises of flexion were started 2-day post-operation. Radiological assessment was used to assess the healing of fracture and the position of the joint. Mayo elbow score was used to assess the joint function. Result: The average follow-up time is 20.4m (8-26m). 1 case of radial head non-union and plate breakage was observed. The average flexion is 132°, extension is 12°, pronation is 76°, supination is 78°. The Mayo elbow score is 87.4 (65-96). The function of 46/54 cases were good to excellent. Conclusion: Bilateral approaches could easily explode the coronoid process, the radial head, the MCL, the LCL and the medial and lateral capsule. The primary reconstruction of stability of bone and soft tissue components facilitates the early rehabilitation. It is an effective and safe method in the treatment of the elbow terrible triad.

Date: 2011-09-07
Session: Trauma - Elbow
Time: 10:30 - 12:00
Room: Club A

Abstract no.: 29395

NERVE GRAFTING IN THE UPPER EXTREMITY

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Purpose: To demonstrate that autogenous nerve grafting can give rewarding results provided certain techniques can be provided. Methods: There were 130 cases in all; 70 involved the median nerve, 40 the ulnar nerve and 20 the radial nerve; 85 males and 45 females. Ages ranged from 20 to 60 years. The time of the injury to grafting was from six months to five years. Follow-up ranged from two to fifteen years. The procedure consists of exploring the injured peripheral nerve with excision of neuromas and insertion of autogenous nerve grafts that were taken from the lower extremities of the patient. The nerve grafts were approximated to the proximal and distal ends of the injured nerve under the microscope by using fine instruments and microsurgical techniques. Results: Motor recovery for median nerve low lesions namely recovery of thenar muscles from M3-M4 level - Excellent in 40%; M2-M3 Good in 40%; M1-M2 Fair in 20%. Ulnar nerve motor recovery for intrinsic to level M3-M4- Excellent in 38%. For level M2-M3- Good 40%; M1-M2- Fair 22%. Motor recovery for radial nerve: extensors of wrist, fingers and thumb, to level M3-M4- Excellent in 42%; Good 37%; Fair 20%. Conclusions: In a large number of patients, this method has improved the function of the extremity considerably. It has given us much superior results than before the use of microscope and microsurgical instruments. By doing nerve grafting, one avoids excessive mobilization of nerve ends, stretching, suture under tension and immobilizing of joints.

Date: 2011-09-07
Session: Elbow - Wrist
Time: 14:00 - 15:30
Room: Club A

Abstract no.: 29787

MEDIUM TERM RESULTS (3-5 YEARS) OF A LATERAL RESURFACING ELBOW (LRE) ARTHROPLASTY IN ARTHRITIS

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Aim: To evaluate the medium-term results of an arthroplasty designed to resurface the lateral compartment of the elbow. **Materials and Methods:** We have used the LRE to resurface the capitellum and radial head in patients with primary or secondary osteoarthritis (OA) and studied these patients prospectively with independent functional evaluation using the Mayo and ASSES scoring systems. The data were analysed using SPSS for Windows statistical package. 73 procedures were performed. 53 patients (55 elbows: 30 males, 23 females-mean age 52 years: range; 25-82) were assessed a minimum of 3 years postoperatively (range; 3-5 years; mean; 49 months) **Results:** Mean preoperative Mayo score 46 (range 10-85) increased to 90 (range 50-100). Mean preoperative ASSES score 60 (range 17-92) increased to 89 (range 38-75). Mean preoperative flexion/extension 79° (range 10-125°) increased to 110°. In every patient the increases were statistically significant ($p < 0.05$). No component specific complications have been observed to date. One deep infection occurred. 48 patients were satisfied. 5 patients with capitellum resurfacing only were dissatisfied these were converted to a total LRE and were subsequently satisfied. **Conclusion:** We consider that the medium-term results of LRE arthroplasty in arthritis compare favourably with alternative treatments. Considering the pattern of degenerative change in most patients with OA, we believe that LRE arthroplasty is a more logical solution than TER.

Date: 2011-09-07
Session: Elbow - Wrist
Time: 14:00 - 15:30
Room: Club A

Abstract no.: 29664

V-OSTEOTOMY RESECTION ARTHROPLASTY FOR BONY ANKYLOSED ELBOWS – MID-TERM RESULTS

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Background: Bony ankylosis of elbow is challenging and difficult problem to treat. The options available are arthrodesis, resection arthroplasty, and total elbow replacement. We report our midterm results on eight patients, who underwent V-Osteotomy excision arthroplasty in our hospital with good functional results. Patients and methods: From 2000-2009, 12 patients with ankylosed elbows were treated in our institute. Eight had bony fusion, and four patients fibrous ankylosis. All patients with bony ankylosis were post traumatic in origin. Four were males and two females. The mean age was 45 years(28-44 years).The patients with bony ankylosis were treated with V Osteotomy excision arthroplasty of our technic and were followed up at 6 weeks, 3 months, 6 months and at one year interval with Mayo`s elbow performance score(MEPS) and radiographs. Results: All the eight patients are followed up for a period of 2 years (18 mon-40 months). The mean Mayo`s elbow score preoperatively and at last follow up were 40 and 80 respectively. All the patients were satisfied functionally and cosmetically. One patient had transient ulnar nerve neuropraxia, which resolved at 5 weeks. There was no continuous bony fusion or ectopic ossification radiologically. Conclusion: Excision arthroplasty is a viable option in young patients with bony ankylosis as it offers satisfactory functional and cosmetic results with minimal complications, and the surgery should be meticulously done.

Date: 2011-09-07
Session: Elbow - Wrist
Time: 14:00 - 15:30
Room: Club A

Abstract no.: 29427

THE CLINICAL USEFULNESS OF THE MINIMAL INVASIVE ULNO-HUMERAL ARTHROPLASTY IN MILD TO MODERATE ARTHRITIS PATIENTS IN ELBOW

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Purpose: To evaluate of the clinical usefulness of the minimal invasive ulno-humeral arthroplasty in mild to moderate arthritis patients in elbow. **Materials and Methods:** We have studied 24 patients with mild to moderate elbow arthritis who underwent ulno-humeral arthroplasty to treat the elbow joint contracture from January 2000 to December 2008. The mean age was 53 years old (31-69). We excluded patients with preoperative ulnar neuropathy symptom, and investigated each patient who was able to follow up over a year, mean operation time, joint range of motion, time required until the start of joint exercise and Mayo elbow performance score (MEPS). **Results:** Passive and active joint exercise were started in an average of 1.8 days (1-4) after surgery, mean operation time was 38 minutes (25-55). Joint range of motion was 25-104 (extension 0~70, flexion 80~130) degrees preoperatively, and was improved 40 degrees on average to 14-133 (extension 0~45, flexion 90-150) degrees after a year of follow up, and time required until the start of joint exercise was 1.6 days (1-5) on average. MEPS was excellent 9 cases & good 5 cases after a year of follow up. Although there was 1 case of delayed wound delay and 7 cases of postoperative edema, they were improved spontaneously. **Conclusion:** For mild to moderate elbow arthritis patients, minimal invasive ulno-humeral arthroplasty is the clinically useful surgery since its operation time is short and early joint exercise is possible and pain is mild. **Key Words:** elbow arthritis, minimal invasive ulno-humeral arthroplasty

Date: 2011-09-07
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Time: 14:00 - 15:30
Room: Club A

Abstract no.: 29838

SHORT TERM RESULT OF MRI EVALUATION IN COSTAL OSTEOCHONDRAL AUTOGRAFT FOR OSTEOCHONDRITIS DISSECANS OF THE HUMERAL CAPITELLUM

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INTRODUCTION: We have experienced costal osteochondral autograft for osteochondritis dissecans (OCD) of the humeral capitellum. The aim of this study is to evaluate the costal osteochondral autograft using magnetic resonance imaging (MRI). **METHODS:** A total of 24 patients with OCD of the humeral capitellum were treated with costal osteochondral autograft. All patients were men and baseball players except two cases. The average age at the operation was 16 y/o. We investigated "surface integrity and contour" and "changes in underlying bone" of the costal osteochondral autograft with MRI images at 12 months (9 - 15 months) after the operation. These features acquired from MRI images were scored, and normal or near normal was characterized as 1 and abnormal as 0. **RESULTS:** Functional improvement was acquired in all patients. They returned to former sports activities within 12 months. The average score of "surface integrity and contour" and "changes in underlying bone" were 0.83 and 0.125 respectively. In 4 cases hypertrophic formation of the costal osteochondral autograft was observed. Additional minor operations, free body removal and shaving of protruded cartilage, were performed in 2 of these 4 cases. **CONCLUSION:** Costal osteochondral autograft was useful treatment for OCD of the humeral capitellum and functionally good results were obtained. In contrast MRI evaluation revealed that revascularization of the graft was not achieved completely at 12 months after the operation. Much attention has to be paid about the returning period to the sports activities.

Date: 2011-09-07
Session: Elbow - Wrist
Time: 14:00 - 15:30
Room: Club A

Abstract no.: 28855

A PROSPECTIVE STUDY OF STATIC WRIST EXTENSOR SPLINT FOR TREATMENT OF CHRONIC LATERAL EPICONDYLITIS

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We analyzed the beneficial effect of static wrist extensor splint in treatment of chronic lateral epicondylitis on 53 patients. The data were collected prospectively and assessed by subjective and objective clinical assessments by visual analogue scale, hand grip strength and mayo elbow performance score. The outcome measures were collected every four weeks for 16 weeks. We observed the reduction in visual analogue score from 72.8% (before treatment) to 11.8% , improvement in hand grip strength of hand from 24.7kgs (mean) before treatment to 32.9kgs (mean) in 3 months and improvement in Mayo elbow performance score after use of wrist extensor splint in majority of the patients for one month to three months. On the basis of our findings we conclude that application of static wrist extensor splint for duration of one month to three months reduces pain, improves functionality of the arm and grip strength in chronic lateral epicondylitis patients.

Date: 2011-09-07
Session: Elbow - Wrist
Time: 14:00 - 15:30
Room: Club A

Abstract no.: 28392

A NEW CONCEPT IN THE TREATMENT OF BOTH BONE FOREARM FRACTURES IN ADULTS WITH INTRA MEDULLARY IMPLANTS

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Objectives: To evaluate the results of screw elastic INTRAMEDULLARY nail for the treatment of adult diaphyseal fractures of both forearm bones. **Methods:** eighty adult patients with forearm fractures were retrospectively evaluated. 76 cases of fresh fractures and 4 cases of old neglected fracture. These patients (53 men, 27 women) ranging between 18 to 72 years with the mean age of 38 years underwent closed reduction and screw intra medullary nail fixation. Ten patients required limited open reduction. In four cases of neglected fractures open reduction and bone grafting was done. The fractures were classified according to the AO/OTA system. The average follow up was 12 months (range 6 to 18). **Results:** The mean operation time was 45 minutes (range: 40 to 65min). The meantime to union was 14 weeks (10 weeks to 21 weeks). The results were evaluated using the criteria of Grace and Eversman. The results were excellent in 54, good in 18 patients and acceptable in 8 patients. Postoperative complications in the form of superficial infection in 3 cases, one delayed infection, painful bursa in 2 cases, delayed union in two cases and mal union with dislocation of the DRUJ in two cases. 1 case of incomplete radio-ulnar synostosis; in one case the tendon of the thumb extensor was injured. The implanted material was extracted from 7 patients. **Conclusion:** Closed reduction and internal fixation of forearm fractures by screw intramedullary nails re-establishes the near normal relationship of the fractured fragments. The stability is achieved by the flexibility and elasticity of the nails, anchorage they gain in the radial and ulnar diaphysis and metaphysis. Screw intramedullary nailing can produce excellent clinical results in fractures of either bones or both bones of the forearm in adults. It has the advantages of technical simplicity, low cost, user-friendly instrumentation, and a short learning curve.

Date: 2011-09-07
Session: Elbow - Wrist
Time: 14:00 - 15:30
Room: Club A

Abstract no.: 28465

FUNCTIONAL OUTCOME OF NEGLECTED/UNREDUCED PERILUNATE DISLOCATIONS TREATED WITH OPEN REDUCTION AND INTERNAL FIXATION: OUR EXPERIENCE WITH FOURTEEN CASES

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Introduction: Management of neglected perilunate dislocations is controversial with different authors advocating various procedures such as open reduction and internal fixation (ORIF), proximal row carpectomy, lunate excision and wrist arthrodesis. The aim of our study was to evaluate the functional outcome of neglected/unreduced perilunate dislocations managed by ORIF. Materials and Methods: Over a period of 10 years (1996 to 2006), 14 patients with neglected perilunate dislocations (undiagnosed or untreated for 6 weeks or more) were managed by ORIF. Six patients each were found to have trans-scapoid perilunate dislocation and volar lunate dislocation while the remaining 2 had a dorsal perilunate dislocation. Results: The average follow up period was 4.1 years (2-12 years). All except one of the patients operated earlier than 5 months had good results. Of the four patients operated after 5 months, 2 had a fair result while 2 had a poor outcome. Chondral damage to the capitate was noted intra-operatively in both the cases with poor outcomes. The two patients were found to have AVN of the lunate; however functional outcome was fair in both and both were able to return to their profession. Conclusion: We believe that the functional results of ORIF in neglected perilunate dislocations are favourable upto 5 months after injury. Even the development of AVN or midcarpal arthritis may not be a major disabling factor as long as stability of wrist has been restored. However, beyond 5 months, an alternative surgical procedure such as proximal row carpectomy should be contemplated.

Date: 2011-09-07
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Room: Club A

Abstract no.: 28130

CARPUS FRACTURES-DISLOCATIONS: SURGICAL TREATMENT, RADIOLOGIC AND FUNCTIONAL OUTCOMES

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Introduction: Dislocations and fracture dislocations of the carpal bones are potentially devastating lesions and they are often misdiagnosed or diagnosed late. The purpose of this study is to evaluate the treatment and radiological and functional outcome after their surgical treatment. Methods: Twenty-seven patients with different types of dislocations or fracture dislocations of the carpus were prospectively evaluated between 2004 and 2010. Patient's age averaged 28 years. Eleven were acute injuries, eleven subacute and five chronic injuries. They were all static, traumatic and intercarpal injuries. The injury patterns were: seven transscaphoperilunate dislocations, three trans os magnum transscaphoperilunate dislocations, seventeen transcuneiform trans os magnum transscaphoperilunate dislocations and one mid carpal dislocation. Results: Follow up averaged 14 months. Carpal angle averaged 130°, scapholunate angle averaged 46°, lunate-os magnum angle averaged 23°, carpal height averaged 1,56 cm. Scapholunate interval averaged 1,5mm. Functional outcomes averaged 60,5° for flexion, 43° for extension, 16° for ulnar deviation, 17° for radial deviation. 77,5° for pronation, 72° for supination. Strength tests averaged: dynamometer 26,5 kg., clamp key digitometer test 8,9 kg., tridigital clamp test 7 kg. DASH Score averaged 32,62 points. Analogical scale of pain averaged 6,5 points. Conclusion: Many aspects of this injury are yet to be studied or are still unknown. It is important to recognize and solve as quickly as possible these kinds of injuries by a surgical procedure that allows optimal bone reduction and ligament repair using a double surgical approach when needed.

Date: 2011-09-07
Session: Elbow - Wrist
Time: 14:00 - 15:30
Room: Club A

Abstract no.: 28205

SURGICAL TREATMENT OF BENNETT'S FRACTURE TYPES WITH VARIOUS OSTEOSYNTHETIC MATERIALS

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We present 90 patients, with fracture of the first metacarpal base (thumb) – Bennett's fracture (two part fracture), who were injured over a period of 6 years (2004-2009). All patients were treated surgically with osteosynthesis of the metacarpal base. The average age of the patient group at the time of injury was 33 years. All patients were injured either in a sport activity or from a fall from height. The surgical approach we used is a modification of the radiopalmar curving incision. Our operative incision was 2-3 cm long. Osteosynthetic materials which were used varied. Kirschner wires were used on patients who presented with very small dislocated bone fragment in Buechler's zone 1 and 3. Patients with fractures in Buechler's zone 2 were treated with a variety of screws (AO screws, mini Herbert screws, standard Herbert screws, or Twin-Fix screws). Osteosynthesis was preformed with a 1.3mm thick mini-T plate with 6 holes where there were larger fracture fragments and it was questionable that the screw could hold the reduced position. The osteosynthetic materials which were used, except for k-wires, were all made of titanium therefore is not necessary to remove them. We believe that it is important to choose osteosynthetic material according to the type of Bennett fracture to be treated, the earliest possible surgical treatment, even if the fracture dislocation is 1mm, and the early start of physical rehabilitation.

Date: 2011-09-07

Session: Foot & Ankle - Hallux Valgus

Time: 08:00 - 09:30

Room: Club B

Abstract no.: 29107

RESULTS OF TREATMENT OF HALLUX RIGIDUS WITH HEMIARTHROPLASTY

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Aim: The presentation of the results of hemiarthroplasty in hallux rigidus with severe osteoarthritis. **Material – Methods:** During the last four years, from 2007 to 2010, seven patients were treated for severe osteoarthritis in the first metatarsophlangeal joint of the foot. The mean age was 69 years old (range 62 to 75). Metatarsophlangeal osteoarthritis was severe according to Roukis classification. All of them were treated conservatively for at least six months. Peripheral vascular disease, local infection, crystallopathy crystal deposition disorder or systematic inflammatory diseases were excluded preoperatively. The American Orthopaedic Foot and Ankle Society (AOFAS) score was used in our study. Other parameters were the relief of pain according to the Visual Analog Scale, the range of motion in the joint and the radiological examination of the prosthesis. **Results:** The follow up was scheduled in one, three, six months and then yearly. The mean follow up was 9.85 months. The decrease of pain was in average 2.7 degrees according the Visual Analog Scale (range 2 to 4 degrees). The AOFAS score was improved in average 25.7 degrees postoperatively. The range of motion was improved in extension (mean 14o) and was decreased in flexion (mean 5o). There was no sign of radiological and clinical loosening of the prosthesis in all cases. **Conclusions:** The hemiarthroplasty is an alternative method to total arthroplasty in hallux rigidus. It is a safe method with good results in older patients with low activity level and with severe pain from osteoarthritis.

Date: 2011-09-07

Session: Foot & Ankle - Hallux Valgus

Time: 08:00 - 09:30

Room: Club B

Abstract no.: 27283

OUTCOMES FOLLOWING CHEILECTOMY FOR HALLUX RIGIDUS

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Introduction: Cheilectomy for treatment of hallux rigidus will relieve dorsal impingement that is usually the source of pain in patients with this condition. The purpose of this study was to evaluate the results of cheilectomy for treatment of hallux rigidus. Data obtained from this study may be used in the pre-operative counselling of patients undergoing cheilectomy. Methods: 50 consecutive patients with degenerate hallux rigidus treated with cheilectomy were included. All operations were performed by one surgeon. The mean follow-up was four months. Outcomes were assessed by comparison of pre- and post-operative range of movement and patient satisfaction following the procedure. Results: Mean patient age was 52 yr (31 to 65). The average pre-operative dorsiflexion was 9 degrees. The mean on-table dorsiflexion following cheilectomy was 46 degrees but dropped to 20 degrees at follow-up. The mean net gain of dorsiflexion was 12 degrees at an average of 4 months ($p < 0.001$). 70% reported a good outcome following the procedure, 17% had a moderate outcome (moderate pain and residual stiffness) and 13% reported a poor outcome (no improvement). 10% of patients subsequently underwent arthrodesis for progression of symptoms within 12 months of cheilectomy. Complications included infection ($n=2$; settled with antibiotics) and scar tenderness ($n=1$). Conclusion: Patients can expect an average increase in dorsiflexion of 12 degrees and 70% of them will be satisfied with the procedure's outcome. Complication rates were minimal and in our study only one-tenth of patients required arthrodesis within a year of cheilectomy.

Date: 2011-09-07

Session: Foot & Ankle - Hallux Valgus

Time: 08:00 - 09:30

Room: Club B

Abstract no.: 28577

DO WEIGHTBEARING FILMS AFFECT DECISION MAKING IN HALLUX VALGUS SURGERY?

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Background: Hallux valgus is a complex deformity of the first ray and forefoot, which can be surgically treated by different procedures and osteotomies. Preoperative planning includes antero-posterior and lateral plain films. The effect of weightbearing on the results of the standardized measurements is still the subject of debate. Materials and methods: We evaluated the effect of weightbearing on the results of measurements and decision making by expert evaluators. Twenty one expert foot & ankle surgeons were given weightbearing and nonweightbearing anteroposterior plain foot films of patients with hallux valgus. They were asked to measure three standard angles and then to select the most appropriate procedure out of a short list. Results: Using paired Student T-test, no difference in the angles measured or the procedures chosen was detected between weightbearing and nonweightbearing films. Conclusion: Although it is generally accepted that decisions regarding the treatment of hallux valgus should be based on plain weightbearing films, in this study we established the nonweightbearing films can be reliably used to choose the surgical procedure.

Date: 2011-09-07

Session: Foot & Ankle - Hallux Valgus

Time: 08:00 - 09:30

Room: Club B

Abstract no.: 29335

THE CHEVRON OSTEOTOMY WITH LATERAL SOFT TISSUE RELEASE FOR HALLUX VALGUS SURGERY IN THE ELDERLY – A PROSPECTIVE STUDY IN 80 FEET

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Introduction: The Chevron osteotomy is a save method for correction of mild and moderate hallux valgus. No results are available about hallux valgus surgery in the elderly. The prospective study reveals the first clinical and radiological results of the chevron osteotomy with pin fixation in patients over 70 years. Material and Methods: 80 chevron osteotomies were fixed with a temporary K-wire. The mean follow up was 35 months; average patient age was 76 years (range 70 to 86 years). The patients were evaluated with the AOFAS forefoot score. Radiographs were analysed according to AOFAS guidelines and statistical evaluation was made with the Wilcoxon signed-rank test. Complications were recorded in detail. Results: The average AOFAS score improved significantly from 55 points preoperatively to 89 points at follow-up. The intermetatarsal and hallux valgus angle improved as well as the sesamoid position significantly. Radiographic evaluation of the patients indicated that all examined osteotomies had healed. The duration of the aftercare using a regular Hallux postoperative shoe was in 61% 6 weeks and in 39% 8 weeks until bony healing. The pin was removed in all patients 8 weeks postoperative. There were no severe complications. Conclusion: This prospective investigation at intermediate follow-up using currently available outcome measures suggests that the chevron osteotomy with fixation in the elderly is a suitable procedure for the surgical correction of hallux valgus deformity.

Date: 2011-09-07

Session: Foot & Ankle - Hallux Valgus

Time: 08:00 - 09:30

Room: Club B

Abstract no.: 29444

SLING PROCEDURE FOR HALLUX VALGUS

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Hallux valgus is one of the most common foot deformities in women. We report a method of forefoot soft-tissue reconstruction using transfer of the long extensor tendon of the fifth toe. **Materials and methods:** The technique is used for correction of flexible pes planus transversus and hallux valgus. This procedure includes the adductor hallucis tendon transfer and formation of a new ligament between distal parts of the first and fifth metatarsals. The portion of the fifth extensor tendon is brought across the foot beneath the necks of the second, third and fourth metatarsals and then around the fifth metatarsal neck. Then, this tendinous graft is fixed in a tunnel drilled in the first metatarsal neck. The inclination of the tunnel from 10 to 30 degrees to the horizontal plane is used for derotation of the first metatarsal. **Results and discussion:** From 1998 till 2010 we performed 110 operations in 85 patients with flexible flatfoot and hallux valgus aged 17-55 years. Sixty four patients (84 feet) were evaluated at a mean of 4,8 years (range, 1-10 years) after surgery. Excellent results were achieved in 21 (25,0 %) cases, good – in 49 (58,3 %), satisfactory – in 11 (13,1 %), poor – in 3 (3,6 %) cases. Analysis of clinical outcomes of the surgical treatment of forefoot deformities in patients with hallux valgus indicates high efficacy of the forefoot sling procedure using a transfer of the fifth extensor tendon. This procedure is indicated for treatment of moderate hallux valgus with flexible forefoot deformity.

Date: 2011-09-07

Session: Foot & Ankle - Hallux Valgus

Time: 08:00 - 09:30

Room: Club B

Abstract no.: 27731

CROSSED-SCREW TECHNIQUE OF HALLUX METATARSO-PHALANGEAL JOINT ARTHRODESIS-SCREW TECHNIQUE: SURGICAL RESULTS AND FUNCTIONAL OUTCOMES

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BACKGROUND: We reviewed a continuous series of hallux metatarso-phalangeal (MTP) joint arthrodesis using a crossed-screw technique and present our surgical results and functional outcomes. **MATERIALS AND METHODS:** 23 toes in 21 patients operated in the period between September 2007 and January 2010 were included for the retrospective study. Average age was 60.0 years (range 31-84 yrs) with male female ratio being 3:4. Differential pitch cannulated crossed screw technique was used in all cases. At the latest follow-up, the radiological findings, the hallux-forefoot AOFAS scores and patient satisfaction questionnaires were used to assess outcomes. **RESULTS:** Overall fusion rate was 91% with a mean hallux valgus angle of 13.6 degrees (8-22 degrees) and a mean dorsi-flexion angle of 25 degrees (18-30 degrees). Complication rate was 13% which included two superficial wound infections and one failed fusion that underwent a successful fusion after revision surgery. At a mean follow-up of 17 months (range 6 -34 m), the mean AOFAS score was 79 (out of a maximum of 90). 92% of the patients were satisfied with the final outcome and 83% mentioned that they would have the procedure again. **CONCLUSION:** Crossed-screw technique of arthrodesis of the first MTP joint is successful for relief of pain, correction of deformity allowing a high level of function and good patient satisfaction

Date: 2011-09-07

Session: Foot & Ankle - Hallux Valgus

Time: 08:00 - 09:30

Room: Club B

Abstract no.: 30061

PROXIMAL CLOSING WEDGE OSTEOTOMY OF FIRST METATARSAL BONE IN HALLUX VALGUS

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Purpose: outcome of long axis correction and clinical results after proximal closing wedge osteotomy of first metatarsal in hallux valgus. Material and methods: In our department, between 2005 and 2009, 76 patients (108 feet – 32 bilateral surgical procedures) with hallux valgus underwent proximal closing wedge osteotomy of first metatarsal. Lateral capsulotomy of the first metatarso-phalangeal joint, realignment of the first phalanx bone, plication of the capsule medially and repositioning of sesamoids were performed in all cases. In some cases, removal of the exostosis of the first metatarsal head and release of adductor hallucis were performed as well. We compared the preoperative and postoperative intermetatarsal angles and metatarsophalangeal angles and the rates of the American Orthopaedic Foot and Ankle Society (AOFAS) score before surgery and at the last check-up. The mean follow-up was 3 years and 5 months. Results: The intermetatarsal angle had a preoperative average value of $18,47 \pm 3,24$ degrees while its postoperative mean value was $8,35 \pm 2,52$. The metatarsophalangeal angle changed from a preoperative mean value of $30,92 \pm 7,56$ degrees towards a postoperative value of $13,38 \pm 5,76$ degrees. The average preoperative AOFAS Score was $49,12 \pm 5,72$, while its mean postoperative value was $86,42 \pm 11,26$. Considering patients satisfaction, the results were good and very good in 91,67% of cases. Conclusions: The best results are obtained by combining several techniques mentioned above. An increase of 37 points in the AOFAS score was recorded and its postoperative values proved stable in time. During an average follow-up of 3 and a half years, the loss of correction of intermetatarsal angles and metatarsophalangeal angles was minor. 92% of patients were satisfied with the results.

Date: 2011-09-07

Session: Foot & Ankle - Hallux Valgus

Time: 08:00 - 09:30

Room: Club B

Abstract no.: 28520

STABILIZATION OF THE CHEVRON PROCEDURE FOR HALLUX VALGUS DEFORMITY WITH A CAPSULOPERIOSTEAL FLAP: LONG-TERM FOLLOW-UP RESULTS FOR 88 FEET OF 59 PATIENTS

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Background: distal chevron osteotomy(DCO) for mild to moderate hallux valgus deformity is inherently more stable than the other forms of distal metatarsal osteotomy, but complications such as loss of correction, infection related to the implants, joint stiffness delayed union, malunion and nonunion can occur. In this study, we have evaluated the use of a capsuloperiosteal flap for stabilization of chevron procedure in the treatment of hallux valgus. Methods: a retrospective study was conducted on 59 patients (88 feet) that underwent distal chevron osteotomy stabilized only with capsuloperiosteal flap for mild and moderate hallux valgus deformity followed-up for a mean of 11.3 years. Results: Clinical evaluation was calculated using the hallux score of the American Orthopaedic Foot and Ankle Society (AOFAS). The score improved from a pre-operative mean of 52 to a mean of 91.5 points at last follow up. Average hallux valgus angle changed from 30.3° preoperatively to 14.2° postoperatively at the last follow-up measurements. Intermetatarsal angle 1-2 changed from 13.6° preoperatively to 10.2° postoperatively. Eighty-six /eighty-eight feet 97.7% were pain free. Discomfort in shoe wearing was absent in eighty-four/eighty-eight feet(95.5%) postoperatively and above all twenty four /twenty five (96%)patients were satisfied cosmetically. Conclusion: capsuloperiosteal flap stabilization of distal chevron osteotomy for mild-moderate hallux valgus revealed excellent clinical results in the long term follow-up. The correction proved to be consistent with only an average of 3.4° correction loss and 4.9° loss in the range of motion with a mean follow-up 11.3 years.

Date: 2011-09-07

Session: Foot & Ankle - Hallux Valgus

Time: 08:00 - 09:30

Room: Club B

Abstract no.: 28409

DIAGNOSIS AND TREATMENT FOR TENOSYNOVITIS OF THE FLEXOR HALLUCIS LONGUS TENDON: APPLICATION OF HINDFOOT ENDOSCOPY

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The diagnosis of FHL tenosynovitis is difficult for a high incidence of asymptomatic tendon sheath effusion in MRI. Hindfoot endoscopy has developed for direct diagnosis and effective treatment of hindfoot disorders. The purpose of this study is to clarify the etiologies including frequency of the FHL tenosynovitis in the cases of posterior ankle impingement syndrome, and the efficacy of the endoscopic surgery for this disorder. 35 feet of 33 cases were the subjects of this study. Before surgery, standard radiography for diagnosis of bony abnormalities including os trigonum (OT) and large posterior talar process (LPTP); and MRI for diagnosis of FHL tenosynovitis were performed. FHL stress test to be the passive extension of the great toe metatarsal joint with the foot in the neutral to the plantar flexed position was performed preoperatively. In hindfoot endoscopy, bony abnormalities and the tenosynovitis and/or stenosing tenosynovitis of the FHL tendon were diagnosed. In hindfoot endoscopy, there were 23 cases of OT, 27 cases of LPTP. For diagnosis of FHL tenosynovitis, all cases showed a focal area of high-signal-intensity in T2 weighted image around the FHL tendon in preoperative MRI, but 8 cases among them (25.8%) didn't show a tenosynovitis in hindfoot endoscopy. A stenosing tenosynovitis of the FHL tendon at its insertion to the tarsal tunnel was showed in 5 cases, and which showed positive in preoperative FHL stress test. The mean AOFAS score was 70.1 ± 3.5 before the surgery and 96.9 ± 4.3 at 1 year after the surgery. The mean duration between the surgery and the returning to the athletic activity was 5.1 ± 2.4 weeks. Hindfoot endoscopy is the excellent tool for exact diagnosis and effective treatment for posterior ankle impingement syndrome, especially for tenosynovitis and/or stenosing tenosynovitis of the FHL.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous I

Time: 10:30 - 12:00

Room: Club B

Abstract no.: 29486

**FOOT & ANKLE INJURIES IN ELITE PROFESSIONAL FOOTBALLERS:
EVALUATING THE RISK INVOLVED**

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Introduction: Foot and ankle injuries are a common occurrence amongst all footballers. The aim of this study was to establish the relative risk of suffering a foot and ankle injury in the English Premier League (EPL). Method: Data was collected prospectively for all foot and ankle injuries suffered by first team players over the 2008-09 and 2009-10 EPL season at one EPL club. The database was compiled detailing all injuries. Squad size, average number of minutes played per player and number of games were calculated to provide the results. Results: 12 players (32%) within the squad of 38 sustained a foot ankle injury during a match over the 2 seasons. Therefore the risk of injury in a season is 16%. The mean time played per player was 1318 minutes per season resulting in a total of 50,084 minutes played by the squad collectively. Over the two seasons this is 100,168 minutes played in total by all players collectively. This calculates as there being 8347 minutes of play per injury, equating to 92 full games. When divided by the 11 players, a foot and ankle injury is demonstrated every 8.5 games by a member of the team. Conclusion: Our findings suggest that foot and ankle injuries sustained in a game are common in elite professional footballers with a risk of a player sustaining such an injury if he plays 92 full games. Observing such an injury in any player within the team is likely within 8.5 games.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous I

Time: 10:30 - 12:00

Room: Club B

Abstract no.: 29074

**TIBIOFIBULAR SHIFTING AFTER SYNDESMOTIC SCREWS
– NEW RESULTS FROM A PROSPECTIVE STUDY**

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Postoperative CT after syndesmotic screws is recommended in several studies. A previous study disclosed worse clinical results in patients with anterior shifting after implantation of a syndesmotic screw. Here we present a new index for tibiofibular shifting. 49 patients (f:m = 18:31, 18 – 87 years) with a syndesmotic screw in ankle fractures were included. According to AO there were 35 (71.5%) C and 14 (28.5%) B fractures. The index A was calculated as the ratio of shifting of the fibula of the non-operated and of the operated side in the axial CT planes. If both sides are identical, $A = 1$. The degree of shifting was classified (no/moderate/clear). Clinical results were assessed by the scores of Philipps, Olerud/Molander and Weber. Average index was 1.75 (0.31-6.3). In patients with clear shifting (n=7), the average index was 4.48, with minor shifting (n=8), average index was 2.17, without shifting (n=35), the average index was 1.10. So there is no shifting if $A < 1$; if $1 > A < 3$ it is moderate, if $A > 3$ anterior shifting is assured. Patients had good to very good results in average (Phillips 120,4/Olerud 89,6/Weber 2,8), while patients with an index $A > 3$ had significantly worse results (average Phillips 87/Olerud 67/Weber 8,6). The tibiofibular shifting index is a good method to find pathologic CT results. The index objectifies the CT and could predict the clinical result.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous I

Time: 10:30 - 12:00

Room: Club B

Abstract no.: 29964

FIXATION OF DISTAL TIBIOFIBULAR SYNDESMOSIS: A COMPARATIVE STUDY BETWEEN TIGHTROPE AND SCREW FIXATION

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Aim of this study is to compare the treatment of ankle syndesmosis injuries using new tightrope technique versus traditional syndesmosis screw fixation. This study comprised of 94 consecutive cases of distal tibio fibular syndesmotic injuries treated in our institute. 49 cases were treated with Arthrex Tightrope™ while 45 were treated with syndesmosis screw. Mean age of patients were 37.7 and 38 years respectively. Patients had clinical and radiological follow up at mean of 5.5 months while subjective data was collected at an average of 24 months (6-36) including time to full weight bearing, American Orthopaedic Foot and Ankle Society (AOFAS) score, Foot and Ankle Disability Index (FADI) score and radiographic parameters for syndesmosis integrity including medial clear space, tibiofibular clear space and tibiofibular overlap on ankle radiographs. Average time to full weight bearing was 7.7 weeks in tightrope group and 8.3 weeks in screw group. There was no significant difference in mean post-operative AOFAS score and FADI score between two groups. Post-operative radiographic measurements demonstrated satisfactory reduction of syndesmosis. 2 patients required removal of tightrope because of soft tissue complication over the lateral knot. 3 cases in screw group showed radiographic evidence of synostosis. This study indicates that tightrope is as effective as syndesmosis screw for the treatment of syndesmotic injuries and also obviates the need for routine removal of implant. We emphasize that surgeons must be aware of potential risk of soft tissue complications and further randomised controlled trails are recommended.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous I

Time: 10:30 - 12:00

Room: Club B

Abstract no.: 28593

ANKLE SYNOVIAL CHONDROMATOSIS: MANAGEMENT ENIGMA

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Introduction: Synovial chondromatosis is a rare, generally benign condition which affects synovial membranes. It most commonly involves large joints such as the knee, hip, and elbow, but its presence in smaller joints has also been reported. The diagnosis of synovial chondromatosis is commonly made following a thorough history, physical examination, and radiographic examination. Patients may report pain and swelling within a joint which is often aggravated with physical activity. Case presentation: A rare case of childhood synovial chondromatosis of the ankle is reviewed. A 10 year-old female presented with chronic ankle pain. Physical examination suggested and imaging confirmed multiple synovial chondromatoses with synovitis, probably secondary to previous trauma. Since this condition tends to be progressive but self-limiting, indications for surgery depend on the level of symptomatic presentation in addition to the functional demands of the patient. Therefore open removal of nodules and partial synovectomy done due to large number and location of nodules. At 3 years follow up functional result was excellent. Discussion: Patient age and disease stage also serve as treatment guides. In young patients, arthroscopic debridement is commonly sufficient to achieve a cure and synovectomies should be used only in instances of relapse. In advance stage of disease, removal of the loose bodies alone is sufficient. Resection of the loose bodies and synovectomy when synovitis is present is thought to be indicated since the recurrence is increased when synovitis is present especially in children. Recurrence rates for synovial chondromatosis after surgical treatment have been reported as varying from 7% to 23%. Overall, prognosis following removal of the nodules is reported as excellent.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous I

Time: 10:30 - 12:00

Room: Club B

Abstract no.: 27758

TRIPLE FUSION AND ILIZAROV GRADUAL CORRECTION FOR STIFF ADULT PES-PLANO VALGUS

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Stiff pes-planovalgus in adults is a challenging deformity to correct. The tibialis posterior tendon is usually dysfunctional and the deformity includes hind foot equinus and metatarsus abductus. In the severe cases the bone stock of the tarsus might be deficient making traditional triple fusion quite challenging. In this study 15 patients with severe stiff collapsing pes-planovalgus were managed by preparation of the subtalar and midtarsal joints for fusion followed by application of an Ilizarov frame and gradual correction of the individual elements of the deformity. In all patients a stable fusion was achieved with significant improvement of the hind foot alignment and the abductus deformity. Varus subluxation of the ankle joint has been noted as a problem that can arise during correction and was managed by using a talar wire to steady the ankle joint during the correction. This technique is technically demanding but can be a useful tool for selected severe cases particularly when bone stock deficiency exists.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous I

Time: 10:30 - 12:00

Room: Club B

Abstract no.: 29193

**CALCANEOSTOP FOR TREATMENT OF FLEXIBLE PES PLANOVALGUS
IN CHILDREN**

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Introduction: The flat foot in children is a frequent reason for seeking treatment in orthopedics, and the concern of parents always superior to the clinical status of children. Surgical intervention for the flexible pediatric flatfoot is typically reserved for symptomatic feet that have not responded to conservative measures. The goals of surgery are simple: pain reduction or resolution and realignment of the foot. The purpose of this study is to show the results of children undergoing "calcaneo-stop" intervention. Material: This study includes 35 children, 70 feet operated between 1999 and 2009. We asked parents and children for the satisfaction and evaluated the foot with standard radiographs, anteroposterior and lateral views. On the anteroposterior view we measured the intermetatarsal angle between the first and second metatarsal and the talocalcaneal angle. On the lateral view of the foot, the lateral talocalcaneal angle, the Meary angle, the Hibb angle, and the calcaneal pitch. Methods: Clinical assessment and consultation of the imaging process for comparing the angles mentioned. Results: The time of follow-up ranged from 1 to 10 years. Clinically, > 90% of patients achieved good or excellent results. We found an intermetatarsal angle of 5°, a talocalcaneal angle of 35°. On the lateral the lateral talocalcaneal angle was 38°, the Meary angle 3°, the Hibb angle 155°, and the calcaneal pitch was 28°. Discussion/ Conclusion: despite indications for surgery are controversial we show that the technique of "Calcaneo-Stop" is a simple, fast and affordable, with clinical and radiologic good results for flexible pes planus.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous I

Time: 10:30 - 12:00

Room: Club B

Abstract no.: 29439

MINIMUM INVASIVE DYNAMIC SURGICAL CORRECTION OF PLANOVALGUS DEFORMITY IN YOUNG PATIENTS

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We evaluated the clinical and radiological results of 35 patients who underwent minimum invasive dynamic surgical correction during 2008-2010. Indication: non-fixed planovalgus deformity. Conservative treatment was not successful. Preplanning included clinical, radiological and pedobarographic study. The surgical procedure involved segmental reinsertion of external Achilles tendon on medial surface of upper part of calcaneum. Mathematical calculations proved that after operation biomechanical environment of back part of calcaneum movement changed in two dimensions: in frontal plane supination effort rose 1.5 times; in sagittal plane bending effort of frontal part of calcaneum reduced on 27 %. Age of patient varied from 5 to 14 years (19 boys and 16 girls). Corrective effect of the operation was initially registered 3-4 month after operation (pedabarographic study), positive dynamic after 6 month (X-ray study). Post operation review showed positive results in 32 patients 6 and 12 month after operation. The study considers possible mistake, complications and corrective actions.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous I

Time: 10:30 - 12:00

Room: Club B

Abstract no.: 27757

MANAGEMENT OF THE STIFF EQUINO-CAVO-VARUS DEFORMITY WITH THE V-OSTEOTOMY AND THE ILIZAROV FRAME

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The stiff equino-cavo-varus deformity is a complex challenge to most foot and ankle surgeons. The traditional treatment includes extensive soft-tissue release combined with wedge tarsectomy or modifications of triple fusion. These procedures involve extensive dissection and demand an extended period in plaster post-operatively. The percutaneous V-osteotomy and gradual correction with an Ilizarov frame is now a different option for these cases that carries several advantages. This study questions the outcome of such a technique and the complications involved. 40 patients with severe stiff equino-cavo-varus deformities, of different aetiologies have been treated with this technique. The radiological as well as the clinical evaluation of these cases are presented in details. We present a scoring system for these complex cases based on the severity of the individual elements of the deformity as well as the soft-tissue condition. Complications encountered included pin-site problems, pre-mature consolidation of the osteotomies, complex regional pain syndrome and under correction. The V-osteotomy and the gradual correction with an Ilizarov frame is a complex and technically demanding technique that however provides an ideal alternative for this complex category of patients.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous I

Time: 10:30 - 12:00

Room: Club B

Abstract no.: 29571

OSTEOCHONDRAL LESIONS OF THE TALUS WITH LARGE SUBCHONDRAL CYST TREATED BY AUTOLOGOUS OSTEO-PERIOSTEAL GRAFT TRANSPLANTATION

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Background: The purpose of this study was to investigate the clinical and radiological results of autologous cylinder osteo-periosteal graft transplantation for osteochondral lesions of the talus (OLT) with large subchondral cyst. Materials and Methods: We examined 10 consecutive cases of OLT with subchondral cyst larger than 15 mm in diameter. All patients were male with an average age of 33.2 years. Arthroscopic assisted osteo-periosteal cylinder graft transplantation was performed, which was harvested from ipsilateral iliac crest. The visual analog score (VAS) for pain during daily activities, the American Orthopaedic Foot & Ankle Society (AOFAS) hindfoot and ankle score, X-ray and MRI of the ankle joint were used for clinical and radiographic evaluation. Second look arthroscopy was performed in 7 patients at 12 months postoperatively with the screw taken-off. Results: At the final followup, the average AOFAS score improved from 69.7 points to 91.3 points and the VAS score decreased from 5.3 points to 0.9 points. On plain radiographs after surgery, low density area of the cyst disappeared, and a good configuration of the articular surface of the talus was showed. MRI image at 12 months after surgery showed the healing of the graft, and subchondral edema decreased. Second look arthroscopy showed the cartilage defect was filled with cartilage like tissue. Conclusion: Autologous cylinder osteo-periosteal graft transplantation is an alternative treatment for OLT with large subchondral cyst.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous I

Time: 10:30 - 12:00

Room: Club B

Abstract no.: 28564

**LOCAL TOURNIQUET PAIN CONTROL IN FOREFOOT SURGERY:
A RANDOMIZED STUDY**

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Background: Forefoot surgery is often performed under regional anesthesia (ankle block) in awake patients, using tourniquet or esmarch bandage to obtain bloodless field. The purpose of this study was to examine the value and need for local tourniquet pain control using local subcutaneous analgesic mixture in patients undergoing forefoot surgery under regional anesthesia. Patients and methods: We prospectively randomized 56 patients who underwent forefoot surgery under ankle block to receive subcutaneous local anesthetic mixture under the tourniquet. We checked for local tourniquet pain score (VAS 0-100) and skin condition during and after the procedure. Results: tourniquet was quite tolerable in both groups, with an average VAS score of 7-21. No difference was observed between groups throughout most of the procedure. No correlation between VAS scores and procedure length or patient's age or gender. Conclusion: ankle tourniquet is well tolerated by patients without need for local anesthetics.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous II

Time: 14:00 - 15:30

Room: Club B

Abstract no.: 28090

RADIOLOGIC CHANGE OF ANKLE JOINT AFTER TOTAL KNEE ARTHROPLASTY

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Introduction: The purpose of this study was to analyze radiologic changes of the ankle joint after total knee arthroplasty. Materials and Methods: A total of 142 cases in 110 patients who underwent total knee arthroplasty were followed for at least 3 years were enrolled. The varus knee group included 128 cases and the valgus knee group, 14 cases. On antero-posterior standing lower extremities roentgenography, varus and valgus angles of the knee were measured preoperatively and at the last follow up. The angle between the ground surface and the distal tibial plafond as well as the upper talus was also measured. In addition, tibial anterior surface angle, talar tilt, space between the medial malleolar distal tip of the ankle joint and the medial articular surface of the talus, and medial clear space of the ankle joint were measured. Results: Out of 142 cases, 50 (35.2%) had arthritis in the ankle before total knee arthroplasty and 31 (21.8%) newly developed or progressed arthritis after the operation. In particular, the varus knee group demonstrated statistically significant differences in preoperative varus deformity, talar tilt, and postoperative correction angle between the cases that developed or progressed arthritis (29 cases) and those that did not show any changes (99 cases). Conclusions: After total knee arthroplasty, arthritis developed or progressed in the ankle of many cases radiologically. In particular, when the preoperative talar tilt increased medial to the ankle or the postoperative correction angle was large, the incidence of arthritis in the ankle joint rose.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous II

Time: 14:00 - 15:30

Room: Club B

Abstract no.: 27534

TREATMENT OF CONGENITAL AND ACQUIRED FOOT DEFORMITIES WITH EXTERNAL FIXATION

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Treatments of complex foot deformities need use of special fixators to treat various deformities. In severe cases the best choice is use external hinge distraction system to restore function of joints, treat short foot, and correct deformity. Simple, small, mobile hinges /SLDF 2 / Salamehfix 2 / was modified for the treatment. From 1995 to 2009 we treated 210 cases of severe foot deformities with congenital clubfoot, neuromuscular deformities and posttraumatic deformities age between 3 to 60 years with the new modified system. In some cases the treatment was combined with lengthening and axial correction of the lower leg if needed. The average time for correction is 4 to 6 week's followings by 1-3 months of fixation to keep the final correction. A special orthosis is needed after removal of the fixation devices for another 6 months. Complications were mostly superficial Pin infection, loosening of wires, no nerve or vascular damage and no thrombosis was seen. In all cases a plantigrade foot was achieved with some stiffness of the joints in neuromuscular diseases. The walking ability was in most cases much better due to plantigrade correction; enable the patient to walk without any aid accept orthopedic shoes. The satisfaction rate of all patients was very good; some of the patients were able to walk first time due to the correction. The use of external fixation is an ideal treatment in complex congenital or posttraumatic foot deformities to achieve good correction, good functional and cosmetic result with a tolerable system.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous II

Time: 14:00 - 15:30

Room: Club B

Abstract no.: 28793

APPLICATION OF ILIZAROV APPARATUS FOR OPERATIVE TREATMENT OF PATIENTS WITH POSTTRAUMATIC FOOT DEFORMITIES

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Treatment of patients with posttraumatic conditions of the foot and malleoli is still a challenging problem of current orthopaedics. From 2001 to 2010 162 patients (197 feet) with posttraumatic foot deformities were treated at our hospital. Patients' age ranged from 16 years to 64 years. The history showed hindfoot fractures in 49 patients, broken fore- and midfoot in 29, fractured malleoli in 41, fractures of various portions of the foot and malleoli. Most of the patients had equinovarus (n=75) and equinovarusadducted foot (n=41) of various severity. Flat valgus foot was observed in 46 cases. Transosseous osteosynthesis with the Ilizarov apparatus was applied for all cases. Operative interventions included arthrodesis of destroyed articular surfaces (n=77), osteotomy of foot bones and malleoli (n=51), combination of arthrodesis and osteotomy (n=34). Foot bones were elongated as indicated in addition to deformity correction. Average fixation time with arthrodesis was 64 ± 3.2 days. Average distraction time of deformity correction was 35 ± 4.3 days with average fixation length of 56 ± 3.7 days. Complications developed in 31 patients (19.1%) were eliminated during treatment and had no effect on the final result. Results of treatment were evaluated with AOFAS rating scale. The majority of long-term and short-term results were rated as excellent and good. Therefore, the usage of controlled transosseous osteosynthesis techniques in treatment of this cohort of patients allows for pain relief, deformity correction and segment lengthening if needed.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous II

Time: 14:00 - 15:30

Room: Club B

Abstract no.: 28765

ADDITIVE CORRECTIVE TRIPLE ARTHRODESIS WITH ALLOGENIC BONE GRAFTING THROUGH A SINGLE LATERAL INCISION

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Introduction: Additive corrective triple fusion aims to correct hindfoot deformity allowing comfortable ambulatory status. In pes planovalgus the deformity should be anatomically corrected to achieve a stable plantar grade foot. We describe a technique that is performed through one lateral incision with allograft block bone grafting. Methods: 32 patients with rheumatoid arthritis or tibialis posterior rupture underwent 35 additive triple arthrodesis. Pre-operatively pain scores, SF12 scores and Manchester oxford foot scores were recorded. These were then repeated at 6 and 12 month post operative follow up. The surgical technique involves anatomical correction through a lateral incision with fusion of sub-talar, talo-navicular and calcaneo-cuboid joints with additive bone allograft. The position is initially maintained with K wires until bone union is confirmed. Results: All 35 fusions went on to union. 31/32 patients had their expectations met and were satisfied or very satisfied with outcome. There was a significant reduction in pain scores at 12 months and a significant improvement in SF12 and Manchester-Oxford foot score. The talo-metatarsal angle was improved from 15 to 5 degrees in the lateral plane (Meary's angle) and from 16 to 7 degrees in the Anterior-posterior view. The calcaneal pitch was restored from 8 to 22 degrees. Conclusion: Additive corrective triple arthrodesis through a single lateral incision gives good restoration of anatomical position. Leading to a significant improvement in pain scores, both mental and physical quality of life scores and validated foot scores. Patients need to be counseled about the prolonged recovery process.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous II

Time: 14:00 - 15:30

Room: Club B

Abstract no.: 29337

BIOTENODESIS SCREW FOR FIXATION OF FDL TRANSFER IN THE TREATMENT OF ADULT ACQUIRED FLATFOOT DEFORMITY – AN INNOVATIVE AND PROMISING TENDON FIXATION

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Aim: Interference screw fixation is an innovative fixation possibility in foot and ankle surgery. This prospective study evaluates the clinical and radiological results of flexor digitorum longus transfer with medial displacement calcaneal osteotomy, using a resorbable interference screw for tendon fixation. **Method:** 16 feet in 16 patients from 49 to 73 years had surgery. All feet were examined preoperative and at an average follow-up of 13 months with the AOFAS hindfoot-score and the VAS Score. Hindfoot radiographic parameters were evaluated and complications were evaluated critical. Statistical analysis was performed with Wilcoxon signed rank test. **Preliminary results:** The average AOFAS-Score improved significant from preoperative to final follow up (46 to 94), the visual analog scale improved from 8 preoperative to 1 at final follow up. All feet showed good hindfoot realignment in the Salzman view and lateral foot view. No pathologic hindfoot valgus was seen clinical or radiographical, no osteolysis were seen at the screw site. Stable and functional FDL fixation was achieved in 96 % feet, 96% were able to perform a single heel raise. **Conclusion:** The technique needs a less extensive harvest of the FDL tendon. It is a save tendon fixation and leads to optimal clinical and radiological results in patients with adult acquired flatfoot deformity and tibialis posterior tendon-dysfunction.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous II

Time: 14:00 - 15:30

Room: Club B

Abstract no.: 27282

EFFICACY OF STEROID INJECTIONS IN TREATING MORTON'S NEUROMA

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Introduction: A retrospective study investigating the efficacy of corticosteroid injections in treating Morton's neuroma is presented. Methods: 31 patients with symptoms of Morton's neuroma were investigated with a mean follow-up of 8 months. 21 patients received ultrasound guided injections and 10 were injected without image guidance (Depo-Medrone/anaesthetic mix). Results: Ultrasonography confirmed the presence of neuromas in 28 patients. The remaining 3 patients were treated for clinical Morton's neuroma with successful injections. The male to female ratio was 1:7 with an average patient age of 55yrs (33 to 70). 20% had two ipsilateral neuromas. All patients had pain; 61% had numbness; and only 19% had a Mulder's click. Injections under ultrasound yielded an 81% success rate compared to 60% when no image guidance was used ($p=0.370$). The injections were effective for an average of 12 weeks. At six months, 25% still had complete relief of symptoms. 88% of patients who had previous successful treatment benefited from further injection but the duration of efficacy was reduced (21wk to 13wk). Only 1 out of 6 patients benefited from further injection after failure of initial injection. 11 patients (35%) underwent surgical neurectomy within a year of presentation. Conclusion: Ultrasound is a useful tool in the management of Morton's neuroma. It has been shown to be reliable and seems to improve the efficacy of treatment. Steroid injections can be efficacious for more than six months. Repeat injections after previous unsuccessful injections yield a very low success rate.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous II

Time: 14:00 - 15:30

Room: Club B

Abstract no.: 29609

**HISTOPATHOLOGICAL CONSIDERATION FOR THE PERONEAL SPASM
IN TARSAL COALITION**

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Aim: Although the clinical characteristics and surgical results of tarsal coalition have been reported, there have been few detailed histopathological studies. The aim of this study was to show the histopathological features of tarsal coalition and approach their relation to the peroneal spasm. **Materials:** Seventy-two clinical samples collected at surgery were included in this study (mean age, 23.5 years). The site of coalition was talo-calcaneal in 39 patients, calcaneo-navicular in 14, and naviculo-first cuneiform in 19. In addition to the routine histology, we paid special attention to the distribution of the nerve elements. **Results:** The coalition site was found to be fibrocartilaginous. At the boundary between bone and coalition, marked destruction of the trabecular bone and the invasion of the fibrous granulation with high osteoblastic and osteoclastic activity, was found. Their histological findings are similar to pseudo-arthritis, including the process of destruction, repair and remodeling of osteochondral micro-damage. Under staining for nerve elements, the coalition site itself was completely free of nerve, though various nerve elements were visible in the periosteum, capsule around the coalition. **Conclusions:** For the mechanism of peroneal spasm, we can speculate that one of abnormal reflex arc may be working. Osteochondral damages due to incomplete coalition cause an invasive stimulus to the free nerve endings, and sural, deep peroneal and posterior tibial nerves may work as an afferent nerve to spinal cord. By passing abnormal reflex arc, stimulated deep peroneal nerve leads to unexpected peroneal spasms resulting in permanent shortening of the peroneal tendon.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous II

Time: 14:00 - 15:30

Room: Club B

Abstract no.: 28965

PLANTAR PRESSURE DURING WALKING IN SUBJECTS AFTER SURGICAL REPAIR OF ACHILLES TENDON RUPTURES

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Background: One of the key factors that limit recovery after rupture of the Achilles tendon is an abnormality of gait. However, few reports on it are to be found in the literature. Purpose: To evaluate plantar pressure distributions during walking in subjects after surgical repair of Achilles tendon ruptures and uninjured volunteers. Materials and methods: The plantar pressure of 32 patients who had undergone surgical repair of Achilles tendon rupture (11-47 months after surgery) and 32 uninjured volunteers were measured by the F-scan system (Nitta inc., Tokyo). The pressure of hallux was compared with that of forefoot at toe off and represented by the percentage (hallux ratio), and was averaged for three steps. The hallux ratios were compared between those of the operated foot of patients and those of a single foot of the volunteers. The level of significance was set at $P < 0.05$. Results: The average hallux ratio of operated foot of patients was $15.1 \pm 10.0\%$ and that of a single foot of the volunteers was $8.4 \pm 6.1\%$. There was a significant difference between the average hallux ratio of operated foot of patients and that of a single foot of the volunteers ($P < 0.001$). Conclusions: The pressure on hallux of operated foot of patients at toe off during walking was increased for a long term. Although the reasons for these results remain unknown, clarifying them may help earlier recovery after rupture of the Achilles tendon.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous II

Time: 14:00 - 15:30

Room: Club B

Abstract no.: 29407

INFLUENCE OF LATERALLY WEDGED FOOT ORTHOSES ON PLANTAR LOAD DISTRIBUTION: A COMPARISON STUDY

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Introduction: Insoles and foot orthotics change the distribution of the plantar pressure. No information exists concerning the effect of plantar pressure distribution and lateral wedge orthoses. The purpose of this study was to determine the effect of the lateral wedge on the plantar pressure distribution. Methods: The GP Mobil Data system was used to evaluate the data using a 6 mm lateral wedge worn by fifty healthy volunteers. Patient age was 18 to 61 years. 50 volunteers walked a standardized distance of 10 metres and the results with and without the wedge were compared. For evaluation, the foot was divided in 6 different anatomical regions. Results: The preliminary results revealed that the maximum peak pressure and intermediate pressure decreased significantly at the medial middle- and forefoot plus the heel and increased significantly at the lateral middle- and forefoot using the lateral wedge. The maximum peak pressure under the great toe decreased by 22 % using a wedge, under the MTP I joint by 19 % under the MTP II-III joints by 8 % and under the heel by 7 %. By contrast, maximum peak pressure increased under the area of MTP IV-V (+11,3 %) and under the lateral metatarsus (+15 %) when wearing a wedge. Conclusion: This study reveals the effects of a lateral wedge orthosis on the plantar pressure distribution of the foot. These relationships and changing patterns may serve as a useful guide for the clinician. A full medical screen of the foot should occur before laterally wedged foot orthotic devices are prescribed.

Date: 2011-09-07

Session: Foot & Ankle - Miscellaneous II

Time: 14:00 - 15:30

Room: Club B

Abstract no.: 28370

TREATMENT OF THE FLEXIBLE FLATFOOT IN CHILDREN WITH THE MODIFIED CALCNEO-STOP METHOD WITH BONESTAR® IMPLANT

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AIM: To determine the efficiency of the innovative BoneStar® implant in treatment of flexible flatfoot, comparing results of arthroresis with AO screw, and patients of the same grade of illness treated with conservative methods. **MATERIALS AND METHODS:** From 1997-2009 – 218 children were operated, indication was: activity limitation-pain, age 8-13, foot print \geq III grade Tachdijan, Meary angle $\leq 170^\circ$, calcaneal pitch $\leq 15^\circ$, lat.talovicular angle $\leq 90^\circ$, heel valgus $\geq 5^\circ$. 48 children (96 feet) operated with BoneStar® were compared with 48 children (96 feet) operated with AO screw. All screws were removed, mean follow-up was 5 years; results were compared with findings of 25 children (50 feet) who refused the surgery, treated with shoe inserts. Preoperative and post-operative angles, elevation of the navicular bone from the floor and standing footprint were compared with ANOVA and X2 test. The AOFAS Midfoot-Scale was tested in every child. **RESULTS:** Patients operated with the AO screw had 92% excellent and good results, midfoot-scale was corrected from 55 to 91, no correction of the flatfoot-8%, badly positioned screws-15, screw breakage-10, temporary loosening of the screw-1, difficulties at the screw removal (bending, ingrowing)-15. Children operated with BoneStar implant have 98% excellent and good results, midfoot-scale was corrected from 51 to 98. We had 3 badly positioned screws and no screw breakages. In only 2 cases the head of the screw grew in the calcaneus, the proximal part was loosened, but none of the implants fell out. Children indicated for surgery, who chose conservative therapy, showed no significant improvement, although they reached 14,5y. **CONCLUSION:** The innovative BoneStar® implant as minimally invasive method showed in many parameters that it is more efficient than the AO screw in arthroresis in children. The placement of the implant is more precise, without complications, smaller skin incision. **SIGNIFICANCE:** Children with limited activities due to painful flexible flatfoot grade III cannot achieve significant improvement with shoe inserts.

Date: 2011-09-07
Session: Trauma - Foot
Time: 16:30 - 18:00
Room: Club B

Abstract no.: 27709

A SURVEY ON ANKLE FRACTURES – BASIS FOR IMPROVING SERVICE EFFICIENCY

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Introduction: Patients with ankle fractures requiring surgical fixation were analysed to identify factors that could improve the efficiency of service provision. We undertook this survey to obtain baseline data for planning theatre space provision, improving bed utilisation and reducing overall costs. Results: 26 consecutive patients with an average age of 43years (10 to 84) were analysed. 92% presented within 6hr of their injuries and most frequently over weekends (42%). The fracture patterns were similar (9 unimalleolar; 10 bimalleolar; 7 trimalleolar). The average time from presentation to fracture reduction in the emergency department was 126 minutes. The median time between presentation and definitive surgery was 3 days (1 to 13), and the median time for hospitalisation was 8 days (2 to 25). The median time between definitive surgery and discharge was 3 days (1 to 24). The length of hospitalisation did not correlate to the delay or adequacy of initial emergency fracture reduction, complexity of fracture or the age of the patient. Conclusions: The delay to definitive surgery and overall length of hospitalisation was dictated by the degree of soft tissue swelling and limited operating slots. Our data suggests that once there was established soft tissue swelling, patients waited between three and five days for surgery. Provision of additional theatre slots in the evenings and weekends could potentially reduce the length of hospitalisation by 3 to 5 days and overall costs by £1200 to £2000 per patient.

Date: 2011-09-07
Session: Trauma - Foot
Time: 16:30 - 18:00
Room: Club B

Abstract no.: 28282

FUNCTIONAL OUTCOME AFTER LOCKING PLATE FIXATION FOR DISPLACED INTRA-ARTICULAR FRACTURES OF CALCANEUM

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Calcaneal fractures continue to be one of the most disabling injuries as these injuries distort the anatomy of hindfoot and compromise functions of the subtalar joint. Forty two patients with 50 calcaneum fractures were operated using locking plate. Eight had bilateral calcaneal fractures. Average age was 34 years (range 20 -60 years). Male to female ratio was 8:1. Average follow-up was 34 months, range 24-52 months with minimum follow-up of 2 years. Fractures were classified according to Essex -Lopresti classification based on radiographs. Thirty percent were tongue type, 40% were joint depression type and rest 30% were comminuted intra-articular fractures according to Essex-Lopresti classification. All fractures were operated in the lateral position using the lateral approach as advocated by Sanders using Benirsche and Sangeorzan incision. The articular fragments were reduced and fixed provisionally using K-wires. Autograft from the iliac crest was placed in the bony defect if any and locking plate was applied to the lateral calcaneal wall. Functional evaluation was done using Creighton-Nebraska scoring ,maximum 100 points which evaluated pain on rest and activity, activity , range of motion, return to motion, change in shoe size, swelling. The minimum score was 67 points and the maximum was 95 points (average score 92 points) . Infection was seen in 1 patient, wound edge necrosis in 2 patients and heel broadening persisted in 2 patients. In accordance with Creighton and Nebraska score, excellent results were obtained in 90% [score 90-100 points]. Good results were obtained in 10% [score 80-89 points]. Statistically significant change was seen post-operatively in the Bohlers angle, width and height of the calcaneum that point towards restoration of anatomical dimensions. Operated patients had better range of subtalar motion and returned to work earlier. Open reduction and internal fixation facilitates early pain free mobilization and joint function.

Date: 2011-09-07
Session: Trauma - Foot
Time: 16:30 - 18:00
Room: Club B

Abstract no.: 29106

**PERCUTANEOUS FIXATION OF DISPLACED INTRAARTICULAR
CALCANEUM FRACTURES: THE NEW WAY?**

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Background: Surgical Intervention is the treatment of choice for displaced intra-articular calcaneal fractures (DIACF). Newer techniques of percutaneous fixation of DIACF have attempted to cut down on the soft tissue complications associated with the ORIF of DIACF. Follow-up results of calcaneal fractures treated surgically by percutaneous method are presented. Methods: All cases of calcaneal fractures managed over the last two years were included in the study. The fracture patterns were noted on CT scan and Percutaneous fixation was attempted in Sanders Type II, Early Type III cases presenting early to the centre. Cases presenting late were offered ORIF with calcaneal plates. The conservative treatment group were the patients who refused surgical treatment despite counseling. Results: Out of the 67 cases of calcaneal fractures, 42 were operated after proper counseling and fulfilling the indications on CT findings. Percutaneous fixation was performed in 17 cases out of the 42 operated. Percutaneous fixation with the help of screws had no wound infection or soft tissue problems. The recovery rate was faster in them as compared to the ORIF cases. Two cases had postoperative collapse of the reduction. The Maryland Foot Score (MFS) for fractures of the calcaneus was used for evaluation. Conclusions: Anatomic reduction and stable fixation of DIACF show better outcomes in midterm follow-up. We conclude that intraarticular calcaneal fractures of Sanders Type II, early III can also be treated with percutaneous fixation. With experience, this technique can be improved upon and provide better results in cases of displaced intra-articular calcaneal fractures.

Date: 2011-09-07
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Time: 16:30 - 18:00
Room: Club B

Abstract no.: 29380

MANAGEMENT OF HIGH ENERGY CALCANEAL FRACTURES AND HINDFOOT INJURIES IN THE MILITARY POPULATION

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Calcaneal fractures account for approximately 2% of all fractures, of which 60-75% are of the displaced intra-articular type. We report such injuries observed within a Military population, where the mechanism is often due to high-energy explosive trauma, as opposed to the conventional axial compression more commonly seen in civilians. This often results in fracture configurations, which do not fall easily in to conventional classification systems, such as those described by Sanders and Essex-Lopresti. There is frequently significant local soft tissue deficit, along with other complex systemic injuries. Such associated factors results in a multidisciplinary challenge in successfully managing such injuries. We present our experience in managing 72 such injuries, which were managed operatively, observed over a 3-year period at the Royal Centre of Defense Medicine, Birmingham, United Kingdom. The aim of operative fixation in displaced intra-articular fractures with posterior subtalar joint compromise was to restore the sub talar articular surface and calcaneal height. All orthopaedic procedures were undertaken by a single surgeon, though multidisciplinary input was often required to address the soft tissue deficit. An extensile lateral approach was used, with AO non-locking calcaneal plates utilized for fracture fixation. Those fractures, which are not amenable to conventional fixation, often require reduction using percutaneous Kirschner wires. A variety of methods to provide appropriate soft tissue coverage were employed. We describe the precise methods of treatment; immediate postoperative fixation radiographs and a 6-month follow up imaging series of patients sustaining these significant disabling injuries. A novel classification system is proposed.

Date: 2011-09-07
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Time: 16:30 - 18:00
Room: Club B

Abstract no.: 27109

INTRA-ARTICULAR JOINT DEPRESSED CALCANEUM FRACTURES TREATED BY PLATING – A STUDY OF 30 CASES BY ONLY LATERAL APPROACH

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Intra-articular calcaneum fractures are challenging to treat .Objective: To study the efficacy of open reduction and internal fixation with a plate through a lateral approach in level 1 trauma center retrospectively. Material and methods: 30 intra-articular joint depressed fractures of calcaneum were identified from June 2008 to June 2009. 28 were closed fractures and 2 were compound grade 2 by gustilo-anderson classification. 27 patients were males and 3 were females. Age range was 20 to 60 years. Routine and special x-ray views along with c-t scan with 3-d reconstruction were done. Sanders{c-t} and Essex lopresti classification was used. Pre-operative bohlers and gissanes angle was calculated and fracture fixation planning by paper tracing was done. Each patient was operated after assessing the status of soft tissue with sangeorzans lateral approach and fixed with rigid plate after anatomical reduction. Patients were called for follow up at 4 weeks, 3 months, 6 months and 1 year. Results were assessed by Maryland foot score which was excellent in 23 and good in 7. All fractures united by 6 months.26 patients had full sub-talar rom. 3 patients had early sub-talar arthritis. 2 patients had superficial infection. 23 patients had normal post-operative bohlers and gissanes angle. 23 patients had normal heel height and width. 7 patients had widened heel and minimal decrease in height. 27 cases had normal heel valgus. Conclusion: Open reduction and internal fixation with a plate by lateral approach is highly effective in treating intra-articular joint depressed calcaneum fractures.

Date: 2011-09-07
Session: Trauma - Foot
Time: 16:30 - 18:00
Room: Club B

Abstract no.: 28747

DISPLACED INTRA-ARTICULAR FRACTURES OF THE CALCANEUS IN ADULT PATIENTS: IS IT WORTH TO OPERATE?

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It is a well-known fact that a conservative treatment of the displaced intra-articular fractures of the calcaneus in adult patients gives satisfactory long term outcomes. At the same time, only a surgical treatment is able to ensure an excellent result and to reduce a frequency of the subtalar arthrodesises in the future, especially in the young patients. However, a high risk of the post-operative complications as a skin necrosis with further osteomyelitis frequently cancels all the advantages of the surgical treatment in some patients. Considering all existing risks and choosing the patients for the save surgery we have elaborated a special risk scale for the open reduction and the internal fixation (ORIF) of the calcaneal fractures in adult patients (Calcaneal ORIF Scale). Calcaneal ORIF Scale is an orthopedic scale that aims to give a reliable, objective way of assessment the risk of the open reduction and the internal fixation on the displaced intra-articula fracture of calcaneus in adult patients. A patient is examined using simple clinical criteria from our scale (age, energy of the injury, comorbidity, type of fracture, etc). The actual result of this examination is the particular mathematically summed up points of the risk estimated from insignificant to unacceptable. Accordingly, this given result lets us choose the type of further treatment: to use ORIF as a method of treatment or to continue a conservative therapy.

Date: 2011-09-07
Session: Trauma - Foot
Time: 16:30 - 18:00
Room: Club B

Abstract no.: 28958

ARE FOOT INJURIES NEGLECTED EVEN TODAY? A ONE-YEAR PROSPECTIVE STUDY

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AIMS: To study the epidemiology of foot injuries, and treatment delays, in an Indian tertiary centre. **METHODS:** All patients of foot injury, admitted in PGIMER Hospital Chandigarh, from January 2010 to Dec 2010 were analysed for severity of injury, number and type of associated injuries and reasons for treatment delay. **RESULTS:** 115 patients [96 males, 19 females] had involvement of 124 feet. Average age was 33.8 years, and road accident was commonest injury modality (71.3%). 80 patients had open fractures and 45.22% had associated fractures outside the foot; 6 calcaneal fractures had spinal injuries. Of total 141 foot injuries 29.79% were Calcaneal injuries, 31.91% were metatarsals injuries, 4.26% Talus, 2.13% subtalar dislocations, 6.38% Lisfrancs, 3.55% Chopart's dislocations, 2.13% Navicular injuries, 1.42% Medial Cuneiform injuries, 10.64% phalangeal injuries. Mean interval between foot injury and surgical intervention was 5.7 days in combined injuries, followed by 5.2, 1.7 and 1.5 days in hindfoot, forefoot and midfoot injuries respectively (overall mean delay of 3.3 days). **CONCLUSION:** We noted that foot injuries at our centre were more severe (high incidence of open fractures, associated injuries) and road accident was commonest mode of injury. Surgical delay was significant, with reasons for delay ranging from delayed referral, priority to other fractures or life threatening injuries. We conclude that foot injuries are often neglected even today, even when referred to a tertiary care centre, due to various factors.

Date: 2011-09-07
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Time: 16:30 - 18:00
Room: Club B

Abstract no.: 29242

**MINIMALLY INVASIVE TECHNIQUE FOR CLOSED REDUCTION AND
FIXATION OF THE TARSOMETATARSAL JOINT COMPLEX (LISFRANC)
INJURIES**

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Lisfranc injury which involves the tarsometatarsal joint complex (TMC) is a rare and easily missed serious trauma. Controversy still exists concerning the treatment of such injuries. Open reduction and internal fixation is currently the accepted treatment of displaced tarsometatarsal joint complex injuries. A new minimally invasive percutaneous reduction and fixation of this injury is described. The technique is based on the use of a tensioned K-wire through the third metatarsal for traction and a twisted K-wire for antero-medial pull. The technique was used in eight adult patients with satisfactory outcome (mean AOFAS midfoot score of 80.5 points). It was concluded that the new technique is simple, provides adequate anatomical reduction and percutaneous fixation, and gives satisfactory results with minimal complications.

Date: 2011-09-07
Session: Trauma - Foot
Time: 16:30 - 18:00
Room: Club B

Abstract no.: 28839

RESULTS OF LOCKED FLEXIBLE INTRAMEDULLARY NAILING OF METACARPAL FRACTURES – A CASE SERIES

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Unstable metacarpal fractures with rotational deformity need to be managed by operative means. Flexible locked intramedullary nails provide stability of such fractures with minimal soft tissue disruption in comparison to ORIF with plates and screws. There is no published series about these implants apart from the originators of the device. We present our case series with the use of these implants in the management of metacarpal fractures. This was a prospective study over 2 years involving 26 patients with completely displaced metacarpal neck/shaft fractures or with rotational deformity. The average tourniquet time was 25 minutes. The fractured metacarpal included little finger (19), ring finger (8) and middle finger (2). The fracture was spiral (11), oblique (5), transverse (4) and comminuted (9). One patient was lost to follow up. All fractures healed at an average of 6.3 weeks which was confirmed clinically and through xrays. There were no nonunions/delayed unions. At final follow up, average residual lateral deformity was six degrees. Nails were removed at an average of ten weeks. All patients had complete range of movements at the metacarpophalangeal joint, regaining full extension with no extensor lag or pseudo clawing and no finger tip to palm deficits at final follow up. They had good grip strength and returned to their pre-morbid levels of activity with no pain. There were no cases of implant related extensor tendon attrition rupture. In our experience, this device helps to achieve good functional results with minimal complications in the management of such unstable metacarpal fractures.

Date: 2011-09-07
Session: Biomaterials
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 28651

USE OF BIPHASIC CALCIUM PHOSPHATE CERAMIC AS BONE GRAFT SUBSTITUTES

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Introduction: Biphasic calcium phosphate (BCP) ceramic is a mixture of Calcium hydroxyapatite and Tricalcium phosphate, the common chemical subtypes of calcium phosphate ceramics used as void fillers in bone tumor surgeries. It combines the merits of both the components rapid resorption and replacement by new bone while providing sufficient mechanical strength till the ceramic gets incorporated. Materials and method: Forty six patients with radiological or histological diagnosis of benign bone tumours underwent extended curettage and implantation of BCP ceramic in the residual cavity. In addition to the ceramic Contra lateral fibular graft and autologous iliac crest graft were used in two patients each. Patients were followed up with clinical and radiological evaluations for a minimum of thirty six months. Results: Out of 46 patients, 37 patients (21 males, 16 females) with an average age of 21.9 years (9 to 50 years) were available for follow up at a minimum of three years post operatively. The mean follow up duration was 45.51 months (36 to 60 months). The mean interval required for complete disappearance of radiolucent zones zone between the BCP and the surrounding normal bone was 15.5 weeks (8 to 24 weeks). Late fractures or deformities of the bones were not encountered. Growth was undisturbed in all the patients with BCP implantation adjacent to open physis. Conclusion: BCP is superior to either Calcium hydroxyapatite or Tricalcium phosphate alone in terms of rapidity of incorporation in to the surrounding host bone and mechanical strength restoration.

Date: 2011-09-07
Session: Biomaterials
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 30215

HYDROXYAPATITE BIOACTIVE GLASS CERAMIC COMPOSITE (CHITRA-HABG) FOR ILIAC CREST RECONSTRUCTION

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Introduction: Significant donor site morbidity (3 - 61%) has been associated with tri-cortical iliac crest bone graft harvesting and reconstruction of the defect has been shown to reduce it. Chitra-HABG (Chitra-Hydroxyapatite-Bio-active glass ceramic composite) is an indigenously developed ceramic which has been evaluated as a bone graft substitute. Aim: To prospectively validate the hypothesis that iliac crest donor site morbidity is a structural issue and reconstructing the crest reduces its incidence. The study also evaluates the efficacy of Chitra – HABG as a material for reconstructing the crest. Methods: 26 cases of iliac crest reconstruction with Chitra-HABG blocks were prospectively evaluated. Outcome measures were donor site morbidity as assessed clinically and radiological assessment for ceramic incorporation, dissolution, fragmentation and migration. Results: At the end of one year from surgery, 25 patients (96.15%) had no donor site pain. Radiological evaluation showed that ceramic incorporation was complete in 21 cases, partial in three and absent in two. Partial dissolution of ceramic was noticed in three patients and migration in one. Conclusion: The present study validates our hypothesis that the donor site morbidity following tri-cortical iliac crest graft harvesting is probably a structural issue and it can be reduced by reconstruction of the defect. It also highlights the fact that the Chitra-HABG block is an excellent material for reconstruction of the iliac crest defect, as it gets incorporated into the surrounding bone without adverse effects. Key words: iliac crest reconstruction, ceramic composite, Chitra-HABG, donor site morbidity Level of evidence: IV

Date: 2011-09-07
Session: Biomaterials
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 28227

**THE ROLE OF COMPOSITE BONE GRAFT IN PLACE OF AUTOGRAFTS
IN BRIDGING BONE DEFECTS**

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Bone is second most transplanted tissue after blood. Composite bone grafting consists of combination of osteoconductive matrix and bio-active agents that provide osteoinductive and osteogenic properties. Thus the osteoconductive substrate becomes a delivery system for bioactive agents, requiring less chemotaxis and less migration of osteoblast progenitor cells to graft site. It has really been a major problem since decades to achieve sufficiently large amount of bone grafts for patients having massive defects. With the advancements in orthopaedic surgery and newer techniques of reconstruction, it has become essential to have an adequate quantity of readily-available bone graft. Though it is a well known fact that autografts are ideal, it is not always possible to procure desired amounts of autografts; or if procured, it inflicts additional morbidity on the patients. In very young, old and even in adult patients where a large defect is to be bridged or cavity to be filled, it may not be practical to procure such a large amount of autograft. In such situations composite bone grafts are a better alternative. We have also compared whether platelet derived growth factor alone improves the fracture healing time and compare it with compound composite (hydroxyapatite, tricalcium phosphate and bone marrow and platelet derived growth factor) and conventional bone graft. The availability, safety and efficacy of composite bone graft has been demonstrated, helping to improve patient care and prevent donor-site related complications such as iliac hernia, second operation, neuroma formation etc.

Date: 2011-09-07
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Time: 08:00 - 09:30
Room: Club C

Abstract no.: 28853

EVALUATION OF BIODEGRADABLE IMPLANTS FOR FIXATION OF INTRA-ARTICULAR ELBOW FRACTURES IN CHILDREN: A RECENT EXPERIENCE IN 32 PATIENTS WITH TWO-YEAR MINIMUM FOLLOW-UP

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Background: Displaced intra-articular fractures around elbow in children are appropriately treated by open reduction and internal fixation, to ensure normal union and growth. Use of conventional metallic implants has disadvantages including pin tract infection, subcutaneous irritation, soft tissue ossification and the need for an additional surgery for removal of implant. Biodegradable implants can be used as a good alternative. Material and Methods: A prospective trial was carried out between July 2006 and November 2008. Thirty two patients with intra-articular fractures of elbow were enrolled in this trial that included 24 lateral condyle fractures, 6 medial condyle fractures and 2 fractures of capitellum. Patients were evaluated using Mayo's scoring system for functional outcome. Mandatory minimum follow up period was two years. Results: There was no evidence of infection, periprosthetic osteolysis, avascular necrosis, premature physeal closure or loss of fracture fixation in any of the children. One case of fracture lateral condyle humerus had malunion, two patients developed inflammatory swelling at operative site and two patients had asymptomatic extra- osseous calcification in radiographs. Eighteen patients (56.2%) showed excellent functional score, eight patients (25%) had good functional score; four patients (12.5%) had fair score and two patients (6.25%) showed poor result. Conclusion: Biodegradable implant are a promising modality of treatment for intra-articular fractures around elbow joint, especially in children in whom general anaesthesia is often required for removal of metal implants. Besides avoiding need of second surgery these implants doesn't carry other complications associated with metal implants.

Date: 2011-09-07
Session: Biomaterials
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 27656

NOVEL ELASTIC TITANIUM FILLER FOR OSTEO-CHONDRAL DEFECT

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(Introduction) For the nonunion of osteoporotic vertebral fractures, PMMA was very hard and accelerated secondary vertebral collapses. For the articular cartilage defects, no scaffold itself has succeeded in conducting long-lasting hyaline cartilage on it. (Materials) A titanium wire ball (TWB), with a diameter of 4 mm, made of 33mg of titanium wire was introduced. The air-space ratio was 83%. The mean stiffness was 36.4 N/mm and that of human cancellous bone blocks was 41.9N/mm. TWBs were acid-washed and implanted into the tibial and femoral condyles of adult rabbits. (Results) At one, two and four weeks, the TWBs were extirpated and undecalcified sections were observed histologically. Active in-growth of the osteoid tissue into the TWB was observed as early as one week and was fully ossified at 4 weeks. Bone remodeling was also found to be taken place along the new bone. TWB were also implanted into the chondro-osseous defect of 5mm in diameter made on the femoral articular surface of the knee. At four weeks, the defects were fully filled and cartilage cells were confirmed on the TWB although the defects left without TWB were filled mainly with vacuolated tissue. (Conclusion) Owing to the elasticity of the TWB, which was comparable to the cancellous bone, and owing also to the superb bioactive properties of the acid-washed and oxidized titanium surface, TWB was found to be a promising filler for any kind of osteoporotic bone defects, and articular cartilage defects.

Date: 2011-09-07
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Time: 08:00 - 09:30
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Abstract no.: 29958

**A NOVEL POLYCARBONATE-URETHANE MENISCAL IMPLANT:
A FUNCTIONAL EVALUATION OF SIZING**

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The medial meniscus plays an important role in distributing knee joint forces and limiting the contact pressure developed in the articular cartilage. Accurate matching of geometry and size are critical for the success of any meniscal implant aimed at restoring the contact pressure distribution and delaying joint degeneration. The goal of this study was, therefore, to study the ability of a novel free-floating elastic polycarbonate-urethane (PCU) meniscal implant to restore the pressure distribution on the articular cartilage surfaces, and to predict the number of sizes needed to cover the candidate population, based on experimental and computational studies. The mean geometrical parameters of the natural meniscus were measured in 130 MRI scans of a mixed male/female population, which were then used to create the general form of the synthetic PCU meniscus. Computational finite elements simulations and laboratory compression tests in cadaver knees confirmed that the PCU meniscus implant performs equally well as the natural meniscus in distributing joint compressive loads on the tibial plateau surface in a 5% range around the 'true' size. Additional kinetic implant evaluation using fluoroscopy, demonstrated good functionality in terms of maintaining contact with the cartilage and smoothness of motion due to the self-adjustment ability of the implant. These findings, together with a statistical analysis of the knee sizes in the general population, imply that 9 implant sizes can accommodate most patients. The meaning of this being that for this type of implant a relatively lenient safety-range exists for the choice of implant by the surgeon.

Date: 2011-09-07
Session: Biomaterials
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 28917

LONG-TERM CLINICAL AND RADIOLOGICAL FOLLOW-UP OF COLLAGEN MENISCAL IMPLANTS

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BACKGROUND: The collagen matrix implant (CMI) is a bioabsorbable scaffold to substitute a partial medial meniscus defect. Long-term data on clinical and radiological outcome of this CMI implant are however scarce. **METHODS:** We evaluated 14 implants with a mean time of follow-up of 10.3 years; mean age at surgery was 33 years. Clinically, the patients were evaluated using a KOOS, SF-36, HSS, VAS, Tegner and Lysholm score. Each patient received radiographs (AP, profile and Rosenberg view) and an MRI-scan. Radiological outcome parameters were joint space width narrowing and Fairbank changes and were scored according to IKDC. On MRI cartilage was evaluated according to ICRS grading scale, Kellgren & Lawrence evaluation was completed and size of implant was measured. Failures were defined as graft removal, conversion to an arthroplasty, transplantation of a meniscal allograft or an osteotomy. **RESULTS:** Preoperative HSS-scores were 119 ± 26.7 , at long-term follow-up 184 ± 24 . Lysholm-score was 84 ± 21 , which was defined as a good result; in contrast preoperative score was 54 ± 16 . Mean VAS-score before surgery was 5.8 ± 2.3 , at long-term 1.9 ± 2.3 , mean Tegner was 4 ± 2 at 10 years. There were no significant differences between following subgroups: left or right knee and male or female. Six (43%) of fourteen implants failed after a mean of 31.5 months, survival rate at 10 years is 57%. Radiographs showed no major aggravation of preexisting cartilage damage; maximum score at 10 year follow-up was 1 (AP/PA). On MRI same findings were seen with a Kellgren & Lawrence score of 1 early post-operative, comparable score was achieved on long-term evaluation. Size of the implant could not be assessed on the long-term MRI scans; the newly formed tissue could not be distinguished from the native meniscus rim. However, shrinkage of the total meniscus was noticed. **CONCLUSIONS:** Transplantation of a collagen matrix implant scaffold can significantly relieve pain and improve function of the knee joint. Probably it also plays a role in protection of cartilage in the knee.

Date: 2011-09-07
Session: Biomaterials
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 28106

BIOFUNCTIONALITY ENHANCEMENT OF POLYETHERETHERKETONE (PEEK) BY PLASMA SURFACE TREATMENT

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Polyetheretherketone (PEEK) has been widely applied in orthopedics. While its mechanical properties are close to bone, its bioactivity is unsatisfactory. Incorporating additional bioactive substance into PEEK has been recently studied. However, the alternation of its original mechanical properties is concerned. Therefore, surface modification is an alternative to enhance the surface bioactivity of biomaterial, without changing its mechanical properties. Hence, this study aims at investigating the feasibility of ammonia and water plasma treatment in enhancing the surface bioactivity of PEEK as well as the mechanical integrity after treatments. PEEK discs were modified by water and ammonia plasma immersion ion implantation (PIII) at various parameters. Assessments of surface bioactivity included cell adhesion, proliferation, alkaline phosphatase and mineralization. Surface characterizations including nano-indentation, nano-scratch and XRD experiments were conducted. Axial compression test was also adopted to investigate the bulk mechanical properties. Generally, all treated samples were better than the untreated ($p < 0.05$) in terms of cell adhesion and proliferation. The ALP expression of all treated samples was higher than the untreated at Day 7 ($p < 0.05$), whereas the mineralized area and ALP expression of the plasma treated samples were not significantly different from the untreated at Day 14. The Young's Modulus of treated and untreated PEEKs had no significant difference after treatments, although the surface hardness dropped and crystallinity was slightly decreased due to the formation of new biofunctional layer. In summary, plasma surface modification is a promising technology in enhancing PEEK surface bioactivity without compromising its original Young's modulus.

Date: 2011-09-07

Session: Research - Clinical II

Time: 10:30 - 12:00

Room: Club C

Abstract no.: 30214

DO WE NEED RADIOLOGICAL GUIDANCE FOR INTRA ARTICULAR HIP INJECTIONS?

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Introduction— Intra articular injections are widely used in treatment and diagnosis of hip joint osteoarthritis. There is still a debate on whether we need radiological guidance for this procedure. Our study was aimed at assessing accuracy of blind intra- articular injection to the hip joint. Methodology— Eighty seven patients (100 hips) with symptomatic hip OA were given (blind) intra-articular corticosteroid injections (80mg Depomedrone; 10ml 0.5% Marcaine). Body mass Index (BMI), grade of surgeon, success rate of blind method were noted down. X-Ray image intensifier (XRII) was used to determine the position of the needle. Confirmation of accurate needle position was verified by injection of a radio opaque dye (Omnipaque 250) and XRII. Results -- Forty six percent of procedures were performed by consultants and 54% by specialist registrars. The average BMI of patients was 29.70 (Range 43.26- 19.20). The overall success rate by blind method was 72%. In the consultant group the success rate by blind method was 80% whereas injections performed by specialist registrars had success rate of 64%. Average BMI was lower where the procedures were successful by blind method. Conclusion-- This prospective study shows that hip injections can be performed with reasonable success without radiological guidance. Consultants may be able to perform the procedure in outpatient department given patients have a normal BMI; thereby reducing cost and need for bed space.

Date: 2011-09-07
Session: Research - Clinical II
Time: 10:30 - 12:00
Room: Club C

Abstract no.: 28630

EFFECT OF FEMOROACETABULAR IMPINGEMENT AND OFFSET DECREASE ON GAIT PATTERN IN THE FOLLOW-UP AFTER SLIPPED CAPITAL FEMORAL EPIPHYSIS

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Aim: Aim of this study was to investigate the use of three-dimensional computerized gait analysis in the intermediate follow up after Slipped Capital Femoral Epiphysis (SCFE). **Patients and Methods:** 36 adults ($23,2 \pm 3,5$ years old) who had been treated surgically with pinning in situ for mild or moderate SCFE could be included into this study regardless of symptoms or radiographic signs of osteoarthritis. Follow-up period was $10,9 \pm 3,6$ years. 40 healthy adults served as control group. With help of the alpha angle, the patients were divided into three groups: 1 = no offset-decrease, $< 50^\circ$, 8 patients; 2 = moderate offset-decrease, $50-60^\circ$, 9 patients; 3 = severe offset-decrease, $> 60^\circ$, 19 patients. **Results:** Significant differences could be revealed in SCFE patients compared to the control group: reduced step frequency, longer stride length, more pelvic obliquity in the sagittal plane, reduced maximal hip extension and maximal knee flexion and less power of the hip joint. Within the group of SCFE patients, a significant impact of offset-decrease was observed for step length and motion pattern of the hip in the frontal plane. **Conclusion:** Compared to the group of healthy controls, significant differences in gait kinematic and kinetic could be observed with loss of gait balance. Globally, the reduced hip function in the sagittal plane was reflected by a pathological "hip flexor index". Gait analysis could help to monitor surgical and non-surgical therapy after SCFE so that pathological motion patterns may be recognized and treated accordingly.

Date: 2011-09-07
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Time: 10:30 - 12:00
Room: Club C

Abstract no.: 28162

INTRA-OPERATIVE REGISTRATION OF THE KNEE KINEMATIC DURING TOTAL KNEE REPLACEMENT

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INTRODUCTION: We developed specific software derived from a clinically used navigation system to allow in vivo registration of the knee kinematics before and after total knee replacement. We wanted to test for the feasibility of the intra-operative registration of the knee kinematics during standard, navigated total knee replacement. **MATERIAL-METHODS:** We are using on a routine basis a non image based navigation system for total knee replacement. The standard software has been modified in order to allow the intra-operative registration of the knee kinematic before and after implantation. Kinematic registration was performed twice during a usual procedure of navigated total knee replacement: 1) Before any bone resection or ligamentous balancing; 2) After fixation of the final implants. 200 cases of total knee replacement have been analyzed. Post-operative kinematic was classified as following: 1) Occurrence of a normal femoral roll-back during knee flexion, no roll-back or paradoxical femoral roll-forward. 2) Occurrence of a normal tibial internal rotation during knee flexion, no tibial rotation or paradoxical tibial external rotation. **RESULTS:** Recording the kinematic was possible in all cases. The results of both pre-operative and post-operative registrations were analyzed on a qualitative manner. The results were close to those already published in both experimental and clinical studies. About femoral roll-back, 54% had a normal femoral roll-back during knee flexion after total knee replacement, 13% had no significant roll-back and 33% had a paradoxical femoral roll-forward. About tibial rotation: 65% had a normal tibial internal rotation during knee flexion, 16% had no significant tibial rotation and 19 had a paradoxical tibial external rotation. **DISCUSSION:** It is possible to record the kinematic behavior of a knee intra-operatively during total knee replacement. This might help choosing the most appropriate type of reconstruction to get a closer to a normal kinematic.

Date: 2011-09-07
Session: Research - Clinical II
Time: 10:30 - 12:00
Room: Club C

Abstract no.: 28203

**PRESENCE AND LOCATION OF OSTEOPHYTE FORMATION ON
MAGNETIC RESONANCE IMAGING IN EARLY STAGE OF KNEE
OSTEOARTHRITIS – DATA FROM THE OSTEOARTHRITIS INITIATIVE
(OAI)**

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Background: Osteophyte formation (OF) is considered as the most important sign of osteoarthritis (OA) and frequently used as criteria for OA. The Kellgren and Lawrence system (KL) depends much on OF. But detecting OF with x-ray examination seems to have limitation. So whether KL 0 knees really lacks OF is to be elucidated. Objective: The objective of this study is to assess the presence and location of OF in early stage of knee OA using magnetic resonance images (MRI). Methods: A hundred sets of MRI image of early stage of knee OA (KL 0 or I) from the Osteoarthritis Initiative (OAI) were examined. KL II knees were also examined as control group. MRI were examined in terms of the presence and location of the OF and compared among the KL 0, I, and II knees. Results: OF was detected in 67.9% of grade 0 knees, 77.3% in grade I, and 100% in grade II. No significant difference was found in the presence and the location of OF between grade 0 and I, but significant difference between grade 0 and I as well as I and II. In grade 0 or I knees frequent OF was found in posterior part of the femoral notch where X-ray cannot detect, whereas in grade II knees, OF were seen in the medial femorotibial joint. Conclusion: This study suggests that OF starts from the posterior aspect of femoral notch and necessity of MRI for early detection of OF.

Date: 2011-09-07

Session: Research - Clinical II

Time: 10:30 - 12:00

Room: Club C

Abstract no.: 28919

LONG-TERM CLINICAL AND RADIOLOGICAL FOLLOW-UP OF VIABLE MENISCAL ALLOGRAFTS

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BACKGROUND: There is growing evidence in literature that meniscal allograft transplantation performed with the right indications results in significant pain relief and functional improvement of the involved joint. Long-term data on clinical and radiological outcome are however scarce. **METHODS:** We evaluated 89 transplants (53 lateral and 36 medial) in 87 patients. Mean time of follow-up was $15,5 \pm 2,85$ years (range 9,9 - 20,4), mean age at surgery was 35,2 years (range 22 - 50). Clinically, the patients were evaluated using a KOOS, SF-36, HSS, VAS, Tegner and Lysholm score. HSS scores were compared to pre-operative and mid-term follow-up data. Each patient received radiographs (AP, profile and Rosenberg view). Radiological outcome parameters were joint space width narrowing and Fairbank changes and were scored according to IKDC. Failures were defined as patients who were converted to an arthroplasty. **RESULTS:** HSS-scores improved significantly from 119 ± 27 pre-operatively to 160 ± 40 at long-term follow-up. Lysholm-score was 69 ± 22 , which was defined as a fair result. Mean VAS-score was $3,4 \pm 3$, mean Tegner was 4 ± 2 . There were no significant differences between following subgroups: left or right knee, medial or lateral allograft, combined procedure with a high tibial osteotomy and male or female. Nine (25%) of the thirty-six medial and ten (19%) of the fifty-three lateral grafts failed after a mean of 9,9 years. **CONCLUSIONS:** Transplantation of a viable meniscal allograft can significantly relieve pain and improve function of the knee joint. Survival analysis showed that this beneficial effect remained in approximately 70% of the patients at fifteen years. This study proves that meniscal allograft transplantation is a beneficial procedure to postpone total knee arthroplasty for more than 10 years in young active patients.

Date: 2011-09-07

Session: Research - Clinical II

Time: 10:30 - 12:00

Room: Club C

Abstract no.: 29328

DYNAMIC QUANTIFICATION OF FEMORO-TIBIAL ROTATION IN POSTEROLATERAL BUNDLE INSUFFICIENCY: A CADAVER STUDY

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The total rupture of the anterior cruciate ligament is one of the most common injuries in orthopaedic traumatology. In contrast the diagnosis of a partial rupture of the anterior cruciate ligament is very rare and in many cases only found by an experienced orthopaedic surgeon or in magnetic resonance imaging. Since the anatomic and biomechanical knowledge of the two bundle structure of the anterior cruciate ligament, the discussion about their distinct biomechanical restraint is ongoing. In this meaning two dimensions of instability are referred to the anterior cruciate ligament, the anterior posterior translation is stabilised due to the antero-medial bundle which comes under tension during knee flexion. The other dimension referree to the rotational stability which is referred more to the postero lateral bundle which is tight under knee extension and lower flexion angles as diverse anatomical studies demonstrated. Until now no objective measurement has been established to identify changes in rotational stability due to the loss of the postero lateral bundle. In this context we concentrated on the rotational stability and analysed the restraint behaviour before and after dissecting the postero lateral bundle mimicking a partial rupture of the anterior cruciate ligament and compared this to the situation of ACL absence in 0°, 30° and 90° knee flexion at 11 cadaver specimens. We calculated the Area under the strain-stress- curve to describe the applied energy and found significant changes for postero- lateral bundle absent knee rotation at 30° knee flexion. We interpreted these changes as a loss of stability.

Date: 2011-09-07
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Room: Club C

Abstract no.: 30224

THE ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION WITH THE PERONEUS LONGUS TENDON: A CLINICAL STUDY WITH THE DONOR SITE MORBIDITY ASSESSMENT AT THE FOOT AND ANKLE

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Objectives: The aims of the study were to evaluate results of anterior cruciate ligament (ACL) reconstruction using a peroneus longus tendon autograft and to assess donor site morbidity of the foot and ankle. **Methods:** The study included 30 patients (20 males, 10 females) who underwent ACL reconstruction using peroneus longus autograft and Endobutton fixation. The results were assessed according to International-Knee-Documentation-Committee (IKDC) score at 1, 3, 6 months of follow-up. Donor site morbidity of the foot and ankle was assessed, at postoperative period, using American Orthopaedic Foot-and-Ankle Society (AOFAS) for ankle-hindfoot score and Visual Analogue Score-Foot Ankle (VAS-FA). **Results:** According to IKDC score, at 6 months of follow-up, 23 patients (75.9%) were rated as normal or nearly normal, and 7 patients (23.1%) were rated as some abnormal. No motion losses occurred in affected knees. ACL stability was assessed by Lachman test, which showed normal findings in 20 patients (66.7%), while ten patients had 1+ anteroposterior laxity. Pivot-shift test was negative in 18 patients (60%); twelve patients had 1+ pivot glide. Three female patients (10%) complained of bulky scar at the donor site of peroneus longus. One female patient (3.3%) experienced mild lateral ankle instability in 1 month after operation. Average score of AOFAS and VAS-FA were 97.3/100 and 91.7/100 respectively at 6 months of follow-up. **Conclusion:** The present study concluded that peroneus longus may be an effective autograft donor for ACL reconstruction with minimal donor site morbidity in terms of postoperative form and function of the foot and ankle.

Date: 2011-09-07

Session: Research - Clinical II

Time: 10:30 - 12:00

Room: Club C

Abstract no.: 29535

THE EFFECT OF INTACT FIBULA IN DIAPHYSEAL TIBIA FRACTURES FIXED WITH INTRAMEDULLARY NAILS UNDER DIFFERENT LOCKING CONDITIONS – A CADAVERIC STUDY

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Introduction: The value of dynamisation of statically locked intramedullary (IM) nails in the treatment of delayed-union of the tibia has been poorly documented. We performed a biomechanical study using cadaveric tibial shaft fracture models fixed by IM nails under static and dynamic locking conditions. Methods Eight human cadaveric tibiae were tested. Interfragmentary movements (IFM) were measured in osteotomised specimens fixed with statically locked IM nails using axial forces to simulate full weight-bearing and toe-tapping. The nails were then fully dynamised and the forces required to compress and distract the interfragmentary gap were measured. All tests were performed with both an intact and then osteotomised fibula. The diameter of each reamed IM canal was assessed using computed tomography (CT). Results: The forces required to distract the fracture gap in dynamised mode were small (Range 0.88 to 1.88 kgf). Under full weight-bearing forces interfragmentary movements were 0.8 to 1.45mm and under toe-tapping forces were 0.11 to 0.3mm. CT scans demonstrated variations in the diameter of the IM canal which did not matched the selected reamer diameter. Conclusions: The forces required to distract the fracture gap were small. This had a strong correlation to amount of clearance of the nail within the IM canal. This is a possible contributory factor in the poor outcomes seen in many studies after dynamisation. The small interfragmentary movements noted in static locking are unlikely to delay union and may promote callus formation. The presence of an intact fibula reduced IFM.

Date: 2011-09-07

Session: Research - Clinical II

Time: 10:30 - 12:00

Room: Club C

Abstract no.: 28959

PATHOGENIC LEVEL ESTIMATION OF CERVICAL MYELOPATHY BASED ON DIFFUSION TENSOR IMAGING

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Purpose: The insidious onset and variety of clinical symptoms of cervical myelopathy (CM) pose a big challenge to clinician for early diagnosis and precise prognostication. The gross morphological and signal changes in T2-weighted magnetic resonance images (MRI) did not necessarily correlate with the severity of chronic compressive injuries of spinal cord. In the present study, we aimed to employ a relatively novel index in diffusion MR imaging directional entropy (DE) to investigate the potential pathogenic levels in CM patients. **Methods:** Subjects Total 22 volunteers were recruited in this study with informed consent, including 8 CM patients (64±20yrs) and 14 healthy subjects (46±16yrs). Diffusion MR Imaging MR imaging were performed with a 3T MR system (Philips, Netherlands), by using pulsed gradient, spin-echo-echo-planar imaging sequence (data acquisition parameters: TR/TS=5000/60 ms; 13 slices (7mm slice thickness, 2.2mm gap); field of view= 80 (RL) ×36 (AP) mm; matrix size =128×128; non-collinear diffusion encoding directions=16, b=600s/mm²; reconstruction resolution= 0.63×0.63×7.0mm³). **Results:** It was revealed the DE value in the myelopathy cord was significantly higher than healthy cord (p<0.05) at compression level (DE(0): 0.91±0.03) and adjacent three levels towards both rostral (DE(-3): 0.74±0.05; DE(-2): 0.82±0.05; DE(-1): 0.85±0.03) and caudal directions (DE(1): 0.83±0.05; DE(2): 0.81±0.06; DE(3): 0.79±0.05). The pathogenic probability was estimated in a multilevel case by extracted increment (C3~4: 31.6%; C4~5: 5.3%; C5~6: 40.5%; C6~7: 22.6%). **Conclusion:** The directional entropy successfully described and quantitatively measured the microstructural disorganization in the cervical myelopathy. It might be a novel approach for the pathogenic level estimation.

Date: 2011-09-07
Session: Research - Cells
Time: 16:30 - 18:00
Room: Club C

Abstract no.: 29987

A STUDY ON OBSERVATIONS OF IRAK-M IN MACROPHAGES AROUND PROSTHESIS WITH ASEPTIC AND SEPTIC LOOSENING AFTER JOINT ARTHROPLASTY

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The most common complication of joint arthroplasty is loosening which caused by chronic inflammatory cytokines of macrophages under stimulation by the bacterial components adhere to wear debris, and the profile of IRAK-M in macrophage around the prosthesis with aseptic and septic loosening after joint arthroplasty is unknown. In this study, immunohistochemical methods were employed to demonstrate the states of IRAK-M in interface membranes and we also analyzed the IRAK-M mRNA levels of macrophages after stimulated with titanium particles and cement debris respectively in vitro by RT-PCR. The results show that the interface membranes of aseptic and septic loosening prosthesis express higher IRAK-M protein compare with the synovial membrane from osteoarthritic patient, and also the IRAK-M mRNA levels of macrophages is increasing after particles stimulation. These findings suggest that the up-regulation of IRAK-M in macrophages is involved in the local immunosuppression around artificial joints, and maybe associated with the "aseptic" and septic loosening.

Date: 2011-09-07

Session: Research - Cells

Time: 16:30 - 18:00

Room: Club C

Abstract no.: 28148

DOES DYNAMIC BLUNT IMPACT TESTING, HISTOPATHOLOGY AND VISUAL MACROSCOPIC ASSESSMENT CORRELATE IN HUMAN OSTEOARTHRITIC CARTILAGE?

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Objectives: Improved staging of cartilage degeneration is required in osteoarthritis, particularly in grades with minimal surface damage. We correlated dynamic mechanical properties with histological findings and macroscopic visual score. Materials and methods: In 14 patient's osteochondral samples were obtained during total knee arthroplasty from lateral and medial condyle of femur and tibia. 2 samples were harvested from the same place. Samples were macroscopically classified following International Cartilage Repair Society (ICRS). Dynamic blunt impact testing was used, response to a single impact evaluated. Parameters of loading resembled physiological cartilage loading. Sample deformation was read simultaneously by accelerometer and laser vibrometer and expressed by loading diagrams. Normal stress, dissipated energy, tangent modulus and stiffness at 1MPa stress were evaluated. Histological samples were stained using hematoxylin-eosin, classified following ICRS visual histological scale. Results: Significant differences (T-test, $p > 0.05$) were found in dissipated energy and related specific damping capacity only for histological features 1, 2, 3 (cartilage, extracellular matrix, cell distribution). Macroscopic score, specific damping capacity and dissipated energy correlated significantly (ANOVA, $p < 0.01$), not stiffness or elasticity. In cartilage with low grade of macroscopic degradation (0-1) histopathologic findings varies a lot. Specific damping capacity increased between macroscopic grades 0-1 and 1-2 by 11.3% and 18.6% respectively. It implies that this material characteristic could serve for distinguishing between early stages of cartilage deterioration. Strong relation was found between relative dissipated energy and thickness ($p < 0.001$, $R^2 = 0.69$). Conclusions: According to our results, mechanical testing evaluating energy dissipation appears to be a promising approach for less invasive and more exact classification of cartilage status.

Date: 2011-09-07
Session: Research - Cells
Time: 16:30 - 18:00
Room: Club C

Abstract no.: 29460

CHONDROGENIC POTENTIAL OF HUMAN BONE MARROW AND ADIPOSE TISSUE DERIVED MESENCHYMAL STEM CELLS

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Objectives: Cartilage laesion heals by formation of fibrocartilage. Cuntured chondrocytes undergo a dedifferentiation process when expanded in vitro and the production of type-II collagen is replaced by production of collagen type-I. Recently, stem cell therapy has offered possibilities for solving this problem. Sources of adult mesenchymal stem cells (MSCs) include bone marrow stromal cells (BMSCs) and mesenchymal adipose tissue-derived cells (MADCs). MSCs have self-renewal ability and are capable of differentiating into different cell lineages. The aim of our study was to verify the in-vitro chondrogenic differentiation potential of human BMSCs and MADCs in presence or absence of TGF-beta1. **Methods:** Human BMSCs and MADCs were collected, expanded in vitro and sub-cultured. For chondrogenic differentiation, a pellet culture system with TGF-beta1 was used. Control pellets were cultured without addition of TGF-beta1. After three weeks, pellets were fixed for histological analysis, immunohistochemistry and real-time PCR. **Results:** We observed spontaneous chondrogenic differentiation in all pellets. The condensation of pellets cultured in chondrogenic medium and in medium without TGF-beta 1 was observed after 24 hours. After 21 days of culture, aggregates cultured in chondrogenic medium were larger than aggregates cultured in control medium; content of glycosaminoglycans and collagen was higher in the pellets cultured in chondrogenic medium. PCR confirmed production of collagen type-II and aggrecan in all tested groups. **Conclusions:** Results from this sudy demonstrate that both BMSCs and MADCs have chondrogenic potential in vitro and therefore both types are likely to play an important role in the future cartilage repair engineering.

Date: 2011-09-07
Session: Research - Cells
Time: 16:30 - 18:00
Room: Club C

Abstract no.: 29643

EXPRESSION OF VASCULAR ENDOTHELIAL GROWTH FACTOR AND MATRIX METALLOPROTEINASE-1 IN BONE SARCOMAS

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The present study was performed to assess the serum levels of Vascular Endothelial Growth Factor (VEGF) and Matrix metalloproteinase I (MMP-I) in patients of bone sarcomas and evaluate their role as diagnostic as well as prognostic markers. Materials and Method: 61 patients of histologically proven bone sarcomas, including osteosarcoma, Ewing's sarcoma and chondrosarcoma were followed prospectively. Blood samples at diagnosis, after neo-adjuvant chemotherapy and after surgery were collected. Blood samples of ten healthy controls were also collected. Commercially available Human VEGF and MMP-1 Elisa kit (Bender Medsystem, Austria) were used to assess the serum VEGF and MMP-1 levels. Immunohistochemistry in the biopsy specimens of 20 osteosarcoma patients was also done. Kaplan-Mier survival curves were drawn to estimate survival. Results: Mean serum VEGF and MMP-1 levels at diagnosis were significantly raised in all patients as compared to healthy controls. High serum VEGF level correlated with high VEGF expression in the histological specimens. Higher serum VEGF levels were associated with significantly higher rate of metastasis in osteosarcoma patients but not in chondrosarcoma and Ewing's sarcoma. No correlation was observed between serum MMP-1 levels and pulmonary metastasis or local recurrence. Conclusion: Serum VEGF and MMP-1 levels may be of diagnostic value in patients with bone sarcomas, though further evaluation is needed. Serum VEGF level can be of prognostic value in osteosarcoma but not in chondrosarcoma and Ewing's Sarcoma. Serum MMP-1 has no prognostic relevance in bone sarcomas.

Date: 2011-09-07
Session: Research - Cells
Time: 16:30 - 18:00
Room: Club C

Abstract no.: 29379

USE OF AUTOLOGICAL MESENCHYMAL STEM CELLS (MSC), AUTOLOGICAL FIBROBLASTS AND AUTOLOGICAL PLAZMA RICH IN GROWTH FACTORS (PGRF) AT TREATMENT OF DEGENERATIVE DAMAGES OF TENDONS (EXPERIMENTAL RESEARCH). ALEXANDR KOSTRUB, ROMAN BLONSKYI

Oleksandr KOSTRUB, Roman BLONSKYI, Ivan ZASADNYUK, Volodymyr ZAETS

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The study was implemented on 353 male rats with experimental degenerative injure of Achilles tendon. Achilles tendon damage of Wistar line rat was modeled by diprospan. Methods of treatment under study were choosen as autological mesenchymal stem cells (MSC), autological fibroblast and autological plazma rich in growth factors (PGRF). As references we used an achilles tendon taken from health animals. All manipulations with experimental animals was made according to European Convention on defence of experimental animals. Experimental animals were taken out from the experiment on day 7, 21 and 45, with blood collecting for biochemical studies. We performed pathomorphological examination of experimental animals' tendons at different periods of treatment. We determined and compared their strength characteristics and also provided infrared spectroscopic examination of experimental tendons. Analysis of the received data and its comparison with placebo group – animals that received 0.2 ml of saline into the body of Achilles tendon demonstrated the following. The best results were obtained with experimental animals that received administration of autological MSC treatment of degenerative tendons injure, the next group by effectiveness was the group of animals, which received injection of autological fibroblasts for tendons degenerative injure treatment. The worst results in comparison with the 1-st and the 2-nd experimental groups were achieved in animals in the 3-rd group that were administrated with autological PGRF for treatment of tendons degenerative injure.

Date: 2011-09-07
Session: Research - Cells
Time: 16:30 - 18:00
Room: Club C

Abstract no.: 29084

INTRALESIONAL AUTOLOGOUS BONE MARROW STEM CELL INJECTION IN AVASCULAR NECROSIS OF FEMORAL HEAD AND EVALUATION OF OUTCOME USING MRI, PET SCAN AND BONE SCAN A PRELIMINARY STUDY

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Background: Osteonecrosis of femoral head usually leads to increased morbidity in young adults. Bone marrow mononuclear cells with the potential for halting the disease process offers a promising new therapy Objectives: To assess the effectiveness of the implantation of autologous bone marrow mononuclear stem cells in osteonecrosis of femoral head Methods and material: Twenty patients (30 hips) with stage I,II or III (ARCO system) osteonecrosis of femoral head were treated by either core decompression and autologous bone marrow mononuclear cells (group A) or core decompression and bone marrow injection (group B).The clinical outcome , changes on MRI , scintigraphy and PET scan were studied subsequently and compared Results: On six months follow up, there was considerable improvement in the hip function as measured by the Harris hip score in both the groups($p=0.031$) .On MRI, there was a decrease in the size of the lesion in group A ($p=0.03$). At 1 year follow up, 2 of 18 hips (11.1%) in group A and 3 of 12 hips (25%) in group B required total hip replacement. MRI (40%) showed a better clinical correlation than bone scan (30%) and PET scan (25%) Conclusions: Implantation of autologous bone marrow stem cell in avascular necrosis of femoral head is a safe and effective procedure for early stage of avascular necrosis of femoral head.PET scan as an imaging modality does not offer any added advantage over the existing modalities Key words: avascular necrosis, mononuclear cells, bone marrow, PET scan

Date: 2011-09-07
Session: Research - Cells
Time: 16:30 - 18:00
Room: Club C

Abstract no.: 28901

TREATMENT OF OSTEOENECROSIS OF THE FEMORAL HEAD WITH A STEM CELL LOADED SCAFFOLD IN A SHEEP MODEL

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The purpose of this study was to evaluate the efficacy of core decompression followed by the implantation of a bone matrix scaffold loaded with cultured bone-marrow mesenchymal stem cells (BMSCs) for the treatment of femoral head osteonecrosis in an established sheep model. Early stage osteonecrosis of the right hip was induced in mature sheep through ligation of the medial and lateral circumflex arteries and veins and also through a cryogenic intracerebral insult with a liquid nitrogen cryoprobe. At three weeks BMSCs were harvested from sternal bone marrow aspiration and cultured accordingly. At six weeks the sheep were divided in three groups, Group A: core decompression only; Group B core decompression followed by implantation of a bone matrix scaffold; Group C; core decompression followed by implantation of a BMSC loaded bone matrix scaffold. At twelve weeks MRI studies were done of the affected and contralateral hip. The sheep were then sacrificed and both hips were harvested. In the area of severe ischemia, only sheep treated with BMSCs showed bone regeneration evidenced by immature osteoid formation. At the transitional area sheep treated with BMSCs showed bone regeneration in the periphery and in the center of the scaffold whilst those treated with the scaffold or core decompression alone showed only mild evidence of bone regeneration in the periphery. MRI findings were not conclusive due to constant bone edema artefact in all cases. Our findings indicate that BMSCs loaded bone matrix scaffold is capable of bone regeneration in experimentally-induced osteonecrosis of the femoral head in sheep.

Date: 2011-09-07
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Time: 16:30 - 18:00
Room: Club C

Abstract no.: 29243

THE OPPORTUNITIES OF REPARATIVE AND DISTRACTION OSTEOGENESIS OPTIMIZATION IN AUTOLOGOUS MESENCHYMAL STEM CELLS TRANSPLANTATION – THE ANALYSIS AT 5 YEARS FOLLOW-UP PERIOD

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Methods: In limited clinical study were used autologous MSC of the phenotype CD34-; CD45-; CD44+; CD90+; CD105+; CD106+, seeded on allogenic demineralized bone matrix (DBM) with density from 7 to 10 mln/cm³, in cases of non-circular defects of bone in 10 patients and treatment of non-unions of the femur and tibia in 15 patients (in control group DBM without MSC was used in 10 patients). At the end of distraction MSC were injected into the region of normotrophic regenerates in 10 patients (control – 10 normotrophic regenerates). Clinical examination, X-rays, CT, densitometry were performed during the period of the treatment and 3-5 years later. Discussion: In treatment of non-unions fixation index average out at $18,9 \pm 4,7$ weeks ($p < 5\%$) and was 1,7 times as short as that without MSC ($32,85 \pm 2,03$ weeks ($p < 2,3\%$)). When we used DBM seeded by MSC we observed primary fusion through the transplant without periosteal callosity in distinction from the control group. Bone marrow canal was formed from 6 months to 4 years. When MSC were injected into the region of normotrophic regenerates fixation index average out at $24,0 \pm 2,93$ day/cm (in control group - $37,125 \pm 5,005$ day/cm), $p = 0,0415$, was found even ossification of the regenerate and early grow of the cortical bone. In estimation according to scale SF-36 at 3-5 years follow-up all the patients shown good and satisfactory results. Use of MSC looks prospective in bone reconstruction surgery.

Date: 2011-09-07
Session: Research - Cells
Time: 16:30 - 18:00
Room: Club C

Abstract no.: 29326

RESVERATROL SUPPRESSES MMP-1, -3, AND -9 PRODUCTIONS AS WELL AS RANKL EXPRESSION IN RHEUMATOID ARTHRITIS (RA) FLS SUPERNATANT

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Introduction: Rheumatoid arthritis (RA) is a chronic, inflammatory autoimmune disease characterized by articular cartilage destruction and massive bone resorption. Synovial inflammation is mainly mediated by matrix metalloproteinases (MMP's) and RANKL-OPG pathways. This study investigated the effect of resveratrol on the MMP's pathological tissues remodelling and RANKL mediated differentiation of bone-resorbing osteoclasts. Methods: Random biopsies of synovial membrane were obtained and in vitro expanded; FLS were characterized via FACS analysis. Cells were treated with Resveratrol in a dose and time dependent manner and cell viability assays were performed. We used Human MMP Base Kit subsequently followed by Luminex analyzer to determine the amount of bound MMP's. To obtain an insight of the effect on the RANKL-OPG pathway we applied qRT-PCR and GeneChip Arrays. Results: The effect of resveratrol on IL-1 β stimulated MMP expression in FLS of RA patients was determined. Cells treated with 100 μ M resveratrol overnight produced notably decreased levels of MMP's. The significance of changes was determined using the Wilcoxon signed-rank test. P < 0.05 was considered significant. Following MMP levels in FLS supernatant were lower after resveratrol treatment compared to FLS supernatant without resveratrol addition: MMP1 p = 0.022, MMP3 p = 0.021, and MMP9 p = 0.047. RANKL is essential for the differentiation of osteoclast precursors into mature osteoclasts. IL-1 β induced RANKL expression was suppressed significantly. Conclusion: These facts may indicate a promising new therapeutic approach to reduce MMP induced cartilage destruction and RANKL mediated osteoclast differentiation in RA.

Date: 2011-09-07
Session: Hand - Scaphoid & Wrist
Time: 08:00 - 09:30
Room: Club D

Abstract no.: 29013

COMPARISON OF THE POSTOPERATIVE COSTS OF VOLAR LOCKING PLATE AND K-WIRE FIXATION OF ISOLATED DISTAL RADIUS FRACTURE IN ADULTS

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Distal radius fractures are common. Most are managed conservatively. The main surgical treatment options are k-wire or volar locking plate fixation. Both surgical treatments have similar long term functional outcome, although research shows that plate fixation has greater operative costs. Our aim was to determine any difference in outpatient costs of these two surgical treatments. Radiology and clinical notes were reviewed for all adult patients treated with k-wire fixation for isolated distal radius fracture by our department between March 2007 and January 2010 (n=50). This group was compared to a consecutive cohort of patients treated with volar locking plate between March 2009 and January 2010 (n=50). Patients with no postoperative follow up were excluded (n=4). For each included patient, the total number of postoperative radiographs and fracture clinic appointments was determined. 96 patients were included, with equal numbers in both groups. Most patients were female (n=74) of mean age 55 years, with no significant difference between groups. The majority of patients in the k-wire group had AO type A fractures (75%) compared to 46% in the volar plating group. There was no statistically significant difference in the number of postoperative fracture clinic appointments (3.4 vs 3.7 p=0.23) or number of postoperative radiographs between groups (1.9 vs 1.8 p=0.26). The outpatient costs of patients treated with k-wire or volar locking plate are similar. We concur that k-wire should be used where possible due to lower intra-operative and implant costs.

Date: 2011-09-07
Session: Hand - Scaphoid & Wrist
Time: 08:00 - 09:30
Room: Club D

Abstract no.: 26986

FACTORS PREDICTING LATE COLLAPSE OF FRACTURES OF THE DISTAL RADIAL

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Although the fractures of distal radius are a common clinical situation for the orthopaedist, their instability depends on many factors varying from age, type and associated ligamentous injury. The aim of this study was to find out the influence of age, sex, DRUJ injury, ulnar styloid fracture, dorsal displacement in late collapse of distal radius fracture. METHODS: 329 patients presented from 2006 to 2009, were treated by closed reduction and plaster cast for 5-8 weeks. The fractures were classified under AO. Dorsal tilt, radial inclination and ulnar variance are measured after reduction and 2 months later. Loss of these angles was analyzed statistically against variables like DRUJ involvement, ulnae styloid fractures, age, sex, AO classification. Statistical analysis was done using Mann-Whitney test. (P value <0.001) RESULTS: 329 patients from 18 to 88 years old (54.3), F/M 3:1, 129 right hands, 195 left. We found 136 (41.3%) patients with associated DRUJ injury and 138 (42%) with fractures ulna styloid. 153 (46.5%) had dorsal displacement. After two months we found loss of reduction in 171(51.9%) cases Loss of reduction was related to age, classification (A3, B2, B3, C2, C3), involvement of DRUJ, ulnar styloid fractures and initially displacement. CONCLUSIONS: Factors like age, associated DRUJ injury, ulnar styloid fracture are predictor for loss of reduction. Knowing these predictor factors, we can make an early decision for the method of treatment. KEY WORDS: Fracture/distal radius, radial tilt, ulnar variance, volar tilt, ulnar styloid fractures, DRUJ

Date: 2011-09-07

Session: Hand - Scaphoid & Wrist

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 29414

ULNA SHORTENING

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Objective: Retrospective study to assess the outcomes of ulnar shortening for TFCC tear and distal radial malunion. Method: Retrospective note and x-ray review of all patients undergoing ulnar shortening over a ten year period along with a clinic assessment and scoring to date. The ulnar shortening was performed using the Stanley Jigs (Osteotec). A 5-6 holed DCP was used to stabilize the osteotomy site. Physiotherapy was commenced immediately following the surgery to promote pronosupination and wrist exercises. Result: 28 patients studied with one subsequent death. 13 patients with an average age of 53 years underwent ulnar shortening for distal radius malunion, whereas 15 patients with an average age of 47 years had a primary indication of ulnar abutment with TFCC tear. Eight patients underwent reoperation for non-union. 2 patients needed plate removal for prominent metalware. Patients undergoing the procedure for TFCC deficiency compared to radial malunion did worse, on functional scoring (DASH & SF36). Failure to place an interfragmentary screw was associated with a higher risk of non-union. Conclusion: Ulnar shortening is not a benign procedure, especially for the treatment of TFCC insufficiency. Interfragmentary screw placement is important in avoiding non-union.

Date: 2011-09-07

Session: Hand - Scaphoid & Wrist

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 29623

EARLY RESULTS OF A RECENTLY INTRODUCED IMPLANT FOR SCAPHOID FRACTURE FIXATION: 3.0 HEADLESS COMPRESSION SCREW

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INTRODUCTION: Different techniques and implants exist for the treatment of scaphoid fractures. We discuss the early results of a recently introduced implant, the non-variable pitch 3.0 Headless Compression Screw (HCS ® Synthes). **PATIENTS AND METHODS:** Twenty eight patients with scaphoid fractures (five acute and 23 non-unions) over a period of 18 months were treated with HCS fixation. The series consists of two females and 26 males with a mean age of 25.6 years (range 16-55). All non-unions additionally had vascularised pedicle bone grafting. All were immobilised in a cast for six weeks and had standardised physiotherapy rehabilitation. They were seen routinely for clinical and radiological review at six weeks, three months and one year. Mean follow up for the series was 4.5 months. **RESULTS:** All five patients with acute scaphoid fracture fixation had satisfactory radiological healing at a mean of eight weeks. Fifteen of the 23 non-unions were united by final follow up. One non-union has failed to unite with the vascular pedicle graft and 3.0 HCS fixation. The other seven patients, although only recently operated on, show probable signs of radiological union at early review. There were no signs of loosening of the screw or loss of compression in the entire group. **CONCLUSION:** The Headless Compression Screw has predictable and satisfactory early results for scaphoid fracture fixation. Follow up continues to assess the long term results.

Date: 2011-09-07

Session: Hand - Scaphoid & Wrist

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 29262

SHORT TERM OUTCOMES OF TRAPEZIECTOMY VERSUS PYROCARBON INTERPOSITION IMPLANT (PI2) ARTHROPLASTY FOR THUMB CARPALMETACARPAL OSTEOARTHRITIS- PRELIMINARY RESULTS

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Multiple methods have been used to treat thumb carpometacarpal joint (CMCJ) osteoarthritis. This study compares the short term outcomes of trapeziectomy alone and PI2 implantation. We undertook a cross-sectional observational study involving 33 patients (36 thumbs). 18 thumbs had trapeziectomy alone and 18 had PI2. Preoperative radiological assessment using the Eaton and Glickel grading for CMCJ osteoarthritis and clinical review including DASH and SF-36 score was performed at a mean follow-up of 18 months. Preoperative and postoperative pain level was assessed using Visual Analogue Scale (VAS) and satisfaction of surgery using the Likert 5-point scale. There were 30 women and 3 men. Mean DASH score at follow up was 26.8 for trapeziectomy and 35.4 for PI2 group. Preoperative to postoperative VAS for pain showed an improvement from fair to excellent in 60% of patients in trapeziectomy and 30% of the patients in PI2 group. 6 out of 16(38 %) patients in PI2 group had multiple surgeries mainly due to dislocation or subluxation of the implant. The overall Likert 5-point scale scores were highest for trapeziectomy group with 70% very satisfied compared to 40% in PI2 group. Preliminary results of PI2 show a relatively high complication rate compared to simple trapeziectomy. Complications such as subluxation and dislocation observed in the early cohort resulting in multiple surgeries may be attributed to steep learning curve of the surgical technique and creation of a shallow groove for the implant. This may have contributed to the low satisfaction levels observed in PI2 group.

Date: 2011-09-07
Session: Hand - Scaphoid & Wrist
Time: 08:00 - 09:30
Room: Club D

Abstract no.: 28255

PROSPECTIVE COHORT STUDY OF 50 TRAPEZIOMETACARPAL JOINT REPLACEMENTS WITH THE ROSELAND PROSTHESIS AFTER VITAMIN C PROPHYLAXIS

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In trapeziometacarpal surgery the complication rate is high and complex regional pain syndrome (CRPS) type I may occur. We prospectively investigated the results of total joint replacement by the semi-constrained hydroxy-apatite coated Roseland prosthesis (Depuy International Ltd. Leeds, England). Visual analogue scale (VAS) scores for pain, activities of daily living (ADL) and satisfaction were taken perioperatively with measurements of the first web opening. Two days prior to surgery of basal thumb arthritis (Dell stages II or III), 500 mg ascorbic acid was started during 50 days as prevention for CRPS. In 42 patients (33 females, 9 males; mean age 60.4 years) with CMC I arthritis, 50 joint replacements were performed under plexus anesthesia (two times under general anesthesia). The improvement in function (15 degrees of first web opening) and VAS scores for pain, ADL and satisfaction ($p = 0.000$) were significant. Complications occurred 7 times (14%), without any infections. Five revisions had to be performed (10%). According to the IASP and Veldman criteria no CRPS was found. Patients should be aware of the complication and revision rate before they decide to undergo surgery. In case of failure, a salvage procedure can be performed. Torrededia (2006) reported 5 cases of CRPS (13%) after 38 procedures with the same implant. In our prospective cohort no CRPS occurred after 500 mg vitamin C daily (relative risk 0.87, confidence interval 0.77-0.98, $p = 0.01$). We advise 500 mg vitamin C daily as prophylaxis against CRPS in this type of carpometacarpal joint replacement.

Date: 2011-09-07

Session: Hand - Scaphoid & Wrist

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 28932

A BIOMECHANICAL STUDY ON VARIATION OF COMPRESSIVE FORCE ALONG THE ACUTRAK 2 SCREW.

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Purpose: Acutrak 2 screws are commonly used for scaphoid fracture fixation. To our knowledge the variation in compressive force along the screw has not been investigated. The objectives of our study were: 1. To measure variance in compression along the length of the Acutrak 2 screw. 2. To identify the region of the screw which produces the greatest compression and discuss the relevance of this to the placement of the screw for scaphoid fractures. Materials and Methods: Laboratory model set up to test the compressive forces along the screw with Sawbone blocks of varying width. The Acutrak 2 screws were introduced in the standard method. Forces were measured using load cell films introduced between the Sawbone blocks and were plotted as a graph along the whole length of the screw. Results: Maximum compression was at the waist (middle) of the screw. The overall compression force produced by the proximal half of the screw was 19% higher than that of the distal half. Minimum compression produced at either end of the screw. Conclusions: There is variation in compression along the length of the Acutrak 2 screw and the maximum compression obtained in the middle third of the screw. Compressive forces were higher in the proximal half of the screw. We suggest for maximum compressive force to place the fracture of the scaphoid at the waist of the screw. If this is not possible, place fracture towards the proximal end of the screw

Date: 2011-09-07

Session: Hand - Scaphoid & Wrist

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 27945

1. MEDIOCARPAL ARTHRODESIS BY SCREWS Â “ALLOWING EARLY FUNCTIONAL TREATMENT

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Background: For patients with scaphoid non-union and painful partial wrist arthroses, a four-corner fusion is a treatment option. The aim of the study was to evaluate clinical and radiological results after scaphoid excision and four corner fusion using four screws and cancellous bone graft. This operative procedure allows a functional postoperative rehabilitation program. Additionally, an implant removal is not necessary. Material and Methods: 19 patients with SNAC-, SLAC-wrist or radiocarpal arthroses were treated operatively by scaphoid excision and four corner fusion, additionally a denervation procedure was added and the processus styloideus was excised in most cases. Our operative procedure allowed an early functional after-treatment. Results: The average duration of follow-up was 18 months. A bony consolidation was achieved after 9 weeks. 17 patients were satisfied. The pain relief displayed on VAS reached 1.9. According to the Mayo Wrist Score Chart a satisfactory result (67 points) was achieved. The patients reached 2/3 of the grip strength as calculated from the uninvolved side. One patient needed a revision because of a dorsal impingement syndrome, a total wrist arthrodesis was necessary in another patient. One patient had to be treated because of a CRPS. Conclusion: Our operative procedure (four corner fusion with four screws and cancellous bone graft) is an option that allows an early functional after-treatment regimen. An implant removal is not necessary.

Date: 2011-09-07

Session: Hand - Scaphoid & Wrist

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 29945

METHODS FOR CORRECTING THE LENGTH OF FINGERS

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Shortened fingers are observed in congenital and acquired conditions in children, leading to varying degrees of functional disorders and cosmetic defect that causes the relevance of this problem. The purpose is to determine the indications for different operative techniques aimed at correcting the length of the fingers in children. Materials and methods: presents the results of treatment of 50 patients of different age groups with the shortening of the fingers of congenital and acquired genesis. Operative technique included a one-step bone grafting, two-step bone grafting with using distraction devices and method of distraction osteogenesis. The results of treatment were analyzed according to the pathology, localization of shortening, age of patients and treatment strategy. Discussion: Best results of distraction osteogenesis were observed in children of early age groups not previously operated. One-step bone grafting returns good results in shortening of less than 1 cm and a lengthening of metacarpal bones. Conclusions: Small patient's age and lack of previous operations are an indication for use of the method of distraction osteogenesis. Shortening of less than 1 cm is an indication for one-step bone grafting. The two-stage bone grafting is an indication with significant shortening, the effects of osteomyelitis and neoplastic diseases.

Date: 2011-09-07

Session: Trauma - Distal Radius

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 28346

EARLY RESULTS OF A VARIABLE-ANGLE VOLAR LOCKING PLATE FOR DISTAL RADIUS FRACTURES: A BI-CENTRE STUDY

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Introduction: We present the results of a bi-centre, retrospective study examining the clinical, functional and radiological outcomes of distal radius fracture fixation with the APTUS locking plates and Tri-Lock® variable angle locking screws. Methods: We assessed 64 patients with distal radius fractures with a minimum of six months follow-up. Functional assessment was made using the DASH score. We measured wrist range of movement and grip strength, and reviewed x-rays to assess restoration of anatomy, fracture union and complications. Results: All fractures united within six weeks. Mean ranges of movement and grip strength were only mildly restricted compared to the normal wrist. The mean DASH score was 18.2. Four patients had screws misplaced into the radio-carpal joint requiring removal of metalwork and seven patients developed minor complications unrelated to the metalwork. Discussion: Variable angle locking systems benefit from flexibility of implant positioning and may allow enhanced inter-fragmentary reduction for accurate fixation of intra-articular fractures. Early results are encouraging but inadvertent intra-articular screw placement is a concern.

Date: 2011-09-07

Session: Trauma - Distal Radius

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 28331

ROLE OF INJECTABLE BONE GRAFT SUBSTITUTE IN FUNCTIONAL OUTCOME OF DISTAL RADIUS FRACTURES

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In comminuted fractures of distal radius with cortical comminution and metaphyseal defects, metaphyseal collapse may occur even after accurate reduction and immobilization in cast or after removal of cast or external fixator device. To avoid such collapse, injection of an injectable bone graft substitute along with cast or fixator can be used to fill the trabecular defect of fractures of the distal radius which also provides a better functional outcome. The authors undertook a prospective review (with a level IV evidence) of 30 patients with distal radial fractures (with metaphyseal comminution) treated with external fixation and bone graft substitute (ostim) injection at site of metaphyseal comminution over a period of 2 year (2008-10). We analysed data for radiological parameters (Radial length, radial angle, and dorsal tilt) and functional outcome (assessed by Modified Gartland and Werley scoring system) at the end of 6 months. Final results regarding radiological/anatomical outcome of the patients in study group were evaluated using scoring given by Stewart et al. (1984). The parameters used were dorsal tilt, radial shortening, and loss of radial angle. 3(10%) patients showed excellent results at the end of 6 months and 27(90%) of patients showed good results at the end of 6 months. On functional assessment (using Modified Gartland and Werley Scoring System) there were 13(43.3%) excellent, 15 (50 %) good and 2 (6.7%) fair results.

Date: 2011-09-07

Session: Trauma - Distal Radius

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 28309

CLINICAL PROGRESSION OF PATIENTS IN THE FIRST YEAR TREATED WITH VOLAR LOCKING PLATE FIXATION

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Introduction and Aim: Volar Locking Plates (VLP) have revolutionised the treatment of distal radius fractures allowing the anatomic reduction and stable fixation of the more comminuted and unstable of fractures. The benefits of this in terms of range of movement (ROM), pain and earlier return to work and daily activities is documented. However we were interested in was what improvements in wrist function patients made from 6 to 12 months after injury? Methods: We retrospectively looked at a series of 34 consecutive patients that had undergone VLP fixation through a standard anterior approach followed by early physiotherapy. We documented standard demographics and assessed function in terms of Range of Movement, Grip strength (GS), Modified Gartland and Werley score (MGWS), Patient Rated Wrist Evaluation (PRWE) and the quick DASH questionnaire at six and twelve months Results: Two patients were excluded from analysis as they failed to make both assessments. Of the 32 remaining (26 female: 6 male) the mean age was 53.2yrs; range (26-78). On average GS, PGS, VAS function and pain did not improve. There was a modest improvement in Movement; Wrist Flexion-13 deg, Wrist Extension-14deg, Radial Deviation-7deg, Ulnar Deviation-9deg. There was no improvement in pronation and supination. There was little improvement in qDASH, PRWE and mGW Scores with only a mean 1.8, 5.6 and 3.6 point improvement respectively. Conclusion: Patients undergoing VLP fixation for distal radius fracture regain the majority of wrist function in the first 6 months and are unlikely to see improvement in function objectively and subjectively after this. We feel patients must be made aware of this prior to intervention and in the early post-operative period to optimise patient satisfaction.

Date: 2011-09-07
Session: Trauma - Distal Radius
Time: 10:30 - 12:00
Room: Club D

Abstract no.: 29726

OPERATIVE TREATMENT OF 23A3, 23C FRACTURES WITH A VOLAR LOCKING PLATE - RESULTS AFTER THREE YEARS

Mihail RASHKOV, Dian ENCHEV, Nikolay TIVCHEV
EMI Pirogov, Sofia (BULGARIA)

Background: There is an increasing trend to subject distal radius fractures to ORIF. Apart from the B type, shearing fractures, conclusive evidence pointing towards the optimal treatment seems to be lacking. Few retrospective studies comment on the long term results after volar locking plating. Material/Method: 38 patients with unilateral distal radius fractures were operated through FCR approach. Volar locking plates of different design were applied. No bone graft or substitute was used. Average patient age was 53.2 years. There were 22 females and 16 males. According to AO classification fracture spread was: A3-9, C2-10, C3-19. Patients were followed for at least 2.5 years (2.5-3.5). At the latest examination, comparison X-rays of the contralateral wrist were taken. DASH questionnaires were filled. Clinical results were evaluated according to Gartland/Werley scale. Results: All fractures healed with a minimal loss of reduction. On average 1mm of length was lost. With a longer follow-up no "settling" of the fracture was noted. X-ray results indicate signs of OA in the majority of C fractures and in some A fractures. Clinical results are dependant mostly upon the reduction of the extra-articular component. Radial length and deviation appear to be most important. Intra-articular "steps" up to 2mm seem to have little functional consequence. Conclusion: Volar locking plates function as fixed-angle devices and are highly effective mechanically. Clinical results tend to correlate with the anatomical and reach a plateau after one year. Deterioration afterwards has not materialised in this study.

Date: 2011-09-07

Session: Trauma - Distal Radius

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 29121

TREATMENT OF COMMINUTED INTRAARTICULAR FRACTURES OF THE DISTAL END RADIUS BY HINGED EXTERNAL FIXATOR

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Misr University for Science and Technology, 6 October (EGYPT)

Distal radial fractures account for more than one sixth of the fracture cases seen in emergency rooms. Treatment of these fractures continues to pose a therapeutic challenge because the comminuted fragments are articular, small and displaced. The aim of this study is to evaluate the functional outcome after hinged external fixator as a method for treating comminuted intraarticular fractures of the distal end radius by ligamentotaxis. Patients and methods: sixty patients with complex and intra-articular fractures (AO Type 'C') were included in this study. Results: Postoperative stability was good, as no redisplacement was noted. The patients' acceptance of the device was high. All of the fractures healed at an average of six weeks, measurement of wrist motion at an average follow-up of 20 months revealed an average return of 60° of wrist extension, 40° of wrist flexion, 90° of pronation and 90° of supination. Radiographic assessment revealed restoration of normal radial length, inclination and palmar tilt in all cases except two with loss of 5° palmar tilt. The final outcome, as assessed by the Gartland and Werley scale, was excellent in 38 cases, good in 12 cases, and fair in ten cases. Pin tract infection was seen in seven patients which was resolved with local care and systemic antibiotics. Conclusions: For the unstable, comminuted fractures of the distal radius, the hinged external fixator make a good alignment, maintain the length of the radius and create the anatomical conditions for full functional recovery. Keywords: radius, external fixator, unstable fractures

Date: 2011-09-07

Session: Trauma - Distal Radius

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 28726

PRELIMINARY PROSPECTIVE REVIEW OF PATIENTS WITH DISTAL RADIAL VOLAR DISPLACED FRACTURE TREATMENT WITH: A MINI-OPEN TECHNIQUE

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Volar displaced fracture treatment with an open method has increased dramatically over the last decade, but now its acceptance is unpopular because it leaves a large scar, stiffness and pain after the surgery. So our aim is to give a good functional outcome with minimally Invasive Volar plate fixation of the same fracture leaving behind a very small scar, supple and painfree wrist in this Distal Radius Volar displaced fracture with a Mini-open technique. Method: With the use of a T.Buttress plate with 3 or 4 hole-plate according to the length of the fracture with a mini-open technique with a ventral approach. Patients were followed up on the 1st month, 2nd month and 6th month (post-op) to evaluate flexion, Extention, grip strength, and pinch. Result: During the year 2010, total of 20 subjects – 4 females and 16 males. The mean age 45yrs (24-63 yrs). All were Volar barton's intraarticular fracture with or without radial styloid separation. Subjective Evaluation - 80% of patients had excellent results with no pain, good ROM, small scar length, no tenderness of scar or thickening. Objective: Evaluation – Very satisfactory. Flexion/Extention 80 to 85%, Grip strength 85%, Pinch 90%. Conclusion: Overall patients made an excellent recovery. Majority had no pain, and almost complete return to function at the end of 6 months post-operative. Individual patient's demography (age, sex, fracture type and post-operative therapy) shows statistically significant difference to measure the outcome.

Date: 2011-09-07

Session: Trauma - Distal Radius

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 28448

PERCUTANEOUS KIRSCHNER WIRES VERSUS LOCKED VOLAR PLATING IN UNSTABLE EXTRA-ARTICULAR DISTAL RADIUS FRACTURES

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Sanatorio Allende, Cordoba (ARGENTINA)

Introduction: The objective of this study is to compare the radiographic behavior of unstable extra-articular distal radius fractures treated with percutaneous Kirschner wires and those treated by open reduction and internal fixation using locked volar plates. Material and methods: We retrospectively evaluated 58 patients with 62 distal radius fractures. 31 fractures were stabilized with percutaneous Kirschner pins and 31 with locked volar plates. Patient's age averaged 62 years. 39 fractures were secondary to low-energy trauma. Radiographic controls were performed pre-operatively, immediately postoperatively, at six weeks and at four months. Absolute radial height displacement, absolute radial inclination displacement and absolute volar angulation displacement were assessed. Results: Union was achieved in all fractures. There was statistically significant loss of radial inclination ($p = 0.0001$), radial height ($p = 0.0001$) and volar angulation ($p = 0.0003$) in fractures treated with percutaneous Kirschner wires and plaster. Discussion: Volar locked plates are more reliable than Kirschner wires in preserving the reduction achieved intraoperatively in unstable extra-articular fractures of the distal radius. The use of locked volar plates is recommended in young active patients, because the maintenance of an anatomic reduction will decrease the degree of secondary arthritis, and in that way will be associated with less long term pain and functional impairment.

Date: 2011-09-07
Session: Trauma - Distal Radius
Time: 10:30 - 12:00
Room: Club D

Abstract no.: 27816

EVALUATION AND COMPARISON OF RADIOLOGICAL AND FUNCTIONAL OUTCOME IN EXTRA-ARTICULAR FRACTURES OF LOWER END RADIUS TREATED CONSERVATIVELY WITH RESPECT TO ITS POSITION OF IMMOBILIZATION

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Extraarticular fractures of lower end radius are conventionally immobilized in palmer flexion and ulnar deviation but this leads to poor functional results. aim of our study is to evaluate and compare the radiological and functional outcome in extra-articular fractures of lower end radius treated conservatively with respect to its position of immobilisation 64 patients, all above age 20 yrs having closed extra-articular fractures of lower end radius were included in the study and treated conservatively by close reduction and below elbow cast application. Patients were randomly allotted dorsal or palmer flexed immobilization attitude of wrist after reduction irrespective of fracture geometry. Patients were followed up for minimum 6-month period. The results were scored by Demerit Scoring System of Saito. Results: All fractures united. Individual movement of dorsiflexion, palmer flexion, supination, pronation and radial-ulnar deviation were all significantly better in dorsiflexed-immobilized group as compared with palmer flexed immobilized group. Grip strength recovery with subjective assessment was better in dorsiflexed group (77%) as compared to palmerflexed group (23%). Radiological parameters were markedly better in dorsiflexed group. 91% of patients in the dorsiflexed group had excellent to good results as compared to 66% in palmer flexed group. Functional results of extra-articular fractures of lower end radius are superior if the fractures after reduction are immobilized in dorsiflexion of wrist rather than in conventional palmer flexion attitude. Immobilization of wrist in palmer flexion has a detrimental effect on hand function because dorsiflexion is needed for rehabilitation of fingers.

Date: 2011-09-07

Session: Trauma - Distal Radius

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 29543

OUTCOME ASSESSMENT FOLLOWING DISTAL RADIUS FRACTURES

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Objectives: Functional outcomes following distal radius fractures are directly influenced by the choice of outcome assessment instruments used. Our objective was to compare scoring systems in measuring patient functional outcomes, and determine which scoring system compared most favourably with DASH questionnaire. Methods: 108 patients were treated operatively following distal radius fractures. Patient outcomes were recorded using DASH, the Green and O'Brien system, Gartland and Werley system and Sarmiento radiological scoring system. Results: There was a stronger correlation between the Green and O'Brien scoring system and DASH than Gartland and Werley and DASH. The Green and O'Brien scoring system was more demanding so patients rated 'excellent' or 'good' had better functional outcome than those bearing the same grade in the Gartland and Werley system. Nonetheless the Green and O'Brien score and Gartland and Werley score showed good correlation with each other. The Sarmiento radiological score had no significant correlation with any of the other scoring systems. Significant predictors of the DASH score were function, power grip, pain and range of motion. Conclusion: The Green and O'Brien scoring system correlated most strongly with the DASH score. The Sarmiento radiological score had no significant correlation with functional outcome. Subjective parameters 'pain' and 'function' in the Gartland and Werley score are highly variable. Significant predictors of the DASH score were pain, function, power grip and range of motion, all of which were parameters used in the Green and O'Brien scoring system.

Date: 2011-09-07
Session: Hand - Soft Tissues
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 28307

DO OLDER PATIENTS BENEFIT FROM VOLAR LOCKING PLATE FIXATION FOR DISTAL RADIUS FRACTURES

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Background: Volar Locking Plates (VLPs) have been shown by to have good radiological and clinical outcomes in the management of Distal Radius Fractures (DRF). The advantage of VLPs is that they offer angular stability allowing for stable fixation even in comminuted fractures of osteoporotic bone. Therefore the benefit should be seen particularly in the older population. Aim: Several studies have shown that VPLs are good at maintaining fracture reduction but what has not been studied is the outcome in older people. We aimed to compare the clinical outcomes of VLP fixation of displaced DRF between younger (<59 yrs) and older (>60yrs) patients. Method: We retrospectively looked at a series of 78 consecutive patients that had undergone ORIF with VPL for displaced distal radius fractures. We documented standard demographics and assessed function in terms of Range of Movement (ROM), Grip strength (GS), Modified Gartland and Werley score (MGWS), Patient Rated Wrist Evaluation (PRWE) and the quick DASH questionnaire at six months. Results: There were 43 patients <59yrs and 35 patients >60yrs. There was no difference in terms of Pain, ROM, MGWS (7.2 vs 6.9), PRWE (24 vs 23.6) and quick DASH scores (17.3 vs 19.1) between the two groups at six months. The younger group did have a significantly better grip strength but when compared as a percentage to the uninjured this was also similar (83% vs 80%) Conclusion: VLPs are a suitable option for fixing distal radius fractures in the older population (>60yrs); the clinical results being as good as in the younger population.

Date: 2011-09-07
Session: Hand - Soft Tissues
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 28439

FUNCTIONAL OUTCOME OF ENDOSCOPIC RELEASE AMONG PATIENTS WITH CARPAL TUNNEL SYNDROME BETWEEN 2005 AND 2009

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Endoscopic release of the carpal tunnel was developed in an attempt to decrease these complications. Proponents of the procedure claim that postoperative morbidity is less, leading to more rapid recovery of hand function. It has been shown to have equivalent clinical efficacy, more rapid recovery and fewer complications. A total of 102 patients with a mean age of 50.22 + 11.96 years ranging from 27 to 84 years old were included in the study. Majority, 77.5%, were females and 15.7 % were male. Sixty five percent of the patients are right-handed, 32% were left-handed and 0.03% were ambidextrous. Average Disabilities of the Arm, Shoulder and Hand (DASH) scores were 5.61 + 0.163 and average 6.40 + 1.269 days to return to normal daily living. Eighty-seven patients (85.3%) had satisfactory rating while 14.7% very satisfactory rating. Complication rate of patients were also noted. Three patients (2.9%) experienced scarring, 2% had numbness and none had post procedure pain. In the basis of clinical outcome measures, endoscopic carpal tunnel release is an effective operation for treating idiopathic carpal tunnel syndrome. This study showed that patients who underwent endoscopic release of carpal tunnel had good functional outcome and satisfaction with faster return to ADLs.

Date: 2011-09-07
Session: Hand - Soft Tissues
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 28274

A PROSPECTIVE AUDIT OF PATIENT SATISFACTION WITH THE COMPONENT PARTS OF CARPAL TUNNEL DECOMPRESSION

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Introduction: The outcome of carpal tunnel decompression is well documented in the medical literature. It is not however well documented as to the patient satisfaction of the individual parts of the procedure. The aim of this study was to determine the level of patient satisfaction with these individual steps in order to identify individual aspects where improvements to the service could be made. Methods: 50 patients were recruited into the study upon presentation for surgery. A questionnaire was completed immediately post-operatively. Areas of patient satisfaction measured included, tolerance of tourniquet and local anaesthetic, subjective pain scores and overall satisfaction. A subset of these patients was followed-up to discharge in order to determine satisfaction with suture removal. Results: Satisfaction levels were very high with most aspects of the patient journey. In terms of the procedure; the tourniquet and local anaesthetic were the least well tolerated, although not in all patients. Interestingly lack of tolerance of these steps showed no significant relationship to the overall patient experience. Suture removal is tolerated well by patients. Almost every patient would recommend the procedure to a friend or relative. Conclusions: In this study we have been able to demonstrate that even when patients poorly tolerate individual component parts of carpal tunnel decompression surgery, this does not result in a poor overall patient experience of the procedure. This then questions the benefit of striving to develop strategies to reduce patient intolerance to the component parts, for example, performing surgery without a tourniquet or warming the anaesthetic.

Date: 2011-09-07
Session: Hand - Soft Tissues
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 29950

ISOLATED TUBERCULOSIS TENOSYNOVITIS- A CASE SERIES

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Tubercular tenosynovitis accounts for < 1% of musculoskeletal tuberculosis. Since it is rare there is a tendency to miss such cases clinically. The study included nine cases of isolated tenosynovitis. 4 cases had involvement of FDS and FDP tendons at wrist. One case had isolated tenosynovitis of the long flexors of the middle finger. Biceps tendon, tibialis posterior and peroneal tendon were involved in one case each. Extensor tendons of the foot were involved in one. Local examination showed diffuse swelling and tenderness of the affected region. Motion was restricted and painful across adjacent joints in all cases. ESR and CRP was raised in all the cases with a mean value of 68(50-88) and 10(8-14) respectively. FNAC was diagnostic in 3 and inconclusive in rest. Biopsy was done in rest to confirm the diagnosis. ATT was given for a period of one year. Follow up period was 3 years (1.5-3.5 years). A repeat MRI done at completion of ATT showed complete resolution of lesions. All patients were completely asymptomatic and had full range of motion of affected limb at last follow up. Tuberculous synovitis should be considered in patients residing in endemic areas, who present with isolated tenosynovitis. FNAC/Biopsy is a must to confirm the diagnosis and differentiate from pyogenic and inflammatory causes. A normal chest radiograph, absence of systemic symptoms or the absence of other foci of active tuberculosis should not dissuade one from making the diagnosis.

Date: 2011-09-07
Session: Hand - Soft Tissues
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 29138

FLEXOR SLIDE PROCEDURE AS TREATMENT OF SEVERE CONTRACTURE OF THE FLEXORS OF THE WRIST AND FINGERS IN TRAUMATIC HEMIPLEGIA

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¹HYGEIA HOSPITAL, ATHENS (GREECE), ²TZANNEIO HOSPITAL, ATHENS (GREECE)

We had the opportunity to treat the contracture of the wrist and fingers due to traumatic hemiplegia in 43 patients; 33 males and 10 females. The right extremity was involved in 28 patients and the left in 15 patients. The time from the injury to the operation was from 3 years to 20 years. The incision was a zic-zag type over the medial aspect of the lower end of the arm to the elbow and forearm. We released the origin of all the flexors of the wrist and fingers and also the flexor pollicis longus from the medial epicondyle, ulna, radius and interosseous membrane until to gain at least 5cm length. At the end of the operation we immobilize the extremity with the elbow in flexion 45 degrees and the wrist and finger in extension for ten days. Then we continue with serial dynamic splints. The follow up was ranged from 2 to 10 years and the results were; 14 excellent, 16 good and 13 fair.

Date: 2011-09-07
Session: Hand - Soft Tissues
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 29684

HAND BONES TUMOURS COMPLEX TREATMENT WITH USE OF THE ILIZAROV METHOD

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Introduction: Limb salvage treatment of the patients with oncological pathology is considered to be difficult due to the necessity to restore not only anatomical integrity but also hand function. Materials and Methods: The material for the analysis was 168 medical records of the patients who underwent treatment between 1992 and 2010 in the center of hand surgery with application of the apparatuses of external fixation for hand bones tumours. Primary reconstruction procedures considerably reduce the treatment period. The fixator for transosseous osteosynthesis was applied after bone resection due to tumour. That aimed preservation of the operated ray anatomical length. In cases of small bone defects the grafts were placed into the defect area followed by mild compression in the fixator to accelerate the reparative process. In extensive defects, graft was mandatory fixed through additional wires to the fixator. Application of the apparatuses enables stable fixation and the possibility to train motion to restore the functioning of tendons and joints. Results: Long-term follow-ups were studied in 152 patients in the period from 1 to 18 years. Tumour recurrence observed in 19 cases (12 of them were malignant tumours). All these patients were reoperated after thorough examination. Conclusion: The use of Ilizarov fixators in the treatment of short tubular bones tumours of the hand is a new perspective trend in hand surgery and oncology.

Date: 2011-09-07
Session: Hand - Soft Tissues
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 29724

THE USE OF ILIZAROV FIXATOR FOR TREATMENT OF PATIENT WITH DEFECTS OF HAND BONES

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Introduction: Bone plasty due to defects of tubular bones is one of the important sections of reconstructive surgery. Materials and Methods: In the period from 1992 to 2010, a total of 98 patients with hand bone defects were operated using the Ilizarov method of transosseous osteosynthesis at the center for hand surgery in the city Chelyabinsk. Autoosteoplasty was used in 62 patients. In 36 patients, the defects were managed using the granules of porous hydroxyapatite ceramics and «CollapAn». The Ilizarov fixator was applied after bone resection due to tumour or after primary surgical debridement of the wound preserving the anatomical length of the operated ray. It was noted that when osteoplasty was combined with transosseous osteosynthesis, the process of union went on faster than in cases when a plaster cast is used. Results: Long-term outcomes were followed from 1 year to 18 years in 81 patients. Seven developed osteomyelitis and then the graft was rejected, the ray became shorter and contracture developed. The hand function was restored in all the remaining cases. Conclusion: The use of Ilizarov external fixator for treating hand injuries and some diseases results in good functional outcomes, considerably reduces inpatient stay, and decreases the number of postoperative complications.

Date: 2011-09-07
Session: Hand - Soft Tissues
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 29418

HYPERTROPHIC GRANULOMA FORMATION FOLLOWING THE USE OF FLEXIGLIDE FOR MEDIAN NERVE PROTECTION IN RECURRENT CARPAL TUNNEL SYNDROME

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Aim: To present our experience of the use of Flexiglide, Ascension Orthopaedics ® for the protection of the compressed median nerve following revision carpal tunnel release
Methods and material: 6 patients who underwent revision carpal tunnel decompression under the care of the senior author (LRI) over the period of three years 2006 - 2009 needed the use of the Flexiglide to wrap and protect the median nerve. **Results:** The age distribution of the patients were 36- 58 years (average of 46) 4 females and 2 males. Flexiglide was used during the 2nd revision in 5 patients and during the 3rd revision in one patient. 2 patients had an extensive hypertrophic granuloma formation with wound breakdown 5-6 weeks post operatively. There were no organisms grown on culture from the granulation tissue. The wounds healed completely following the removal of the Flexiglide implant. **Discussion:** Flexiglide is manufactured from 100% micro-biologically safe synthetic material. The final degradation products, lactic acid and -hydroxy-hexanoic acid, are resorbed, metabolized and excreted by the body. Our experience denoted that it lead to a foreign body granuloma type formation in 33% of the patients. This possible complication should be considered prior to the use of this implant.

Date: 2011-09-07

Session: Hand - Soft Tissues

Time: 14:00 - 15:30

Room: Club D

Abstract no.: 30037

TREATING UNSTABLE DISTAL RADIUS FRACTURES WITH VOLAR LOCKING PLATE- FUNCTIONAL AND RADIOLOGICAL OUTCOMES

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Background: There is an increasing trend towards treating unstable distal radial fracture with open reduction and internal fixation. The purpose of the study was to evaluate the radiological and functional outcome of treating distal radius fracture with volar locking plate (Aptus, Medartis). Patient and Methods: A consecutive cohort of 32 adult patients with distal radial fracture treated with volar locking plate (Aptus, Medartis) was selected. They were followed at 2, 6 and 12 weeks. Functional assessment tools included mini DASH scores, return to pre-injury activity level, grip strength and range of movements. Radiological assessment was done for radial length, volar tilt and radial inclination. Results: Of the 32 patients there were 8 male and 24 female with average age of 53.7 years. 5 fracture pattern were identified (AO classification: 6:23-A3, 6:23-B3, 6:23-C1, 10:23-C2, 4:23-C3). All fractures achieved radiological union at last follow up. The mean mini DASH score was 20.93 (range 0-75). 80% of the working patients returned back to their preinjury employment. The mean radial length was 9.5mm, volar tilt was 8.8 deg, and radial inclination was 18.8 deg. There were 2 cases of post operative complications (1-superficial infection, 1-CTS). 2 patients needed removal of metal work due to collapse of the fracture with intra-articular migration of the screws. Conclusion: Fixation of unstable distal radius fracture with fixed angle volar locking plate appears to restore the distal radial anatomy and produce a satisfactory functional outcome.

Date: 2011-09-07
Session: Hand - Miscellaneous
Time: 16:30 - 18:00
Room: Club D

Abstract no.: 29691

INTERPRETATION OF NORMAL HAND AND WRIST RADIOGRAPHS BY EMERGENCY ROOM AND ORTHOPAEDIC CLINICIANS

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The aim of this study is to assess the ability of clinicians dealing with hand and wrist trauma to interpret plain radiographs of the hand and wrist in standard views. A survey of 47 clinicians was conducted between November and December 2010. Clinicians were recruited from the Emergency Room (ER) and Trauma & Orthopaedic departments at a University Teaching Hospital in the UK. Participants included junior residents and residents from the ER and Orthopaedic junior residents and residents. Orthopaedic interns were also included to establish a base knowledge of doctors fresh from medical school. Participants were supervised identifying 10 standard landmarks on two views of normal hand and wrist radiographs. Participants received one mark for each correctly identified structure (maximum of 10). Nineteen ER and 28 Orthopaedic clinicians were recruited in the study. The mean number of correctly identified structures for ER clinicians was 7.1. The mean for the Orthopaedic group was 8.7. The mean for junior residents in the ER was 6.5. Overall, doctors in the ER scored lower than Orthopaedic trainees. Junior residents in the ER correctly identified only sixty five per cent of the structures assessed in this study. Failure to recognise these landmarks may potentially give rise to problems regarding the identification of fractures and dislocations. It is the authors' opinion that there appears to be a deficiency in the knowledge and application of radiographic anatomy across both Emergency clinicians and Orthopaedic trainees. This is particularly evident in junior residents in the ER.

Date: 2011-09-07
Session: Hand - Miscellaneous
Time: 16:30 - 18:00
Room: Club D

Abstract no.: 29436

PREOPERATIVE COMPUTERIZED MODELING IN SURGICAL TREATMENT OF WRIST PATHOLOGIES

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Materials and methods: In the Republican Center of Hand Surgery of City Clinic #6 of Minsk, 150 patients aged 16-55 were given medical assistance in the years 2008-2010. Among those seeking aid were 133 male patients and 17 female patients. Basing on CT DICOM-series there was developed a computer program of wrist pathologies visualization with a measuring module which was used when diagnosing and rendering a specialized aid to 60 patients. Results and discussion: Virtual preoperative modeling was carried out in 5 patients with old fractures and scaphoid nonunion with dislocation and a probable defect of the bone substance, which made it possible to determine the angle of the bone fragments displacement during the forthcoming reposition as well as to determine the necessary amount of the defect of the bone autograft. In 7 cases of avascular necrosis of the semilunar bone (IIIB stage according to Lichtman) with signs of adaptive collapse of the wrist there was carried out preoperative computerized modeling of the lengthening osteotomy of the capitate bone. The level and the length of the suggested osteotomy were determined, as well as the distance at which the proximal fragment of the capitate bone is to be dislocated. By means of the program instruments, suggested length of the metal screw for osteosynthesis was determined in 10 patients with scaphoid fractures. Conclusion: Thus, visualization program made it possible to carry out preoperative modeling of the most significant stages of the forthcoming operative intervention and perform measuring several parameters of the wrist.

Date: 2011-09-07
Session: Hand - Miscellaneous
Time: 16:30 - 18:00
Room: Club D

Abstract no.: 28707

APPLICATION OF MRI IN EARLY DIAGNOSIS AND MEDICAL MANAGEMENT OF WRIST TUBERCULOSIS

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The study was designed to evaluate the role of MRI in early diagnosis and treatment outcome of wrist tuberculosis. Eighteen patients with wrist tuberculosis were subjected to routine clinico-hematological assessment as well as Xray, MRI and Fnc or Needle biopsy (under fluoroscopic guidance) for histo-pathological evaluation. AFB (Acid Fast Bacilli) culture was reserved for patients with inconclusive evidence from the above modalities. These patients were started on short course chemotherapy and followed regularly for five years. There were fifteen male and three female patients. Right side was involved in fifteen and left in four cases including one case with bilateral involvement. The clinico-hematological parameters were non-specific. Xrays suggestive of tuberculous infection of wrist were seen in nine cases. However, characteristic features on MRI were seen in all patients including the two patients diagnosed within one month of symptoms. Acid fast bacilli were seen in only six patients but granulomatous inflammation characteristic of tuberculosis was observed in all cases. Thus, AFB culture was not required. All the patients except one healed with chemotherapy alone. Nine patients given chemotherapy within the shortest duration of symptoms appearance did not show stiffness in the wrist joint but the others having delayed presentation and the single patient who underwent surgical debridement had residual stiffness. No recurrence of disease was seen. In patients with chronic arthritis of wrist with inconclusive lab and Xray findings, MRI helps in establishing an early diagnosis of tuberculous infection without having to wait for the AFB culture reports. This followed by an early institution of short course chemotherapy has excellent functional outcome with no recurrence and minimizes the need for surgical intervention.

Date: 2011-09-07
Session: Hand - Miscellaneous
Time: 16:30 - 18:00
Room: Club D

Abstract no.: 29949

**RECONSTRUCTION OF DEFECTS BONES OF UPPER EXTREMITY
USING VASCULARIZED DIFFERENT BONES GRAFT IN CHILDREN**

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The Turner Scientific and Research Institute for Children's Orthopedics,
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Failures after attempts to treat the upper limb bone defects by conventional orthopedic methods compel the surgeons to resort to a surgical management with the use of microsurgical techniques. Objective of this study was to examine the late results after surgical reconstruction carried out on upper limbs in children with the use of vascularized bone autotransplants. At the Department of Reconstructive Microsurgery and Hand Surgery of The Turner Research Institute for Children's Orthopedics, from 2000 up today, in children from one to 15 years, fifty operations with the use of vascularized bone fragments were performed. As an autotransplant were used a lateral part of the scapula, fibular diaphysis, fibular epimetadiaphysis, 2nd metacarpal bone, rib as a part of thoracodorsal flap. To control the management, x-ray and CT were carried out before surgery as well as at early rehabilitation stages. The followup was from one to five years. Observing the true healing of vascularized bone transplants, in a recipient area no reoccurrence of bone defects, a shorter rehabilitation time, preserved function of displaced growth plates, change of displaced vascularized bone fragments in accordance with function at the recipient area were marked. The use of vascularized bone transplants has shown its effectiveness in microsurgical reconstructive operations on upper limbs in children when compared with conventional orthopedic methods, and this allows solving the problem in one stage.

Date: 2011-09-07
Session: Hand - Miscellaneous
Time: 16:30 - 18:00
Room: Club D

Abstract no.: 30245

FREE AND CONSTRAINED MUSCLE GRAFTING IN PATIENTS WITH SEVERE ISCHEMIC HAND CONTRACTURE

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(UKRAINE)

On the base of Department of Microsurgery and Reconstructive Surgery of the Upper Extremity of the Institute of Traumatology and Orthopedics of AMS of Ukraine, 23 patients with severe ischemic contracture in the residual period received surgical treatment within 1999-2010. Depending on the muscle grafting performed, the postoperative patients were divided into two clinical groups. The first group included 16 (69.6 %) patients who received a constrained muscle grafting on the ischemic limb. The second group included 7 (30.4 %) patients with free muscle grafting. Out of 16 first group patient's m. triceps brachii were used as donor muscles to recover the elbow joint flexion function in 7 (43.7 %) patients. In 5 (33.3 %) patients m. pectoralis major were used. Also, for recovery of the elbow joint and fingers flexion in 4 (26.7 %) cases m. latissimus dorsi was used. To recover the elbow joint and fingers flexion and to repair skin defects, a free grafting of the musculocutaneous flap m. latissimus dorsi was used in 5 (71.4 %) second group patients. Two (28.6 %) patients received the musculocutaneous flap m. gracilis for flexion recovery. A transitory thermal ischemia lasted 2 hours and 15 minutes, on average. The treatment outcome was evaluated during over two years in 12 (80 %) patients with constrained muscle grafting and in 5 (71.4 %) patients after free grafting. The total gain in the ischemic upper limb function exceeded 40 %, this being quite enough for a medico-social adaptation of this patient category.

Date: 2011-09-07
Session: Hand - Miscellaneous
Time: 16:30 - 18:00
Room: Club D

Abstract no.: 29039

AMPUTATION OF THUMB IS A VERY SEVERE DISABILITY

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Today reimplantation is done by microsurgical procedures. In case reimplantation is not possible a new digit to be opposed to remaining fingers must be created either by lengthening of a stump of thumb or by the Morrison procedure of wrap around or transferring a toe to hand. Other ancient techniques are not anymore in use. A procedure that does not require microsurgery and can give a good neo-thumb is pollicisation i.e. the transfer of a finger to the place of the lacking thumb. The easier technique is the transfer of the index finger that can be done with various techniques according to the length of the thumb stump and to the preference of surgeons and patients preserving the 3rd phalanx or amputating it. The 3rd phalanx preservation gives a 3 phalanx neo-thumb which will be longer and slimmer than the controlateral thumb and will also have 2 flexor tendons. The amputation of the 3rd will produce a neo-thumb of normal size with only one flexor tendon but without nail. The of the A. is the second option that even without nail has a better function. In case of missing index the transfer of the ring finger is the second option. Technical details are given and a series of 54 pollicisation since 1956 is presented.

Date: 2011-09-07
Session: Hand - Miscellaneous
Time: 16:30 - 18:00
Room: Club D

Abstract no.: 29979

DIABETIC HAND PROBLEMS

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A retrospective review of hand infection cases for the period of 2006-2010 was performed. We studied 37 patients with diabetic hand infection. The average age was 62 (23-87). 54% were male and 46% were female. 10 patients required insulin injection of which 27 was initially on oral medication. Out of these 27, 5 needed to switch to insulin injection during hospital stay. 15 patients (40%) had polymicrobial infection. Out of 15 patients; 11 patients (73%) required multiple amputation. 4 patients (27%) required digital amputation. 13 patients (35%) had superficial infection while 24 patients (65%) had deep infection. Out of these 24 patients with deep infection, 19 (79%) required digital amputation. There was no proximal amputation. Deep infection results in significantly prolonged hospital stay (average 16 days). Key points in management include □ Proper glycaemic control to decrease immunopathy □ Proper immobilization during acute infection to slow down spread of infection and control edema □ Early aggressive antibiotic management to cover mixed growth □ Aggressive exploration and radical repeated debridement to control infection □ Digital amputation should be considered early if the digit is not able to achieve reasonable function □ Start hand rehabilitation early and keep non-infected part mobile

Date: 2011-09-07

Session: DGU: Trauma Prevention - Road Traffic Accidents

Time: 10:30 - 12:00

Room: Club E

Abstract no.: 30308

THINKAUTO - INDO-GERMAN INITIATIVE DEDICATED TO URBAN ROAD SAFETY

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Developing countries such as India suffer disproportionately from road traffic crashes and injury. The first part of the presentation will review the current status of road safety research and the impact of crashes and injury to the individual, the Indian society, and the Indian health system. In the second part, the authors present a binational interdisciplinary initiative that aims at contributing to the goals set within the "Decade of Action for Road Safety 2011-2020".

Date: 2011-09-07

Session: DGU: Trauma Prevention - Road Traffic Accidents

Time: 10:30 - 12:00

Room: Club E

Abstract no.: 30309

ATV RIDING IN GERMANY: LI: E ENDANGERING FUN?!

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Quads or all-terrain vehicles do not seem to play a major role either in traffic accidents or in hospital admissions in Germany. However, reports about spectacular quad crashes in the press are not infrequent. In contrast, no scientific survey or study regarding the issue of quad crashes in Germany has been published so far. At a level I trauma centre, data from accident and hospital records of quad drivers were analysed focusing on the following parameters: injury type, localisation and mechanism, treatment details, abbreviated injury scale (AIS) score, collision speed, and other technical parameters. Comparisons to motorcycle accidents were performed. During a five-year period, there were ten admissions of quad drivers out of around 11000 emergency trauma patients (0.1%). One patient died, only two recovered fully. The accident research data bank revealed 14 cases of quad accidents out of 18990 (0.1%). The most frequent injury mechanism was a collision with a car. The upper extremity was the predominant injured region (AIS 0.7), while it was the lower extremity for motorcyclists (AIS0.91). Although the absolute incidence of quad accidents in Germany is low, they pose a relatively high risk for severe injuries. Possible additional measures to prevent a rise in quad accidents could be the total prohibition of alcohol consumption for quad drivers as well as special courses or driving licenses or an increase of the legal age for driving quads.

Date: 2011-09-07
Session: Road Trauma
Time: 14:00 - 15:30
Room: Club E

Abstract no.: 29060

ENDOSCOPICALLY-ASSISTED RAISING OF THORACODORSAL FREE FLAPS

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¹GIUV MO RF, MOscow (RUSSIA), ²PMGMU im. I.M. Sechenova, Moscow (RUSSIA)

Latissimus dorsi and serratus anterior free flaps are used more often than other flaps to reconstruct soft tissue defects. The main disadvantage of these flaps is donor-site morbidity. A possible solution to this is the endoscopically-assisted harvesting. We performed an anatomical study (15 cadavers, 30 dissections) investigating variant anatomy of thoracodorsal artery and its branches. Optimal portals and approaches for endoscopically assisted dissection of the blood vessels were identified. The appropriate incision located at the anterior border of the latissimus dorsi muscle with the center located at the level of scapula's inferior angle should be 5 cm long. That was enough in all cases of variant anatomy we have met. Endoscopically-assisted raising of thoracodorsal flaps was performed in 12 patients (9 – latissimus dorsi and 3 – serratus anterior flap) to treat soft tissue defects of the heel. The results were compared with the traditional open technique (19 patients). Mean time of harvesting in endoscopically-assisted group was 112min (91min in the traditional group, $p < 0.05$). Blood loss was equal in both groups (1040ml intra/op and post/op summary, $p > 0.05$). Mean DASH score 6 months post operation was 41 in the miniinvasive group and 52 in the traditional group ($p < 0.05$). At the 12 months post operation there were no significant differences between groups by the DASH score, but patients in endoscopically group were much more satisfied with the cosmetic results. With the use of minimally invasive operation techniques it is possible to reduce donor-site morbidity.

Date: 2011-09-07
Session: Road Trauma
Time: 14:00 - 15:30
Room: Club E

Abstract no.: 28493

COMPARISON OF SURGICAL TRAINING BETWEEN SOUTH AFRICA AND THE UK

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Aim: The European Working Time Directive [EWTD] has impacted on the operative experience of surgical trainees. Despite remedial approaches to protect core competencies, operative experience, particularly in emergency operations, may be affected. The aim of this paper was to compare the surgical exposure of first year registrars - One in United Kingdom [UK] and one in South Africa [SA] **Methodology:** Retrospective audit of personal logbooks for two first year trainees one South African and one British. **Results:** In a 1 year period there were more than 100 orthopaedic operations were performed in SA when compared with the UK. In addition to the orthopaedic operating, more than 50 laparotomies, 50 cesarean sections, 50 split skin grafts and 24 above knee amputations as the surgeon at night is expected to deal with basic general surgical emergencies. The majority of the SA cases were emergency/trauma cases with only 10 'elective' cases logged In South Africa, all patients were managed by the operating surgeon pre and post-operatively allowing a continuity of care in the junior tiers. In the UK pre and post-operative care was managed according to shift patterns. In SA the Doctors perform 24 hour on calls with a shortened day following the on call. **Conclusions:** Despite remedial action and hard work by trainers, operative experience of surgical trainees in the UK, has been affected by the EWTD initiatives and this has implications for future patient care. This audit suggests that experience gained abroad is valuable, and flexibility in the training system to allow a period of training elsewhere may be useful both for the trainee and patients. One possibility is a transfer scheme with SA, where UK graduates would gain valuable trauma experiences and the SA counterparts would benefit from greater exposure to elective operating.

Date: 2011-09-07
Session: Road Trauma
Time: 14:00 - 15:30
Room: Club E

Abstract no.: 29695

TRAUMA PATTERN & IMPACT OF EARLY REHABILITATION, AN EXPERIENCE OF KASHMIR (INDIA) EARTHQUAKE

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Background: The Kashmir earthquake also known as South Asia Earthquake, hit Jammu & Kashmir (India) on 8th October 2005 (registered as 7.6 on Richter scale). After any earthquake, the injuries need to be addressed, right in time, for better restoration. Other important thing is to make & keep a database for all types of injuries. This study is one such effort to get database of earthquake injury, an insight into the types, magnitude and pattern of injuries following an earthquake and the rehabilitative services offered. The study analyses and critically examines the issues of management. Material & Method: This study was conducted by National Institute for the Orthopaedically Handicapped (NIOH), Kolkata in collaboration with Department of Community Medicine, SKIMS Medical College, Srinagar (Kashmir, India). Earthquake victims admitted in various hospitals of Srinagar and around it was taken as material for study. Result & Conclusion: Total 429 victims (admitted in different hospitals of Srinagar & around it) were registered for study. 266 were traced out during follow up. Majority of injured were females of low socioeconomic group, due to collapse of pucca (stone) house. Majority had injuries of limb followed by spine. Result of early rehabilitation in terms of appropriate aids/ appliances was found to be satisfactory in 70%. In any event of earthquake, what is important is the scale and speed with which the administration responds to save and restore the precious lives, infrastructure and brings back the normalcy.

Date: 2011-09-07
Session: Road Trauma
Time: 14:00 - 15:30
Room: Club E

Abstract no.: 29993

SAHER TECHNOLOGY'S EFFECT ON INJURY SEVERITY SCORE (ISS) AMONGST NGH POPULATION

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Introduction: Deaths and injuries due to motor vehicle accidents (MVAs) are a rapidly growing public health concern. General Directorate of Public Security stated the number of traffic accidents last year reached 485,931. Over 60 percent of road accidents were caused by reckless driving. Thus, the Saher system, an automated traffic control and management system, was implemented. This study aims to evaluate the effect of the system on the injury severity scores (ISS) of trauma cases admitted to National Guard Hospital (NGH) due to motor vehicle accidents. Methodology: Medical records of subjects, who were involved in MVAs from April through June during 2007 to 2010, were reviewed from trauma registry of the NGH. Patients who were deceased on arrival, died in the ER, or admitted to the hospital were included in this study. However, the study did not include subjects who were treated and discharged through the ER, for they had no available medical records in the trauma registry. The 378 subjects were divided into 2 groups; pre (2007-2009) and post saher (2010). Results: 85.4% of the study subjects were males while 15% were females. The mean age was 29 years. There was no significant change in severity levels before and after Saher utilization i.e. ISS $p= 0.89$ and GCS $p = 0.67$. Discussion: Data suggest that Saher system did not aid in preventing disability and death resulting from MVAs. However, with the relatively small sample size, further long term studies should be conducted.

Date: 2011-09-07
Session: Road Trauma
Time: 14:00 - 15:30
Room: Club E

Abstract no.: 29978

DEVELOPING COUNTRIES NEED MOTOR CYCLE SAFETY STANDARDS

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Background: Mortality and morbidity figures due to road traffic accidents are significant in South East Asian countries. Motor cycles associated road traffic accidents are a major contributing factor. Problems related to the road safety and human factors are main identifiable factors related to it. Quality and safety standards of motor cycles which are using in this region are questionable. Objective: To identify the incidence of motor cycle injuries, pattern of injuries, contributing factors and factors related to quality and safety standards of motor cycles. Assess the adequacy of Sri Lankan safety standards for motor cycle registration and maintenance. Method: Prospective longitudinal study with a questionnaire survey among the motor cycle victims admitted to the National Hospital of Sri Lanka. Results: Motor bike injury victims contribute 50.53 % to the total road traffic accident victims. Motorcycles contribute to 52.27% Of total vehicle population (2009). Identified pattern of injuries and associated factors were discussed and compared with the regional and western countries. Problems related to the quality and safety standards of motor cycles were identified. Some commercial brands are more associated with certain mechanical failures which were related to safety standards. Conclusion: There are identified preventive factors for motor cycle injuries in Sri Lanka. Safety standards of motor cycle registration should be reevaluated in the country. Affordable international safety standards have to be introduced and implement from the manufacturers at least for the South East Asian region.

Date: 2011-09-07
Session: Road Trauma
Time: 14:00 - 15:30
Room: Club E

Abstract no.: 29850

IS DRIVING SAFE WITH UPPER LIMB PLASTER CASTS?

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The purpose of this study is to evaluate whether it is safe to drive with an upper limb immobilised in a plaster cast. The vehicles used were a manual geared right-hand drive with power steering and an automatic geared right-hand drive with power steering. Test drives were done in a standard track which is closed to traffic for a duration of twenty minutes. We assessed driving ability with two most common type of upper limb plaster cast: Scaphoid cast and Colles cast. One right handed, and one left handed volunteer driver was finished the test drives. All test drives were done in a sequence of normal (without immobilisation), right and left hands immobilized, and manual and automatic geared vehicles respectively. Each driver subjectively rated their driving abilities (right turn, left turn, U turn, gear change, panel control and back drive) between 0-10 separately. Resultant score is compared according to gear option, dominant extremity, type of cast and body side. There is no significant difference between automatic and manual geared vehicles ($p=0.442$). Dexterity have no effect on driving abilities ($p=0.878$). Colles and Scaphoid casts have statistically similar scores ($p=0.234$). Left sided casts significantly decreases the driving abilities compared to right ($p=0.001$). Control test drives were significantly higher than all type of immobilised test drive scores ($p=0.000$). Conclusions: Driving with upper limb plaster casts significantly decreases the driving abilities. Patients should be warned that driving with upper limb plaster cast is unsafe.

Date: 2011-09-07
Session: Road Trauma
Time: 14:00 - 15:30
Room: Club E

Abstract no.: 29419

THE EFFECT OF KNEE / ANKLE IMMOBILISATION ON BRAKE REACTION TIME

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Introduction: The aim of the present prospective comparative study was to evaluate the effect of knee / ankle immobilisation on the Brake-reaction times in healthy individuals. Methods & Materials: Twenty-three healthy drivers performed a series of emergency brake tests in a driving simulator having applied above knee plaster casts, below knee plaster casts, or a knee brace with increasing restriction. Results: Our study showed that compared to braking normally, total brake reaction time was significantly longer when wearing an above knee plaster cast, below knee plaster cast or a knee brace with zero degrees of freedom ($p < 0.001$). Increases in movement time from accelerator to brake accounted for some of the increase in the total brake reaction time. However, unexpectedly thinking time also increased with the level of restriction ($p < 0.001$). Conclusion: This study suggests that all patients wearing a plaster cast or knee brace are significantly impaired in their ability to perform an emergency stop. We suggest changes to the legislation that prevents patients driving with lower limb plaster casts or knee braces. It also provides evidence for guidance of such patients on safety to return to driving.

Date: 2011-09-07
Session: Road Trauma
Time: 14:00 - 15:30
Room: Club E

Abstract no.: 30003

RSA EVALUATION OF AN IMPLANT SYSTEM FOR ABOVE THE KNEE AMPUTEE PATIENTS

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Introduction: Treatment of high, above the knee amputees is complicated by the difficulty or inability to properly use conventional socket prosthesis. This study reports on the outcome of a transdermal, femoral implant system for the treatment of these difficult cases. Methods: Fifty one patients with high above the knee amputations were enrolled into an RSA study. RSA and plain radiographs were obtained at 6 months, 1, 2, 5, and 7 years after surgery. RSA films were analyzed using UmRSA software (RSA Biomedical, Umea, Sweden). Plain radiographs were graded for bone incidences in defined zones around the implant. Results: Analysis from the UmRSA software showed that the median \pm standard error of the proximal/distal migration of the implant was -0.01 ± 0.01 mm at 1 year; -0.01 ± 0.02 mm at 2 years, -0.02 ± 0.06 at 5 years, and -0.02 ± 0.05 mm at 7 years. The median \pm standard error of the rotational movement was -0.10 ± 0.16 degrees at 1 year; -0.08 ± 0.17 degrees at 2 years; 0.42 ± 0.32 degrees at 5 years; and 0.38 ± 0.34 degrees at 7 years. There was no significant difference at any follow up time. Plain radiographic grading between the Post-op and 2 year films showed that the greatest incidence was cancellization as it appeared in 58% of patients primarily in the medial and posterior zones; 34% of patients showed cortical thinning; 22% of patients showed trabecular streaming. Discussion: The OPRA system is a promising new technique for addressing the difficult prosthetic challenges faced by patients with high, above the knee amputations.

Date: 2011-09-07

Session: Natural Disasters - Amputation: When, How and After

Time: 16:30 - 18:00

Room: Club E

Abstract no.: 30350

AMPUTATION: HOW TO FACE CHALLENGING PROBLEMS IN A PRECARIOUS ENVIRONMENT

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Indications for amputation in natural disasters are not the same compared to our daily practice. They must be determined by those with great surgical experience and good knowledge of military or disaster surgical doctrine. Unfortunately, nowadays few surgeons have this experience. In fact, some volunteer surgeons may be interested in providing care for civilian victims of war or disaster in developing countries. However, there are significant differences between the type and the management of cases seen in this context versus those seen at home. The problems of amputations cannot be solved schematically. Amputation will depend on several factors: the form of warfare or disaster, the conditions for surgery, the skill of surgical team and the experience of the surgeon, the length or duration of the mission. Here is a schematic showing the three main situations: civilian practice, war practice, and disaster context. These three different situations require different strategies for treating the wounded, and for making amputation decisions. In case of a natural disaster, there are many wounded civilians, they arrive at the medical facility late and there is usually only one surgeon and a single, limited, medical facility to provide all treatment. He must make quick, wise choices, economizing limited blood supplies and the use of surgical procedures. The decision to proceed with limb salvage or amputation for patients with severely injured limbs will be a source of continued debate. Amputation, radical and irreversible intervention, is a frequent and essential procedure in the disaster context and one of the standard means to successful treatment of limb wounds. We propose to reflect to the following questions: why to amputate, how to perform amputation under these conditions, and how to pass on a doctrine to the voluntary surgeons who lack experience in disaster context.

Date: 2011-09-07
Session: Navigation
Time: 14:00 - 15:30
Room: Club H

Abstract no.: 29672

ROLE OF THE COMPUTER NAVIGATION IN ACHIEVING IDEAL MECHANICAL AXIS OF TKR

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Mechanical axis of knee replacement (TKR) is essential for ideal function and durability of components. Axis deviation of more than 5dg increases mechanical wear of polyethylene and results in early replacement loosening. Maximal durability is achieved with mechanical deviation of no more than 3dg. It is also essential to ballance soft tissues in extension and flection. If the resection deviates from the mechanical axis, ligament ballancing is also improper and the risk of instability and wear of components is higher. Computer model is unique for each patient and is more precise compared to standard instruments. Furthermore computer navigation allows surgeon to have more control during the procedure. We compared the computer navigation to standard procedure and assumed that the computer navigation is more precise in achieving the ideal machanical axis and soft tissue ballancing. 50 computer-navigated TKR's were performed and compared to 50 standard procedures. Differences of mechanical axis on X-ray were evaluated. When using computer navigation our average deviation of mechanical axis was 1.1 degrees, with maximum of 2.7dg, while deviation during standard procedure was 2.1dg with maximum of 4.8dg. The advantage of computer navigation is in higher accuracy of soft tissue ballancing and precise bone resections. Ability to implant TKR is higher if the surgeon is more expirienced, computer navigation however enables even less skilled or expirienced surgeons to produce good results. But it is essential for surgeons to fully understand principles of computer navigated surgery to achieve good results.

Date: 2011-09-07
Session: Navigation
Time: 14:00 - 15:30
Room: Club H

Abstract no.: 29416

NAVIGATION SURGERY AS A UNIFYING ELEMENT TO OPTIMAL FINAL MECHANICAL AXIS IN KNEE REPLACEMENT AMONG NOVEL SURGEONS

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The end result of a knee replacement is conditioned by adequate bone resection, orientation of components and consistency and symmetry of soft tissue in flexion-extension gap. All these parameters are dominated by the progressive surgical experience of the surgeon but require a large learning curve that is not always possible. The progressive incorporation of navigation systems in prosthetic knee surgery has allowed novel surgeons to achieve the same results in alignment and soft tissue balance than those more experienced surgeons. The starting up of our hospital has allowed us to investigate this aspect. We present a retrospective cohort of 121 PTR (LPS Columbus Braun Aesculap) implanted in our center since its opening all of them assisted by surgical Orthopilot Navigator. The average age of the series is 73 + - 6.45 years, mean weight 78 + -11.65 kg and mean height 154 + -8.19 cm. As a discriminating variable is considered the previous surgical experience of the surgeon: 1) at least 1 year (33.71% operated knees), 2) 1-2 years (24.72%), 3) between 2-4 years (10, 11%) and 4) with more than 4 years (30.34%). The four groups are comparable to preoperative baseline characteristics of patients. In all cases we achieved optimal postoperative mechanical axis (+ -3 °), being no statistically significant differences between any of the groups. We therefore believe that the use of navigation system has consistently yielded optimum mechanical axes regardless of the surgeon's experience and is a powerful teaching tool that shortens the learning curve.

Date: 2011-09-07
Session: Navigation
Time: 14:00 - 15:30
Room: Club H

Abstract no.: 29199

ROTATIONAL ALIGNMENT OF DISTAL FEMUR IN COMPUTER ASSISTED TOTAL KNEE REPLACEMENT (TKR)

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Rotational alignment of the femur in TKR is usually referred to the bone landmarks in the conventional measured resection technique (femur first) or to the flexion-extension gap in the gap balancing technique (tibia first). Both techniques could lead to undesirable rotation of the femoral component, especially in knees with significant pre-operative leg axis deviation, causing patella mal-tracking and joint instability especially in flexion. Using computer assisted surgery (CAS) rotational alignment may be achieved combining data related to the bone morphing of the distal femur to flexion gap balancing data. Aim of this study was to examine the influence of the pre-operative leg axis on the rotation of the femoral component and the symmetry of the flexion gap after TKR using CAS. Femoral component rotation, varus-valgus laxities at 0° and 90° degrees of flexion were measured intra-operatively in 144 patients. The outlier of soft tissue balancing was defined as a gap difference >3 mm between the medial and lateral sides. A mean external rotation of the femoral component of 0.5° was achieved with a positive correlation of the preoperative leg axis with the rotation of the femoral component. A greater external rotation of 2.9° was detected in pre-operative valgus knees. Medial or lateral outliers in extension or flexion were observed in 12% of TKR. Navigation-assisted soft tissue balancing in TKR allowed the reduction of not only the post-operative alignment outlier, but also the flexion gap differences achieving a more rectangular flexion and extension gap especially in medial osteoarthritic varus knees.

Date: 2011-09-07
Session: Navigation
Time: 14:00 - 15:30
Room: Club H

Abstract no.: 30024

COMPARISON OF FUNCTIONAL AND RADIOLOGICAL OUTCOMES AFTER COMPUTER-ASSISTED VERSUS CONVENTIONAL TOTAL KNEE ARTHROPLASTY: A MATCHED-CONTROL RETROSPECTIVE STUDY

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Purpose: The aim of our study was to compare the radiological and functional outcomes of patients in total knee arthroplasty (TKA) using computer-assisted navigation system and the conventional technique. **Methods:** Two groups of 50 patients each underwent either computer-assisted or conventional TKA were retrospectively studied. Patients were matched according to body mass index (BMI), gender, and their age. In the computer-assisted (18 men and 32 women) and conventional (17 men and 33 women) groups respectively, the mean patient ages were 69 and 71 years, and the mean BMIs were 30 and 32 kg/m². Three senior orthopaedic surgeons with comparable experience performed all surgeries, using Aesculap's OrthoPilot® Navigation system and Columbus® knee prostheses. The surgical approach, peri-operative and post-operative regimens were the same in both groups. The mechanical axis and the tibial and femoral angles were measured using standardised long-leg weight-bearing radiographs and computed tomography (CT) scan. Overall function was assessed using the Short Form-12 (SF-12) and International Knee Society (IKS) scores. Patients were followed up at 6 weeks, 3 months, 6 months, and yearly thereafter. **Results:** No intra-operative technical difficulties were encountered in either group. The computer-assisted group resulted in more consistent and accurate alignments in both the coronal and sagittal planes and better SF-12 and IKS scores. In obese patients (BMI≥30 kg/m²), computer-assisted TKA provided better alignment than the conventional technique. **Conclusion:** Computer-assisted TKA improves implant positioning, limb alignment, and overall functional outcome. It may be particularly advantageous for obese patients.

Date: 2011-09-07
Session: Navigation
Time: 14:00 - 15:30
Room: Club H

Abstract no.: 28687

COMPUTER ASSISTED TOTAL KNEE ARTHROPLASTY USING EM NAVIGATION, CASE SERIES OF INITIAL EXPERIENCE

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Introduction: Computer assisted total knee replacement has been reported to improve the accuracy of components alignment in total knee arthroplasty .This study presents initial 30 procedures in which Electromagnetic (EM) computer assisted total knee arthroplasty was used by the author. Methods: A case series of the initial 30 consecutive patients who underwent computer assisted total knee arthroplasty using EM (Electromagnetic) navigation for osteoarthritis of the knee from February 2008 to July 2008 made the study group. All operations were performed by the author. There were 13 males (43%) and 17 females (57%).The mean age was 70 years and mean deformity was 3° varus. The implant used in all patients was Zimmer Nexgen total knee prosthesis. A Medtronic AxiEM for navigation guidance platform was used. Results: The coronal alignment for both the tibial and femoral components was within 3° of 90° to the mechanical axis for all patients. The mean tibial component coronal alignment was 90.55 (range 87.5 – 93) and the mean coronal femoral alignment 90.25 (range 88 – 93. Tourniquet time averaged 75 minutes (50 – 110 minutes). The mean length of hospital stay was 5 days (range 3-7 days). Discussion and conclusion: These 30 consecutive cases of CAS TKA using EM navigation study demonstrate accurate component alignment with no complication directly related to the technique. Without the line of sight issues seen in the optical systems, relative freedom in the operative field, EM appears to be a reasonable alternative in computer assisted total knee arthroplasty.

Date: 2011-09-07
Session: Navigation
Time: 14:00 - 15:30
Room: Club H

Abstract no.: 28692

**UNICOMPARTMENTAL KNEE ARTHROPLASTY (UKA) REVISIONE
USING COMPUTER ASSISTED TECHNIQUE**

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Uni-knee represents a fascinating solution for medial or lateral knee osteoarthritis also in young people; nevertheless early aseptic loosening isn't rare. When a UKA requires revision, the best outcome is achieved when it is converted to a TKA. Particularly challenging at the revision surgery is to achieve a correct lower limb alignment, a correct rotation of the distal femur with a good patellar tracking and a healthy bone support for the implants. Goal of this study was to evaluate the usefulness of computer assisted surgery (CAS) in UKA revision. From 2008 to 2010, 12 consecutive knees with a failed UKA underwent conversion to TKA. The most common mode of failure was tibia plateau collapse (6 patients). All UKA were converted to primary cruciate sacrificing components. We have performed the revision surgery following the same steps as in a primary implantation with a procedure based on a bone morphing acquisition performed on the surface of the original implants, followed by a dependant bone cut sequence. Twenty-five percent of patients had contained defects on the femoral condyle that required bone graft. Forty-two percent of patients had contained defects on the tibia that required bone graft. Metal wedge augmentation and stems were required in two knees. All the patients were followed for an average of 14.5 months. Full weight bearing X-ray exams were performed to evaluate lower-limb alignment. Knee Society knee scores and functional scores at latest follow-up were 93 and 78, respectively. Conversion of a failed UKA to a TKA is technically demanding, but may be done successfully with CAS technique. Use of the navigation system in UKA revision surgery allows for precise alignment of components, balance of the gaps, and filling of the bony defects by facilitating selection of appropriate implant sizes and wedges.

Date: 2011-09-07
Session: Navigation
Time: 14:00 - 15:30
Room: Club H

Abstract no.: 29953

3D- BASED NAVIGATION AT INTERVENTIONS OF THE CERVICAL AND THORACIC SPINE- BENEFIT OR WASTE OF TIME- RESULTS OF 449 PLACED SCREWS

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BACKGROUND: This study analyses the experiences with 3D-based navigation in the posterior cervical and high thoracic spine after two years of use. **METHODS:** A 3D-C-Arm (Ziehm) was connected with a navigation system (Brainlab) and since 10/2007 used for the placement of overall 449 Screws at 66 Patients. 9 Patients had to undergo operations in the cervical and 53 at the thoracic spine. Indications were traumatic fractures, spondylodiscitis and metastases. **RESULTS:** Scan-time took 60 seconds on average. Application-time needs approx. 6 minutes [5;18]. In total 352/449 (78,4%) screws could be inserted navigated, 270/449 (60,1%) were controlled intraoperatively. Regarding the cervical spine in 86,76% (59/68) of the screws the navigation procedure was uneventful. Positioning of 63,2% (43/68) of the screws was checked immediately postoperatively. In the upper thoracic spine 77% (293/381) could be placed with navigation, 59,6% (227/381) were controlled intraoperatively. Occasionally we experienced technical problems. Correct placement was seen for each screw, thus correlating well with the intraoperative findings. **CONCLUSIONS:** The application of the combination of intraoperative 3D-imaging and navigation is technically feasible and reliable in clinical use. User- and software-dependant sources of error could be solved during the first course of the series. Image-quality is depending on individual bone density, and possible metal artifacts. Additionally, it has the advantage of skipping preoperative acquisition of data as well as the matching-process. Exposure to radiation is reduced due to the possibility of sparing postoperative CT.

Date: 2011-09-07
Session: Navigation
Time: 14:00 - 15:30
Room: Club H

Abstract no.: 27040

ANATOMICAL TIBIAL AXIS DEFINITION FOR COMPUTER GUIDED ANKLE REPLACEMENT SURGERY

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Aim: To determine an algorithm to define the anatomical axis of a 'normal' tibia in the coronal plane and to assess the clinical application of this algorithm to facilitate accurate alignment of the tibial component of a Total Ankle Replacement. **Methods:** Twenty full-length AP radiographs of 'normal' tibiae were obtained and the anatomical axis defined. The lateral prominence of the fibula head and the medial prominence of the tibial plateau were defined and the ratio of the distances between these two landmarks and the anatomical axis of the tibia calculated. **Results:** Univariate analysis of the ratio of the defined distances revealed a mean value of 1.25 (95% CI: 1.19-1.31, Range: 1.02 -1.47). A Shapiro-Wilk test of normality (P-Value: 0.879) does not reject the null-hypothesis, whilst the linearity of the Q-Q plot suggests that the data follows a normal distribution. Application of the algorithm to human tibiae, conforming to forensic anthropological measurements, would result in an alignment of the tibial plafond component between 0.55° of varus to 0.42° of valgus for axes at the extreme of the observed range. Misidentification of the anatomical landmarks by 15mm would, in the worst case scenario, create a 1.23° valgus mal-alignment of the tibial plafond component. **Conclusions:** Despite the observed variation in the value of the ratio the resultant varus/valgus mal-alignment of the tibial plafond component is less than 1°. This algorithm is a valuable adjunct in achieving accurate component alignment in Total Ankle Replacement.

Date: 2011-09-07
Session: Navigation
Time: 14:00 - 15:30
Room: Club H

Abstract no.: 30168

**A NEW CLASSIFICATION SYSTEM FOR COMPUTER ASSISTED
ORTHOPAEDIC SURGICAL TECHNIQUES**

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Computer assisted orthopaedic surgery (CAOS) is an emerging and expanding field. There are some old classification systems that are too comprehensive to cover all new CAOS tools and hybrid devices that are currently present and others that are expected to appear in the near future. Based on our experience and on the literature review, we grouped CAOS devices on the basis of their functionality and clinical use into 6 categories; robotics, navigation, hybrid, templating, simulation and tele-surgery. Then we sub-grouped on technical basis. For example, templating is divided into guide or tool and simulation is divided into planning simulators, augmented reality and virtual reality. In future, new devices can be added under new categories or subcategories. This grouping scheme is meant to provide a simple guide on orthopaedic systems rather than a comprehensive classification for all computer assisted systems in surgical practice. For example, the number and diversity of tasks of surgical robots is enormous, up to 159 surgical robots with different mechanisms and functions reported in the literature. These can be classified according to their tasks, mechanism of actions, degree of freedom and level of activity but for the purpose of simplicity we subcategorised the orthopaedic robots to only industrial, hand-held and bone-mounted.

Date: 2011-09-07
Session: Spine - Cervical
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 27768

POSTERIOR OCCIPITOCERVICAL FUSION IN RHEUMATOID ARTHRITIS OF UPPER CERVICAL SPINE - ANALYSIS OF OUR RESULTS

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OBJECTIVE: To determine the final outcome of patients with upper cervical rheumatoid arthritis treated by occipitocervical fusion. **SUMMARY OF BACKGROUND DATA:** There are few studies in the literature reporting the final outcome of patients with rheumatoid arthritis treated and observed for longer period by occipitocervical fusion. **Methods:** We conducted a retrospective study of patients who had posterior occipitocervical fusion for upper cervical spine rheumatoid arthritis between January 2001 and June 2009. The patients were assessed for pre- and postoperative neurologic status (Ranawat classification), radiological examination, fusion, and hardware complications. All the patients underwent posterior decompression / occipitocervical stabilization and fusion using rigid occipital screws/plate and rod construct. Intra-operative SSEP were monitored. **Results:** During the study, 11 women and 8 men with rheumatoid arthritis underwent occipitocervical fusion. The average age was 70 years, and the mean follow-up was 39 months (range: 7 months – 102 months). Five out of eight (26%) nonambulatory patients gained ambulatory status after surgery. The Ranawat neurologic grade II and above improved at least by one grade in 15 out of the 18 patients (83.3%). No patient had neurological deterioration in the postoperative period and follow-up. One patient had a superficial wound infection. There were no hardware complications. **Conclusion:** Although occipitocervical fixation is technically challenging and demanding, it remains a viable option with favorable results especially in non-ambulatory patients. Based on the results from our study, we believe that posterior occipitocervical fusion in patients with advanced rheumatoid arthritis improves myelopathy, and hence the prognosis of bed-bound patients.

Date: 2011-09-07
Session: Spine - Cervical
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 29481

A PROSPECTIVE RANDOMIZED STUDY OF CLINICAL OUTCOMES IN ELDERLY PATIENTS WITH CERVICAL SPONDYLOTIC MYELOPATHY TREATED WITH TWO TYPES OF FRENCH-DOOR LAMINOPLASTY

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Introduction: A French-door laminoplasty has been used hydroxyapatite (HA) spacer to maintain the expansive spinal canal and reattach the posterior elements (LAP-A). It is still unknown if use of HA spacer and the reattachment affect clinical outcomes in elderly patients with cervical spondylotic myelopathy (CSM). We prospectively compared clinical outcomes of LAP-A and a simple French-door laminoplasty through splitting spinous processes approach without peeling off the paravertebral muscles (LAP-B). Methods: After informed consent was obtained from 42 patients with CSM (Age at surgery \geq 65 years old), they were randomized into two surgical groups LAP-A and LAP-B. The following criteria were evaluated: operation time, blood loss, complications, axial pain, the Japanese Orthopaedic Association Cervical Myelopathy Evaluation Questionnaire (JOACMEQ), changes of cervical lordosis and position of HA spacers. Results: Although mean operation time was same in both groups, mean blood loss in the LAP-B group was statistically less than that in the LAP-A group. There were no perioperative complications. Five patients in the LAP-A group, however, showed neurological deterioration due to HA spacer dislodgement. There were significant improvements in axial pain, cervical spine function and QOL of the JOACMEQ subscales in the LAP-B group, compared with those in the LAP-A group. Cervical lordosis was maintained in both groups. In the LAP-A group, laminar bone resorption and HA spacer dislodgement were observed in 18 and 12 patients, respectively. Conclusion: HA spacer and reattachment of the posterior elements in the LAP procedure might result in poor clinical outcomes in the elderly CSM patients.

Date: 2011-09-07
Session: Spine - Cervical
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 28463

CRANIOCERVICAL FLEXORS ENDURANCE TRAINING: TREATMENT APPROACH FOR CERVICAL SPONDYLOSIS

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Introduction: Disturbance in neck flexor synergy has been commonly observed in patients with neck pain. It presents as altered pattern of muscle activity and deep cervical flexors are compensated by increased activity of superficial neck muscles. It is hypothesized that morphological and joint kinematic changes in cervical spondylosis and can result in alteration of muscle recruitment patterns. Results of a pilot study suggested that patients with cervical spondylosis demonstrate poor performance on craniocervical flexion test. The study addresses the endurance related deficits and impairment in neck flexor synergy in patients with cervical spondylosis. Primary aims to study the efficacy of craniocervical flexor endurance training on pain and disability in patients with degenerative cervical spondylosis. The study hypothesizes that craniocervical flexor endurance training will improve pain and disability in comparison to conventional isometric training in patients with cervical spondylosis. Method: 24 patients between 30-70 yrs with history of cervical spondylosis were randomized into to conventional isometric training and Craniocervical Flexor Endurance Training groups. The study was approved by institute's ethical panel prior to commencement Results and discussion: At the end of six-week intervention, Craniocervical Flexor Endurance training revealed significant improvement in pain and disability scores in comparison to Conventional Isometric Training ($p \leq 0.05$). On within group analysis both exercise groups demonstrate significant improvement in both the parameters.

Date: 2011-09-07
Session: Spine - Cervical
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 27355

AN OBJECTIVE CASE CONTROLLED STUDY: DOES CERVICAL MUSCLE ADAPTATION IN MALE RUGBY PLAYERS AGED 13-18 OCCUR WHEN COMPARED TO AGE MATCHED CONTROLS?

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Background: Rugby is a physical game the most catastrophic of which is the Cervical spine injury (CSI), resulting in tetraplegia or even death. The adolescent cervical spine is affected in 60-80% of spinal cases compared to only 30-40% in Adults [1]. With a childhood cervical injury associated with up to a 75% mortality [2]. The biomechanics of children may play a role in the incidence of CSI Currently the Rugby Football Union guidelines differentiates between age alone and not strength Objective: The primary outcome goal is to investigate the cervical strength of adolescent rugby playing individuals versus age match controls. Methods: Rugby players were evaluated for their strength, using isometric contraction until eccentric failure. Results: Cervical circumference and strength is significantly stronger in rugby players versus age matched controls and also in 17-18 year old rugby players compared with their 14-16 year old counterparts $P < 0.05$. The difference in strength is not just age related but also sport specific as 17-18 year old controls were not significantly stronger than 14-16 year old rugby players $P > 0.05$. Conclusion: The results indicate that rugby players go through cervical adaptation and are stronger than age matched controls and increase in age alone does not produce increase cervical strength. Urgent RFU regulations need to be addressed before the coming season to make sure U16 players are not playing for U18 teams unless having both sufficient strength and skill.

Date: 2011-09-07
Session: Spine - Cervical
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 30026

A NOVEL TECHNIQUE FOR RESECTION AND STABILIZATION OF C2 DESTRUCTIVE LESIONS

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Introduction: C2 destructive lesions are usually treated with transoral resection and decompression and 2nd stage posterior stabilization. Difficulties include non-extensile anterior approach, inadequate anterior stabilization, high risk of infection and graft dislodgement and the need for prolonged external support or second stage posterior stabilization. We describe our experience in treating 7 patients through a one stage high retropharyngeal approach for resection and C1-3 stabilization using an inverted T plate. Methods: Seven patients (age range, 13 - 69 years), presented with Frankel Grade D to B neurological affection due to C2 destruction. After resection of the destroyed tissues and decompression of the spinal cord through an anterior high retropharyngeal approach, a tricortical iliac crest graft is fashioned to support the anterior arch of C1. Then an inverted small T-plate is used to fix the anterior arch of C1 to C3 body with a screw in the graft. Follow-up duration ranged from 6 months to 2 years. Results: Biopsy proved metastatic adenocarcinoma (4), aneurysmal bone cyst (1), osteoblastoma (1), and tuberculous infection (1). Preoperative VAS improved from an average of 8.9 to 2.3 postoperatively. All patients showed marked neurological improvement. No graft dislodgement or stabilization failure was recorded. No operative or postoperative complications were recorded. One patient died 6 months postoperatively from advanced pulmonary metastasis. Conclusion: One-stage excision of C2 lesions and stabilization with an inverted T-plate through an anterior high retropharyngeal approach seems to be safer, easier, and less morbid, and achieves better stability than transoral resection.

Date: 2011-09-07
Session: Spine - Cervical
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 29947

PROGNOSTIC VALUE OF SIGNAL INTENSITY CHANGE IN CERVICAL SPONDYLOTIC MYELOPATHY

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The clinical significance of SI change remains controversial. The aim was to determine the MRI classification of SI changes in patients with CSM that is useful for prognostication of surgical outcome. We retrospectively studied 35 patients who underwent cervical laminectomy and met the inclusion criteria. Postoperative MRIs were performed at a mean of 51.3 months to assess resolution of preoperative signal changes. The pattern of spinal cord SI was classified into Group A (MRI normal/normal), Group B (MRI normal/high SI) and Group C (MRI low/high SI changes), low intensity intramedullary signal abnormality on T1WI and high-intensity intramedullary signal abnormality on T2WI. Preoperative clinical findings and MRI abnormalities were correlated with outcomes (Nurick scores, RR) after surgical intervention. Resolution of signal changes in T2WI was seen in most patients; however, four patients developed low SI in T1WI in the postoperative MRI. There was no significant difference in the recovery rates of patients with different grades in the T2WI or with focal or multisegmental SI changes. In contrast, patients with low SI changes in T1WI were associated with a poor surgical outcome ($p < 0.001$). The linear regression model confirmed the significance of low SI changes on T1WI as a predictor for surgical outcome. A classification system of MRI signal changes that accommodates both T1WI and T2WI is more predictive of surgical outcome than those that include T2W SI changes alone.

Date: 2011-09-07
Session: Spine - Cervical
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 30241

TREATMENT OF INJURIES OF UPPER CERVICAL SPINE

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Study is based on the analysis of the examination and treatment results of 214 patients with different lesions of cervical spine. There were 111 patient with upper cervical spine (C1-C2) and 103 with low cervical spine (C3-C7) injuries. There were 35 patients with odontoid fracture, 20 – Hangman fracture, 6 – old rotatory dislocation of C1, 2 – C2 dislocation, 3- C1-C2 combined injury, 3 – rupture of ligament complex C1-C2, 3 – Jefferson fracture, 1- eosinophilic granulema of C2 and pathological fracture. Neurological deficit has developed in 15 patients. There were 15 patients with fracture and dislocation of C3-C7 and 2 patients with eosinophilic granulema and pathological fracture of C5 and C4. Neurological deficit has developed in 6 patients. Halo-traction was applied in all patients with upper cervical spine injures. In 80 patients Halo-traction was used as a single method of treatment. Surgical stabilization in complex with halo-traction was performed in 31 cases. In 12 patients with C3-C7 injuries Halo-traction was used as a single method of treatment. In 5 patients we performed stabilizations of injured C3-C7 in addition to Halo-traction. In 5 cases transoral resection of odontoid process was performed. We achieved 85% of good results, 10 % - satisfactory results, 5% - poor results.

Date: 2011-09-08

Session: Hip - Resurfacing & Cemented THA

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 28794

HIP RESURFACING IN THE ELDERLY

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Introduction: There is no consensus on the upper age limit for patients to be treated with hip resurfacing (HR). Although gender is often a criteria, the most commonly used measure is age, with 65 years generally being the cut-off. In our practice, the indication for HR is primarily based on the patients' level of activity, regardless of age. In addition, to be eligible for HR, our patients must have a bone mineral density (BMD) T-score greater than -2.5 in the femoral neck. We report the outcomes and survival rate in a cohort of 145 patients above 65 years of age. Methods: The cohort comprised 105 males and 40 females. Mean patient age was 69.7±3.9 years (65-82). In 90 hips, the Birmingham Hip Resurfacing system was used, and in 55 hips the Adept Hip System. Two hips were fitted with acetabular cups comprising supplementary screw fixation. Mean follow-up was 4 years (2-9). Results: Mean acetabular component inclination angle was 44°. Mean valgus positioning of the femoral component was 6.6° compared to the femoral neck/shaft angle. To date, 3 patients have been revised (2%). Two hips were revised due to notching of the neck during surgery which resulted in a femoral neck fracture. One patient was revised because of a varus shift of the femoral component. The Harris hip score (HHS) was 96 points at follow-up. Discussion and conclusions: Hip resurfacing is a viable surgical indication for elderly patients who lead an active lifestyle and who have adequate BMD.

Date: 2011-09-08

Session: Hip - Resurfacing & Cemented THA

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 27799

HIP RESURFACING. WHAT WE LEARNED AFTER OUR FIRST 486 CASES

Manuel RIBAS¹, Carlomagno CÁRDENAS - NYLANDER¹, Rubén LEDESMA¹, Vittorio BELLOTTI¹, Enric CÁCERES¹, Oliver MARÍN²

¹University Hospital Dexeus, Barcelona (SPAIN), ²Hospital Universitario Infanta Leonor Madrid, Barcelona (SPAIN)

Introduction: promising clinical results of new metalonmetal hip resurfacing in young osteoarthritic patients have suposed its renaissance. Our experience in the first consecutive 486 cases is presented. Material and method: From 2003 to 2008 486 surface arthroplasties were implanted in 450 patients, 314 males and 136 females, mean age of 46,6 years (16 - 69). Data related to surgical time, intraoperative bleeding and collected blood in drains, component orientation, complications, Merle d'Aubigné-Postel score, WOMAC and HHS clínico-functional scores were registered. Statistical analysis was performed by means of chi-squared test (software SPSS, 13). Results: Mean surgical time was 1h 50' (1h 15' to 2h 30'), intraoperative bleeding 273,4 cc (210 – 360cc), drained blood 224,2 cc (180 – 380cc). CCD angle 139,7° (SD 130 - 147) and acetabular inclination 43° (SD 35° - 65°). There were 4 femoral neck fractures in the first year after surgery and one cup (65°), were revised. MDA score improved from 12,9 pts. preoperative (11 – 14) to 17,4 at latest follow-up (15 – 18) (p<0,001) , WOMAC from 46,2 (19 – 67) to 93,2 (79 – 100) (p<0,001) and HHS from 52,3 (range 42 – 60) to 96,7 (range 89 - 98) (p<0,001). Overall survivorship was 98,97%. Conclusions: hip resurfacing provides excellent clinico-functional results, comparable to non cemented total hip implants in the shortterm. For this reason, we think it is a very promising implant for young adults with well stablished hip osteoarthritis.

Date: 2011-09-08

Session: Hip - Resurfacing & Cemented THA

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 28824

FEMORAL HEAD AVASCULAR NECROSIS CAN BE SUCCESSFULLY ADDRESSED WITH HIP RESURFACING

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Introduction: The use of hip resurfacing (HR) to treat avascular necrosis (AVN) of the femoral head has been debated. Methods: Our single surgeon consecutive retrospective series included 48 patients (49 hips) with FICAT-ARLET III/IV AVN. The cohort consisted of 36 males and 12 females. Mean age was 46.6 ± 13.9 years (16-81). The Birmingham Hip Resurfacing system was used in 33 hips and the Adept Hip System in 16. At surgery, all the necrotic avascular bone was removed. Bone-deficient areas were augmented with bone chips harvested while reaming the socket and impacted onto the top of the femoral head. In 4 hips in which the femoral head had severely collapsed, the previous head length was restored using this technique. Results: The acetabular component was implanted with a mean inclination of 44° . The femoral component was implanted with a mean valgus of 6.7° compared to the femoral neck/shaft angle. Mean follow-up was 4 years (2-9). Two patients were lost to follow-up. To date, no patient has been revised. The mean preoperative Harris hip score (HHS) was 58, increasing to 98.8 at the last follow-up. Radiographically, the implants were stable and no bone rarefaction was visible. Discussion and conclusion: Our results show that HR is a viable surgical indication for AVN. We believe that the precision of the surgical technique, the accurate removal of dead bone and its replacement with bone chips, as well as the implantation of the femoral component in a slightly valgus position, are the major factors contributing to its success.

Date: 2011-09-08

Session: Hip - Resurfacing & Cemented THA

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 30187

LEARNED LESSONS IN OUR FIRST CONSECUTIVE 486 HIP RESURFACINGS

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¹USP - University Hospital Dexeus, Barcelona (SPAIN), ²Hospital Universitario Infanta Leonor, Madrid (SPAIN)

Introduction: Improvement in metal on metal bearings, excellent clinico-functional results have supposed the renaissance of the new hip resurfacing. We report the experience in the first consecutive 486 cases. Material and method: From 2003 to 2008 486 surface arthroplasties were implanted, with a mean age of 46,6 years (16 - 69). Data related to surgical time, intraoperative bleeding and collected blood in drains, component orientation, complications, Merle d'Aubigné-Postel score, WOMAC and HHS clinico-functional scores were registered. Chi-squared and Wilcoxon non - parametric test (software SPSS, 13) were used for statistical analysis. Results: Mean surgical time was 1h 50' (1h 15' a 2h 30'), intraoperative bleeding was 273,4 cc (210 - 360cc) and drained blood 224,2 cc (180 - 380cc). Mean CCD angle was 139,7° (SD 130 - 147) and acetabular inclination 43° (SD 35° - 65°). 4 femoral neck fractures, one infection and one too steep cup (65°) needed to be revised. MDA score improved from 12,9 pts. preoperative (11 - 14) to 17,4 at latest follow-up (15 - 18) (p<0,001) , WOMAC from 46,2 (19 - 67) to 93,2 (79 - 100) (p<0,001) and HHS from 52,3 (range 42 - 60) to 96,7 (range 89 - 98) (p<0,001). 1 arterial thrombosis, 1 venous thrombosis and 4 transient femoral paresia were registered. Overall survivorship was 97,9% at mean 5,2 years of follow-up. Conclusions: hip resurfacing provided very promising clinical-functional results, comparable if not better to standard total hip arthroplasty in the young osteoarthritic adult.

Date: 2011-09-08

Session: Hip - Resurfacing & Cemented THA

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 30234

INTRAMEDULLARY ASPIRATION OF THE ILIUM DURING CEMENTING OF THE SOCKET IN TOTAL HIP ARTHROPLASTY (THA) IMPROVED RADIOGRAPHIC APPEARANCE OF THE BONE-CEMENT INTERFACE

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The method of intramedullary aspiration of the ilium during cementing of the THA socket was developed to minimize bleeding on the acetabular bony bed. Improved bone-cement interface around the socket has been shown on radiographs made just after THA. We have been performing THA employing the method. We examined the acetabular bone-cement interface on radiographs made 1 year or more after THA. A series of 85 primary THAs (in 77 patients) that were followed up for 1 year or more were studied. The average patient age at THA was 70 years and 81% were in female patients. Hip disease etiology was primary osteoarthritis in 58%, developmental dysplasia of the hip 33%, and others 9%. Through the lateral approach, Crossfire socket and Exeter stem were cemented. Before cementing of the socket, an Exeter iliac-wing aspirator was introduced into the ilium proximal to the acetabulum and connected with suction that was maintained until the cement had hardened. At 1 year, 94% of the sockets were classified as Hodgkinson type 0 (no demarcation) and type 1 (demarcation in outer 1/3) 6%. At the latest follow-up (2.2 years on average), type 0 in 94%, type 1 in 4%, and type 2 in 2%. The results were significantly better than those in a previous series of THAs that were performed without employing the method. The 1-year radiographic appearance of the cemented socket was reported to predict its long-term durability. The aspiration of the ilium during cementing is expected to improve long-term durability of the socket.

Date: 2011-09-08

Session: Hip - Resurfacing & Cemented THA

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 28915

A BIOMECHANICAL COMPARISON OF EPIPHYSEAL VERSUS METAPHYSEAL FIXED CONSERVATIVE HIP ARTHROPLASTY

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The Birmingham Mid-Head Resection (BMHR) is a bone-conserving, short-stem alternative to hip resurfacing for patients with compromised femoral head anatomy. It is unclear if the uncemented, metaphyseal fixed stem of the BMHR confers a mechanical advantage to that of a traditional hip resurfacing. Thus, we aimed to determine if a metaphyseal fixed, bone preserving femoral component provided superior mechanical strength in resisting neck fracture compared to a conventional hip resurfacing arthroplasty. Sixteen matched pairs of human cadaveric femurs were divided evenly between specimens receiving a traditional epiphyseal fixed hip resurfacing and those receiving a metaphyseal fixed BMHR. A minimum of 10 degrees of relative valgus alignment was planned for all implants and the planned stem-shaft angles and implant sizes were equal between femur pairs. Prepared specimens were potted, positioned in single-leg stance and tested to failure using a mechanical testing machine. Human cadaveric femur pairs were well matched for anatomic parameters and BMD with no statistically significant differences in neck-shaft angle ($p=0.110$), neck width ($p=0.173$), femoral offset ($p=0.224$) or neck BMD ($p=0.525$). There was a statistically significant difference between failure loads for femurs prepared with a BHR and those prepared with a BMHR ($p<0.001$). Femurs prepared with a BHR (7012 N, SD 2619) failed at an average of 1578 N (SD 865) greater than paired femora prepared with a BMHR (5434 N, SD 2297), representing a 23% increase in failure load. Transcervical vertical shear fractures accounted for 19 of 32 failures, the remaining 13 were subcapital fractures. There were no fractures observed at the base of the femoral neck for either implant. A metaphyseal fixed, bone conserving femoral implant does not provide superior mechanical strength nor increased resistance to femoral neck fracture compared to a conventional hip resurfacing arthroplasty.

Date: 2011-09-08

Session: Hip - Resurfacing & Cemented THA

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 29484

ERADICATION OF NEGATIVE BONE REMODELLING USING THE CEMENTED C-STEM POLISHED TRIPLE TAPERED FEMORAL IMPLANT

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Introduction: Negative remodelling of the femoral cortex in the form of calcar resorption due to stress shielding and cortical hypertrophy at the level of the tip of the implant, due to distal load transfer, is frequently noted following cemented total hip replacement, most commonly with composite beam implants, but also with polished double tapers. The C-stem polished femoral component was designed with a third taper running from lateral to medial across and along the entire length of the implant, with the aim of achieving more proximal and therefore more natural loading of the femur. Materials and methods: We present the results of a consecutive series of 500 total hip replacements performed between March 2000 and December 2005 at a single institution, using a standard surgical technique and third generation cementing 500 arthroplasties were performed on 455 patients with an average age of 68.3 years (23-92). 77 patients have died (73 arthroplasties) and the average duration of follow-up for the entire series is 81 months (52 - 124). Results: Only 2 femoral implants have been revised. One implant is currently loose following a periprosthetic fracture treated by internal fixation, but none of the other remaining implants demonstrates any progressive radiolucency. Rounding of the calcar has been observed, but there have been no cases with obvious loss of calcar height and no cases of distal femoral cortical hypertrophy. Conclusion: The C-stem femoral component has therefore performed well in clinical practice and the objective of eradicating negative bone remodelling has been achieved.

Date: 2011-09-08

Session: Hip - Resurfacing & Cemented THA

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 30166

RADIOGRAPHIC ASSESSMENT OF CEMENTATION IN HIP HEMIARTHROPLASTY FOR TRAUMA

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Introduction: Barrack et al (1992) introduced grading of the radiographic appearance of the cement mantle in total hip arthroplasty. Cemented Charnley stems with a high Barrack grade (C or D) are associated with higher rates of aseptic loosening. Despite widespread use of Barrack's grade, evidence exists to question its reproducibility in total hip arthroplasty. None was found relating to Barrack grade in cemented hip hemiarthroplasty in trauma cases. Aim: To assess the reproducibility of Barrack grade in assessing cementation of hip hemiarthroplasty for trauma. Methods: 66 postoperative radiographs were assessed by 4 observers on 2 occasions each, 1 month apart. Results: Analysis of intraobserver error largely revealed poor reproducibility. 2 observers displayed a statistically significant difference ($p = 0.001$) in the grades they attributed during their first and second assessments. 1 observer had a tendency towards poor reproducibility ($p = 0.08$). The remaining observer had similar results in both assessments. Interobserver error was significant, with a high level of disagreement between all assessments undertaken ($p < 0.001$). High Barrack grades were recorded in 55 - 99% of cases. Conclusion: Relating to cemented hip hemiarthroplasty for trauma, Barrack's grade has poor reproducibility in the assessment of cementation. In comparison to studies of elective total hip arthroplasty, we had more cases with high Barrack grades, suggesting less adequate cementation. This may be explained by trauma operating being more frequently undertaken by less experienced surgeons, with less experience in modern cementing techniques. Surgeons may be more hesitant with pressurisation in comorbid trauma patients.

Date: 2011-09-08

Session: Hip - Resurfacing & Cemented THA

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 28736

CEMENTED POLISHED STEMS PRESERVE THE FEMUR IN YOUNG PATIENTS UNDERGOING PRIMARY HIP ARTHROPLASTY

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When undertaking hip arthroplasty in young patients, there is an emphasis on surgical techniques that preserve the femur. This study examined damage to the femur following the use of cemented polished stems in young patients performed by community surgeons. We evaluated 197 primary hip arthroplasties in 169 patients less than 55 years performed by community surgeons between 1988 and 2005. Clinical, radiographic and survival analyses were undertaken at a follow-up from 2 to 19 years to determine the incidence of loosening and osteolysis, the extent of bone damage from stem removal and the need for long stem revision. Survivorship at 13 years with an endpoint revision for aseptic loosening was 100%. No stems were radiographically probably or possibly loose, nor revised for aseptic loosening at up to 19 years. Five stems were revised using standard length stems, in four the femur was preserved by cement in cement exchange and there was one impaction grafting. One periprosthetic fracture was treated by long stem revision and one by internal fixation. Of the unrevised femurs, 8% had mild and 4% had intermediate osteolysis; 98% had Paprosky type I and 2% had type II deficiency, and 77% had Endoklinik grade 0 bone loss and 23% had grade 1. The femur is well preserved after the use of cemented polished stems due to the absence of aseptic loosening, minimal osteolysis, and the ability to use standard length stems and bone preserving techniques when revision is required. Importantly, in young patients, these results can be achieved by community orthopaedic surgeons.

Date: 2011-09-08

Session: Plenary Lecture - Frederic PICARD (United Kingdom)

Time: 10:00 - 10:30

Room: Forum Hall

Abstract no.: 30656

IS COMPUTER ASSISTED TOTAL KNEE SURGERY MAINSTREAM?

Frederic PICARD

(UNITED KINGDOM)

Computer-assisted surgery (CAS) in the field of knee arthroplasty has been in existence since 1997. This technique has been used in routine practice in many hospitals for about ten years. However, CAS is far off having attained the majority of all the world's hospitals. Nevertheless, more and more relevant evidences are accumulated to testify the unquestionable advance that computer-assisted surgery represents in accurately orienting joint implants and improving patient's outcomes. Explanations regarding why this technique is still not widely used remain uncertain. The objective of this lecture is to put in light the reasons why computer, that has invaded so many work spaces such as offices, cars, houses, and even the anaesthesiologists "side" of the orthopaedic theatres, still shyly penetrate the surgeon's area. If computer assisted surgery had invaded orthopaedics work place as much as, for instance emails (which almost substitute conventional mails) have overwhelmed us, this presentation would be totally unnecessary. We would then confirm that CAS or navigation, the main field of CAS in orthopaedics, is mainstream indeed. In fact, CAOS techniques and linked technologies are not prevailing current thoughts in most of the places. Is this technique finally only an "underground culture", a disillusion or even a fiction? It is true that, other than Germany, orthopaedic surgeons from other countries are rather in the "laggards" categories concerning the use of this technology. There are historical reasons to this advance in Germany mainly related to previous early introduction of CAS in the nineties, such as the Robodoc system. On looking more deeply into the pathways of introduction for innovations in orthopaedics and in other fields, it enabled us to isolate various factors of defiance for this technique and understand the delay for this technology to become mainstream, if ever it will be.

Date: 2011-09-08
Session: Hip - Minimally Invasive
Time: 14:00 - 15:30
Room: Forum Hall

Abstract no.: 29431

FEMUR EXPOSURE IN DIRECT ANTERIOR APPROACH FOR TOTAL HIP ARTHROPLASTY: CONTRIBUTION OF THE HIP JOINT CAPSULE AND SHORT EXTERNAL ROTATORS

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INTRODUCTION: Exposure of the femur during the direct anterior approach to total hip arthroplasty is challenging. We performed a biomechanical study to investigate the contribution of the hip joint capsule and short external rotators during the exposure of the femur in the direct anterior approach. **METHODS:** In 10 fresh frozen human cadavera (19 hips) we measured the release of the hip joint capsule (inferior and superior components) and short external rotators (piriformis and obturator internus) with respect to (1) external rotation of the femur and (2) displacement of the proximal femur in the lateral and anterior directions with the femur in an externally rotated position. Measurements were performed with the hip positioned in neutral, twenty-five degrees of extension and twenty-five degrees of extension plus fifteen degrees of adduction. **RESULTS:** (1) Inferior capsular release resulted in significantly greater external rotation than superior capsular release in all tested positions. (2) Piriformis release was small in magnitude at all tested positions. (3) Obturator internus release resulted in greater anterior elevation than other releases with the hip positioned in twenty-five degrees of extension and twenty-five degrees of extension plus fifteen degrees of adduction. **DISCUSSION AND CONCLUSIONS:** (1) The inferior capsule has a larger contribution than the superior capsule with respect to external rotation of the femur. (2) The behavior of the piriformis and obturator internus are markedly different. While the piriformis contribution is quite small in all areas, the obturator internus has a marked influence on the anterior elevation of the femur.

Date: 2011-09-08

Session: Hip - Minimally Invasive

Time: 14:00 - 15:30

Room: Forum Hall

Abstract no.: 28452

A COMPARATIVE STUDY OF THE POSTEROLATERAL AND ANTEROLATERAL APPROACHES FOR ISOLATED ACETABULAR REVISION

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Although isolated revision of the acetabular component has become an increasingly common option for revision hip surgery, opinions differ regarding the ideal surgical approach for reducing postoperative instability. The purpose of this study was to compare the clinical and radiographic results of isolated acetabular revision performed using a posterolateral and an anterolateral approach. The authors retrospectively compared the clinical and radiographic results of isolated acetabular revision performed in 33 hips using a posterolateral approach with those performed in 36 hips using an anterolateral approach. All procedures were performed by a single surgeon and all patients received the same postoperative protocol. Mean duration of follow-up was 4.6 years (range, 2-13.2). Mean postoperative Harris hip scores were similar in the posterolateral and anterolateral groups (86.5 and 87.2 points, respectively). In the entire series of 69 hips, six (9%) underwent re-revision of the acetabular component because of aseptic cup loosening in four, recurrent dislocation in one, and deep infection in one. No significant difference was found between the two groups with respect to complication or re-revision rates, but the dislocation rate in the anterolateral approach group was significantly lower than that in the posterolateral group (0% vs. 12%, $p = 0.047$). Isolated acetabular revision performed using an anterolateral approach seems to be the more viable option in selected patients, and in particular, it has a significantly lower postoperative dislocation rate than posterolateral acetabular revision.

Date: 2011-09-08
Session: Hip - Minimally Invasive
Time: 14:00 - 15:30
Room: Forum Hall

Abstract no.: 28505

PROCESS OPTIMIZED, MINIMALLY INVASIVE TOTAL HIP REPLACEMENT – MAKING A ROUTINE PROCEDURE MORE ECONOMICAL AND ERGONOMIC: A SINGLE-ARM, NON-RANDOMIZED PROSPECTIVE STUDY

Philipp GEBEL

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Background: The purpose of this study was to optimize the appliance and to enhance security and efficiency of the minimally invasive direct anterior approach (DAA) to the hip joint. Therefore a new leg positioner Rotex-table was used, a retraction-system Condor was adapted and operative techniques were simplified and standardized. Patients and methods: We evaluated the first 100 primary THR operated with application of the leg positioner, Rotex- table, and the retraction system, Condor, using the DAA, in the period between January 2009 and February 2010, regarding operation data, radiological and clinical values by the osteoarthritis outcome score (HOOS) pre-operatively and 3 months after surgery. All THR were realized by an experienced surgeon with only one assistant in a standardized operation technique basing himself on a radiologic and optoelectronic navigation device. The average age of the patients was 68 years (min. 37, max. 92y), with a mean BMI of 26.5 kg/m² (min. 17, max. 43 kg/m²). Results: The mean time of surgery was 80 minutes (min.55, max. 130min.) The blood loss showed an average amount of 511.5ml/surgery (min. 200, max. 1000ml). No intra-operative complications occurred and the HOOS could be raised from 43points pre-operatively to 90 of 100 points 3 months after surgery. The rate of complication was 6%, while no loosening or mal-positioning of shaft or cup had to be noticed. The radiological measurement showed an average cup inclination of 43°, further symmetrical leg length in 99% of the patients. Conclusion: Refinement of surgical techniques, development of a new leg positioner use and formation of a retractor system improved the ergonomic and economic performance of the DAA. The optimized THR leads to a high level of satisfaction in patients, shows a low rate of complication and allows an excellent positioning of cup and shaft.

Date: 2011-09-08
Session: Hip - Minimally Invasive
Time: 14:00 - 15:30
Room: Forum Hall

Abstract no.: 30229

COMPARISON OF CLINICAL AND RADIOGRAPHIC RESULTS OF DIRECT ANTERIOR MINIMALLY INVASIVE TOTAL HIP ARTHROPLASTY IN OBESE AND NON-OBESE PATIENTS

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Obesity has been cited by some authors as a contraindication to minimally invasive joint surgery. The aim of the present study is to determine whether there are any differences in the implant position and early functional outcome of total hip arthroplasty between obese and non-obese patients. A series of 122 consecutive patients who had 136 primary total hip arthroplasty surgeries done through an anterior approach was reviewed. The patients were categorized into three groups: non-obese (body mass index (BMI) < 25 kg/m²) (1), overweight (BMI 25 – 30 kg/m²) (2) and obese (BMI >30 kg/m²) (3). The outcome measure included radiological analysis assessing cup position and leg length discrepancy, modified Harris Hip Score, operative time and estimated blood loss. Mean abduction angle was 49,4±3° +/- 5,1° in group 2, 48,3° +/- 5,6° in group 3 and 47,2° +/- 5,6° in group 1. The average anteversion was 16,5° +/- 5,5° in group 2, 18,6° +/- 5,8° in group 1 and 17,5° +/- 4,7° in group 3. Average modified HHS was 83,7 +/- 11,0 in group 1, 83,4 +/- 14,0 in group 2 and 85,2 +/- 11,3. Student's T-test revealed no statistical difference significance between any of those groups. The results of the present study reveal that a single anterior approach allows accurate and reproducible component positioning in non-obese as well as obese patients. Our findings suggest that there is no evidence to support withholding total hip replacement from obese patients.

Date: 2011-09-08
Session: Hip - Minimally Invasive
Time: 14:00 - 15:30
Room: Forum Hall

Abstract no.: 29072

THE NEW SL-PLUS-MIA-TIHA STEM – RESULTS AFTER 12 TO 24 MONTHS

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Goal of MIS in hip surgery is saving bone and soft tissue with the possibility of postoperative full weight loading. After implantation of the uncoated SL-MIA stem, part of the Zweymüller family, in combination full weight mobilization we noticed the occurrence of RII's to a certain percentage. Thus, the stem has been modified with a bioactive surface coating (HA). The aim of our analysis was if the coating provides clinical or radiological benefits. Since January 2008 we implanted 963 coated MIA-stems. Patients were mobilized immediately after surgery under full load. The clinical (HHS) and radiological follow-ups were performed 6 and 12 weeks, and at 6, 12 and 24 months postoperatively. Emphasis of radiological evaluation was RII's in the Gruen zones and axial migration.

Date: 2011-09-08
Session: Hip - Minimally Invasive
Time: 14:00 - 15:30
Room: Forum Hall

Abstract no.: 29070

RADIOLOGICAL ANALYSIS OF OSSEOINTEGRATION IN MIS-THA AND POSTOPERATIVE FULL WEIGHT MOBILIZATION ON THE BASIS OF 200 TIHA-COATED AND UNCOATED SL-PLUS-MIA-STEMS AFTER ONE YEAR

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Background: Previously, due to invasive surgical approaches and thus extended mobilization in the first weeks after THR, shear forces at the implant-bone interface were rare. In MIS combined with postoperative full weight mobilization, osseointegration occurs under immediate loading. The aim of our analysis was whether a TIHA surface has a positive effect concerning osseointegration under full weight loading. Methods: Since January 2008 the TIHA coated SL-Plus-MIA stem is used in our department. Each operation was performed in supine position via anterolateral MIS-approach followed by postoperative full weight mobilization. Clinical (HHS) and radiological follow-ups were performed after 6 weeks, 3, 6 and 12 months. Main focus of the radiological evaluation was RII's in the proximal Gruen zones. The radiological evaluation was performed by digital image analysis. Results: The radiological results after one year showed in both groups a good osseous integration. The uncoated stem shows in 24% RII's in the proximal part versus 1,5% in the coated group. Regarding HHS values were nearly equal. Conclusion: Referring to our results only coated stems should be used in MIS-THA combined with post-operative full weight mobilization, as uncoated stems could reach their limit concerning osseointegration.

Date: 2011-09-08
Session: Hip - Minimally Invasive
Time: 14:00 - 15:30
Room: Forum Hall

Abstract no.: 28461

BIOMECHANICAL AND RADIOLOGICAL ANALYSIS WITH A 4-YEAR CLINICAL OUTCOME OF SHORT HIP STEM METHA WITH AN EXPERIENCE OF MORE THAN 750 IMPLANTATIONS

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Introduction: Bone stock preservation is a challenging part of THA. The purpose of this study was to analyse the clinical results of a 4 year FU out of an experience of more than 750 short hip stem implantations in addition with a biomechanical and radiological analysis of the proximal metaphyseal load transfer. Methods: In this study 126 patients were treated with the Modular Short Hip Stem and a pressfit cup (Metha Short Stem and PlasmaCup – BBraun Tuttlingen) between February 2005 and December 2008. There are 2 FU's reported after 27 months and 4 years with a FU rate of 85%. Clinical evaluation included the Harris Hip Score, pain and ROM. Radiographic examination included the cortical index, spot welds, cortical hypertrophy, and stress shielding. A biomechanical FE analysis of load introduction is presented. Results: The average HHS improved significantly from 55 preoperatively to 98,3 postoperatively. 1 stem subsided postoperatively and stabilized. 89 patients (81%) show bone compacting and bony support in Gruen Zones 2, 4, 6. 61 patients (55%) show bony resorption in area 7. We found in the FE analysis a proximal loading, which effectively preserves metaphyseal bone stock and increases periprosthetic bone mineral density (BMD). Conclusion: The requirement for a proximal loading seems to be realized in our mid term data. We could show with our radiographical evaluation a significant bone remodelling in the metaphyseal area. These excellent mid term results need to be followed up for a longer period to validate the good tendency resulting after 4 years.

Date: 2011-09-08
Session: Hip - Minimally Invasive
Time: 14:00 - 15:30
Room: Forum Hall

Abstract no.: 30149

**EARLY DISCHARGE FOLLOWING PRIMARY TOTAL HIP
ARTHROPLASTY BY MINIMALLY INVASIVE TECHNIQUE – DISTRICT
GENERAL HOSPITAL EXPERIENCE**

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Aim: To find out the length of hospital stay following Primary Total Hip Arthroplasty by Minimally invasive technique. **Material and methods:** This retrospective study done between June 2006 and June 2010 included patients who underwent Primary Total Hip Arthroplasty for Primary osteoarthritis of hip. This was minimally invasive technique done by single Senior Surgeon*. In total 96 patients were included in this study. Males were 35 and Females were 61. Age ranged between 49-94 years, average age was 73 years. Average length of the skin incision was 7cm. 84 patients had cemented hips and 11 had uncemented hips and one had Hybrid hip Arthroplasty. **Observations:** Average length of the stay was 4.2 days against our national average of 7.6 days. Range was 2 -10 days. Length of stay was less in uncemented hips than cemented hips. There no immediate complications. **Conclusions:** With our technique the average length of the stay was significantly reduced. It was very cost effective, with average saving of £800 (€1000) per patient. There were no complications. The patient satisfaction rate was very high.

Date: 2011-09-08

Session: Hip - Minimally Invasive

Time: 14:00 - 15:30

Room: Forum Hall

Abstract no.: 29489

OBJECTIVE MEASUREMENT OF INTRAOPERATIVE LIMB LENGTH AND OFFSET IN TOTAL HIP REPLACEMENT

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Introduction: Limb length discrepancy (LLD) and offset are critical variables to determine stability and long term success of total hip arthroplasty. Complications range from chronic pain to nerve palsies and the resultant patient dissatisfaction often can lead to litigations. There are numerous subjective and objective methods described to assess these variables. None of the methods measure both limb length and offset at the same time. Methods: We devised a simple, reliable and reproducible intra-operative technique to evaluate the LLD as well as offset. The posterior approach is used for all hip replacements. We use a No. 5 Ethibond suture to take a stitch at the posterior capsule-osseous junction of the acetabulum. Keeping both limbs in identical position the markings are made on greater trochanter in such a way that it would allow measuring LLD and offset at the same time. Results: We compared the pre- and post-operative clinical measurements and radiographs in consecutive 20 primary THA patients. All the patients were satisfied with the outcome of surgery. We found the mean pre-operative LLD was -3.7mm (range -16 to +3) and that post-operative was +1.5mm (range -4 to +11) while the mean pre-op offset was -2.6mm (range -15 to +4) and that in postoperative was 1mm (range -5.5 to +4). Both limb length and offset were accurately reproduced within statistically significant limits. Conclusion: The technique above is the only described technique that measures both limb length and offset simply and accurately. It's cheap, quick and reproducible.

Date: 2011-09-08
Session: Hip - Bearing Surface
Time: 16:30 - 18:00
Room: Forum Hall

Abstract no.: 28643

A PROSPECTIVE RANDOMIZED CONTROLLED TRIAL COMPARING THREE ALTERNATIVE BEARING SURFACES IN PRIMARY TOTAL HIP ARTHROPLASTY

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Aim: This prospective randomised controlled trial compares the outcomes of ceramic on ceramic, cobalt chrome on standard polyethylene, and cobalt chrome on cross-linked polyethylene. **Methods:** One hundred and two primary total hip replacements were performed in 91 patients between February 2003 and March 2005. All patients were younger than 65 (mean 52.7, 19-64) and were randomised to receive one of the three bearing surfaces. Outcome measures included WOMAC and SF12 scores. Radiological assessment included implant position, evidence of osteolysis and linear wear. **Results:** Ninety seven hip replacements in 87 patients were available for review at a minimum of five years. Two hips were revised (one for infection and one for periprosthetic fracture). There were no differences in age, gender, body mass index, diagnosis, level of activity, and comorbidities between the three groups. At five years there were no statistical differences in the clinical outcomes using the WOMAC or SF12 scores. Three patients in the ceramic group reported squeaking. Radiological evaluation revealed mean annual wear rates in the ceramic group of 0.006mm/yr, standard polyethylene of 0.151mm/yr and highly cross linked polyethylene of 0.059mm/yr. ANOVA analysis revealed these differences in wear rates to be significant ($p < 0.0001$). **Conclusions:** In the mid-term there are no differences in clinical outcome between ceramic on ceramic, cobalt chrome on ultra-high molecular weight polyethylene, and cobalt chrome on highly cross-linked polyethylene bearing surfaces in total hip arthroplasty. Cobalt chrome on standard polyethylene has a significantly greater annual linear wear rate than that of cobalt chrome on cross-linked polyethylene.

Date: 2011-09-08
Session: Hip - Bearing Surface
Time: 16:30 - 18:00
Room: Forum Hall

Abstract no.: 30009

TEN-YEAR FOLLOW-UP OF HIGHLY CROSS-LINKED POLYETHYLENE LINERS IN TOTAL HIP ARTHROPLASTY

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Introduction: The electron-beam irradiated highly cross-linked and melted polyethylene (HXLPE) has shown low wear rates at 3-year and 6-year follow-up intervals. The aim of this study is to report on the 10 year clinical and radiographic outcomes of patients with HXLPE liners. Methods: HXLPE liners in 385 THA's (363 patients) implanted between 1999 and 2002 with 22mm, 26mm, 28mm or 32mm femoral heads were evaluated. The clinical outcome measures included the Harris hip, EQ-5D, and UCLA activity scores. Martell Hip Analysis Suite was used to measure head penetration over time. A matched set of 186 THA's (129 patients) with 26mm and 28mm head sizes coupled with conventional gamma sterilized in air polyethylene was identified as a wear measurement control group. Results: There are no osteolytic lesions. No revisions have been performed for polyethylene wear or liner fracture. The average scores for the Harris hip, EQ-5D, and UCLA scores were 85, 80, and 6 respectively. At a minimum 10 year follow-up, the average head penetration rates were $18.5 \pm 44.7 \mu\text{m}/\text{year}$ and $25.5 \pm 80.9 \mu\text{m}/\text{yr}$ for 28mm and 32mm heads, respectively, with no significant difference in penetration rates between the two head sizes. The wear rate of a match set of conventional PE was significantly higher $96.7 \pm 139.0 \mu\text{m}/\text{year}$ ($p < 0.0001$). Discussion: The wear results at minimum 10 year follow-up continue to indicate very low wear in vivo with no signs of changes over time. This long-term clinical and radiographic follow-up study of HXLPE liners represents the largest series and longest follow-up period for this bearing material.

Date: 2011-09-08
Session: Hip - Bearing Surface
Time: 16:30 - 18:00
Room: Forum Hall

Abstract no.: 30016

MULTI-CENTER MINIMUM 5-YEAR WEAR ANALYSIS OF LARGE FEMORAL HEADS ON HIGHLY-CROSSLINKED POLYETHYLENE

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Introduction: A recent study shows a significant increase in volumetric wear rates for head sizes of 36mm and 40mm at 5 years follow-up. This study combined data from two centers to determine if the wear rates of highly cross-linked polyethylene depend on head size. **Methods:** We identified 316 patients (334 hips) who underwent primary total hip arthroplasty with radiographic follow-up at a minimum of five years. Martell Hip Analysis Suite was used to analyze pelvic radiographs resulting in head penetration values. Linear and 2D volumetric wear rates were calculated by dividing the head penetration between the longest follow-up and the 1-year film. Wear rates for standard head sizes (26-32mm) and large head sizes (36-40mm) were compared. **Results:** Radiographic follow-up was gathered (242 patients and 74 patients) on THAs using 26mm(19 hips), 28mm(131 hips), 32mm(106 hips), 36mm(63 hips), 38mm(7 hips), and 40mm(8 hips) head sizes. At longest follow-up, there was no significant difference in linear penetration rates between standard and large head sizes ($-2.8 \pm 92.0 \mu\text{m}/\text{year}$ and $16.9 \pm 154.7 \mu\text{m}/\text{year}$ respectively, $p=0.18$), however, there was a significant difference in 2D volumetric head penetration rates between head sizes ($19.4 \pm 26.7 \text{mm}^3/\text{year}$ and $57.9 \pm 64.5 \text{mm}^3/\text{year}$ respectively, $p<0.0001$). **Discussion:** While no significant difference was observed in the linear head penetration rate between the small and large head size groups, a significant difference in volumetric head penetration was observed. Two-dimensional volumetric wear calculations are based on a number of mathematical assumptions, and considerable data scatter results in large standard deviations for volumetric calculations. Additional centers/patients are needed to further understand the issue.

Date: 2011-09-08
Session: Hip - Bearing Surface
Time: 16:30 - 18:00
Room: Forum Hall

Abstract no.: 29110

THE EFFECT OF ACETABULAR INCLINATION ANGLE ON THE SURVIVORSHIP OF ALUMINA-CERAMIC ARTICULATIONS

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Reports have linked high acetabular inclination angles to increased wear of ceramic-on-ceramic bearings. Many of these studies were conducted in vitro and did not address the clinical relevance of such findings. We therefore determined: (1) whether the cup inclination angle influences survival or function in patients with ceramic-on-ceramic implants; (2) the incidence of radiolucencies, osteolysis, and subsidence of ceramic-on-ceramic implants; and (3) whether the survival rate higher for ceramic-on-ceramic THAs than for conventional metal-on-polyethylene THAs. We retrospectively reviewed 537 THAs performed in 512 prospectively followed patients having THA between October 1996 and October 2000. Eleven patients (12 hips) were lost to follow-up before 2 years, leaving 501 patients (525 THAs); of these, 421 were alumina-ceramic-on-ceramic articulations and 104 cobalt-chromium-on-polyethylene. The mean age was 54 years. We determined acetabular cup inclination angles, Harris hip scores, Health-Status-Questionnaire-12 scores, and presence and location of any radiolucencies, osteolysis, or radiographic subsidence. We compared survival using the Kaplan-Meier method. The minimum followup was 24 months (mean, 59 months; range, 24–120 months). Twenty-two of the 424 THAs (4.2%) were revised. We observed no difference in clinical or radiographic outcomes with respect to cup inclination angles. Radiographically, two loose acetabular components and two femoral components had subsided. The 5-year survival rate was slightly higher for ceramic-on-ceramic bearings (98%) than for metal-on-polyethylene (92%). Although there may be a link between acetabular inclination angles and wear rates as reported by some authors, we found no differences in patient function or radiographic survivorship using alumina-on-alumina articulations.

Date: 2011-09-08
Session: Hip - Bearing Surface
Time: 16:30 - 18:00
Room: Forum Hall

Abstract no.: 28438

LONG-TERM RESULTS OF TOTAL HIP ARTHROPLASTY WITH A SANDWICH TYPE ALUMINA CERAMIC BEARING

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The authors analyzed the long-term results of a single-surgeon series of 102 cementless total hip arthroplasties performed using a sandwich type alumina ceramic bearing incorporating a polyethylene-alumina composite liner within a titanium-alloy shell. Mean age at the time of arthroplasty was 39 years (range, 18 to 66 years) and 76% of the patients were less than 50 years old. Mean follow-up duration was 115 months (range, 84 to 133 months). When failure was defined as revision of either the acetabular or the femoral component for any reason, Kaplan-Meier survival probability at 10 years was 95.3% (95% confidence interval, 89.5% to 100%). Mean Harris hip score improved from 47 points (range, 16 to 70 points) preoperatively to 95 points (range, 85 to 100) at the final follow-up evaluation. No radiographically detectable osteolysis around the acetabular or femoral component was observed in any hip. No patient complained of squeaking in the operated hip. During the follow-up period, three hips (3%) required revision surgery; two underwent acetabular revision because of a ceramic liner fracture and one underwent revision for early loosening of the acetabular cup. Ten-year results of cementless THA with a sandwich-type alumina ceramic bearing were encouraging, and no great increase in ceramic failure rate was observed, which contrasts with the findings of previously reported short-term follow-up studies.

Date: 2011-09-08
Session: Hip - Bearing Surface
Time: 16:30 - 18:00
Room: Forum Hall

Abstract no.: 29741

NAVIGATED BILATERAL MODULAR SHORT STEM THA

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To evaluate the benefit of simultaneous bilateral navigated THA in a single stage procedure, 35 selected patients were treated with modular Metha® short-stems via anterior approaches. To improve implant position, the image-free navigation system OrthoPilot®3.1 was used, followed by immediate early mobilization according to our standard postoperative protocol. At 12 months of mean follow-up surgical time, blood loss, complications, subjective feeling, clinical and radiological outcome, and economical aspects were evaluated. Nine female and 26 male patients with a mean BMI of 25.2kg/m² needed a surgical time of 171 min. Eight cellsaver and six erythrocyte conserves were transfused. Consumption of pain relieving drugs was not increased and all patients could be mobilized and rehabilitated in normal time. The leg length was equal within a range of 5 mm. After a fall, one femoral fissure caused a stem subsidence of 15mm, but then healed without further subsidence. There was no revision, no infection, and no dislocation. At discharge, pain was judged 0.13 on the visual analog scale. Radiologically, all cup positions were within the safe zone and almost identical on both sides and differed only by 2.2° for anteversion and 1.8° for inclination. All patients were highly satisfied with the bilateral procedure. Selected ASA-2 patients with bilaterally damaged hip joints clearly benefit from a bilateral single stage THA procedure. The complication rate is not increased. Effort, pain, time, and costs are reduced compared to two unilateral treatments, whereas it's indifferent to the hospital economics.

Date: 2011-09-08
Session: Hip - Bearing Surface
Time: 16:30 - 18:00
Room: Forum Hall

Abstract no.: 29373

PRIMARY TOTAL HIP ARTHROPLASTY WITH DURALOC CUP

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We evaluated the clinical and radiographic results of 67 (64 patients) cementless Duraloc-300 cups for young active patients after a mean follow-up period of 6.2 years. The preoperative mean Harris hip score improved from 46.24 to 96.5 points at 5 years. The survivorship of the cup, using radiographically confirmed aseptic loosening as the end point, was 100% at 5 years. The mean rate of liner wear was 0.125 mm/y (00-0.39 mm/y). Acetabular osteolysis was found in 14% (9 hips) of the 67 hips, and the osteolysis is related to polyethylene wear ($P = .0024$) and sex ($P = .001$). Although there was no aseptic loosening of the components, there was a high rate of liner wear of the polyethylene liner and acetabular osteolysis.

Date: 2011-09-08
Session: Hip - Bearing Surface
Time: 16:30 - 18:00
Room: Forum Hall

Abstract no.: 29977

A MINIMUM 8-YEAR FOLLOW-UP OF PRIMARY TOTAL HIP ARTHROPLASTY WITH A PROXIMALLY-COATED TAPERED TITANIUM FEMORAL STEM

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Introduction: The use of cementless, proximally porous-coated femoral stems for total hip arthroplasty has increased in popularity. This is in part due to lower stress shielding and less proximal bone loss when compared to stems that obtain distal fixation. This report examines the minimum eight-year results with the use of a second-generation circumferentially proximally porous-coated titanium-alloy stem. **Methods:** Ninety-seven hips (83 patients) with Fiber Metal Taper (FMT) femoral stems, implanted between 1998 and 2002, were followed prospectively and were reevaluated at a minimum of eight years postoperatively. The median patient age was 57 years (range 34-79). Radiographic data and clinical follow-up using Harris Hip Score (HHS) and EQ5D outcome measures were assessed. **Results:** The average duration of follow-up was 9.1 years (109 months). The average HHS was 85.8 points, the average EQ5D Score was 81. All stems were biologically stable, with all hips having osseous ingrowth and none having stable fibrous fixation. Two stems had proximal non-progressive radiographic lucency in zones 1 and 7, though both patients were asymptomatic. No hip had diaphyseal osteolysis, and one stem was revised because of early periprosthetic fracture with subsidence. **Conclusions:** The current data represent the longest clinical follow-up of this second-generation cementless, proximally porous-coated femoral stem. The stems were found to perform well clinically and radiographically beyond the first 5 years reported in the literature. Patients had high levels of satisfaction and function, and osseous fixation occurred reliably without evidence of distal osteolysis.

Date: 2011-09-08
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Time: 16:30 - 18:00
Room: Forum Hall

Abstract no.: 29959

DOES RADIATION THERAPY IN CANCER PATIENTS INCREASE THE RISK OF RECEIVING A TOTAL HIP ARTHROPLASTY? A LINKAGE STUDY BETWEEN THE CANCER REGISTER OF NORWAY AND THE NORWEGIAN ARTHROPLASTY REGISTER

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Background: About 60% of all cancer patients survive at least 5 years. Therefore several of these have a risk to develop long-term effects after cancer treatment. Aim: To determine whether radiation therapy as treatment for gynaecological cancer increase the risk for receiving a total hip replacement. Analyses are based on a linkage between The Cancer Register of Norway and The Norwegian Arthroplasty Register. Materials and methods: In this study we identified all women who received curative treatment (40-80 Gy radiation more than 28 days) for gynaecological cancer or breast cancer. Patients who received a total hip replacement prior to radiation therapy were excluded. A total of 12,534 patients were included after these criteria's. Results: Out of 11,182 patients with breast cancer, 178 (1.6%) received total hip arthroplasty, and 13 (1.0%) of 1352 patients with gynaecological cancer received total hip arthroplasty ($p=0.074$). Patients with gynaecological cancer had however a higher mortality frequency than breast cancer patients, 34.6% and 13.3% respectively ($p<0.001$). Conclusion: We hypothesised that cancer patients receiving radiotherapy treatment in the pelvic area had a higher risk to receive a total hip arthroplasty than patients receiving radiation for breast cancer. Our results were not statistically significant; however they showed a trend for fewer hip arthroplasties in gynaecological cancer patients than in breast cancer patients. The mortality for gynaecological cancer is much higher than for breast cancer patients. Gynaecological cancers are more malignant than breast cancer, and may therefore reduce the chance to receive a total hip arthroplasty.

Date: 2011-09-08
Session: Hip - Bearing Surface
Time: 16:30 - 18:00
Room: Forum Hall

Abstract no.: 28610

IMPACTION BONE GRAFTING: COMPARISON OF TWO IMPACTION MODES

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During Total Hip Arthroplasty (THA) bone loss is recovered by using bone chips. In order to guarantee sufficient mechanical strength, the porous bone chips have to be compacted. In the acetabular impact-grafting procedure, a hammer and an impaction stick is used for manual compaction. Another technique uses a hammer driven by compressed air, which could lead to a higher density and improved stability of bone chips in the acetabulum. The aim of this study was to compare these two different compaction modes for bone impaction grafting. The bone mass characteristics were evaluated by 30 measurements taken for each compaction method and for each time step, determining the bulk density, impaction hardness, contact stiffness and penetration resistance at 0, 3, 6, 9, 12, 15 and 30 [s] of compaction time. In order to determine this parameters a measurement system was developed, which consists of a punch which can be lowered in a plastic cup filled with bone chips. Since not all data was normally distributed the non-parametric U-Test was used for further analysis. Results have shown that the pneumatic method reaches higher values faster in impaction hardness, contact stiffness and bulk density and could be more suitable to increase the primary stability of the implant. The differences in bulk density, impaction hardness and contact stiffness where statistically significant ($p < 0.01$). An evaluation of the penetration resistance of the bone chips compacted with the two different methods showed no significant difference between manual and pneumatic impaction.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder I

Time: 10:30 - 12:00

Room: Meeting Hall I

Abstract no.: 29349

EARLY RESULTS OF EXTENDED ARTICULAR SURFACE COPELAND SURFACE REPLACEMENT FOR SHOULDER CUFF ARTHROPATHY

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Objectives: We present our early results in the management of significant shoulder cuff arthropathy with a surface replacement procedure. **Methods:** This is a retrospective study of patients with shoulder cuff arthropathy whom had a shoulder surface replacement using the Copeland EAS (extended articular surface) prosthesis without replacing the Glenoid surface between August 2007 and January 2010. A total of 13 patients have been identified. The average age at operation was 68 years with a majority of patients being females. Pain was the main preoperative symptom with significant cuff arthropathy as the main underlying pathology. The average overall preoperative Oxford shoulder score was 15 (range 10-24). **Results:** With a minimum of 10 months follow up, 12 out of the 13 patients had pain-free post operative movements in their shoulders with improvement in their range of motion. The average implant size is 3. One major complication was recorded which was anterior superior escape of the humerus head. There were no cases of deep infection. **Conclusions:** Our early results show good outcomes following Copeland EAS surface replacement are encouraging. Longer follow up is needed to determine mid-term and long term results.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder I

Time: 10:30 - 12:00

Room: Meeting Hall I

Abstract no.: 28929

HOW SAFE IS SHOULDER RESURFACING? INTRA OPERATIVE AND IMMEDIATE POSTOPERATIVE COMPLICATIONS

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We carried out this study with the purpose of evaluating the safety of both total shoulder resurfacing and humeral surface replacement for the surgical management of relevant surgical pathologies. The complications following shoulder resurfacing has not yet been reported in literature. We analysed medical records of 60 patients (61 shoulders) who underwent either HSR (18) or TSR (43) from Aug 2007 to Aug 2009. The procedures were all performed by the senior author. These 60 patients (42 female and 18 male) were aged between 39-88 years. For every patient, we ascertained the development of the following immediate and early complications: 1) Excessive intra-operative and/or post-operative blood loss requiring blood transfusion, 2) Infection, 3) Neural injury, 4) Instability, 5) Rotator cuff tear, 6) Deltoid detachment, 7) Periprosthetic fracture, 8) Thrombo-embolic events, 9) persistent pain or loss of function. There were no cases of post op blood transfusion, infection, cuff tear, deltoid detachment, periprosthetic fracture, in either group. All patients who had HSR, had uneventful post operative recoveries that continued when assessed in outpatient clinic. In TSR group, 2 patients developed posterior subluxation (treated successfully, 1 in shoulder spica and other in abduction brace for 3 weeks) of humeral head and another had transient axillary nerve neuropraxia which recovered completely without any intervention. Sperling reported a transfusion rate of 8.1 % following shoulder replacement surgery. Bhosali² reported the incidence of instability (4.9%), periprosthetic fracture (1.8%). Cuff tear (1.3%), neural injury (0.8%), infection (0.7%) and deltoid detachment (0.08%). We have demonstrated that with adequate surgical expertise, both HSR and TSR are safe and reliable for patients with GHJ pathologies requiring surgical intervention in appropriately selected patients. References 1. Sperling et al, JBJS Am 2006;88:2279-2292 2. Bhosali et al JSES, November /December 2005

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder I

Time: 10:30 - 12:00

Room: Meeting Hall I

Abstract no.: 29650

OUTCOME OF REVISION TOTAL SHOULDER REPLACEMENT AFTER FAILURE OF COPELAND SHOULDER RESURFACING

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Introduction: Aim of our study was to determine the outcome of revision total shoulder replacement after failure of Copeland shoulder resurfacing. Methods: 148 Copeland resurfacings were performed in our hospital by three experienced shoulder surgeon between 1995-2008. Seventeen have been revised in 16 patients over these thirteen years. We retrospectively analysed outcome of revision surgery in these patients. Results: 17 shoulders in 16 patients were revised. Mean age at revision was 66.6 years (range, 45-84). There were five males and 12 were females. Reasons of revision were painful glenoid erosion in seven shoulders, pain in five, loosening in two, rotator cuff tear in two and infection in one. Ten had total shoulder replacement, four had reverse polarity shoulder replacement, two had bipolar shoulder hemiarthroplasty, and one had shoulder replacement with Epoca shell. Constant-Murley scores improved from a mean preoperative score of 24 (range, 10-48) to 42 (range, 18-70) at mean follow-up of 3.2 year ($P < .05$). Discussion: Revision of failed Copeland resurfacing significantly improves functional outcome of the patient. There is no study in the literature which has analysed outcome of revision of failed Copeland resurfacings. Surgeon should use appropriate revision prosthesis after analysing carefully the cause of failure. Summary: Outcome of 17 revision shoulder replacement after failure of Copeland resurfacings was analysed. Most common cause of failure was painful glenoid erosion (41%). There was significant improvement in mean Constant score from 24 to 42.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder I

Time: 10:30 - 12:00

Room: Meeting Hall I

Abstract no.: 29718

EARLY OUTCOMES OF PROXIMAL HUMERUS FRACTURES TREATED WITH REVERSE TOTAL SHOULDER ARTHROPLASTY

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INTRODUCTION: The utilization of different reconstructive techniques for complex fractures of the proximal humerus has become a controversial issue in orthopaedic surgery nowadays. The purpose of the current study was to evaluate early outcomes of reverse total shoulder arthroplasty for four part humerus fractures and proximal comminuted displaced humerus fractures. **METHODS:** Between July 2008 and February 2010, 19 patients underwent reverse total shoulder arthroplasty with the use of Delta X-Tend shoulder prosthesis (Depuy). All patients were evaluated clinically and radiologically using the Constant & Murley score. **RESULTS:** All patients, 9 man, 10 woman, were seen at clinics. The mean age was 79 years (71-89 years). Mean duration of follow up was 18 months with a range of 12 month to 29 months of follow up. The gender and age corrected Constant Murley Score was above 75. No complications have been observed. **DISCUSSION:** In our study we have shown that the reverse total shoulder replacement might be a successful alternative method for the treatment of complex fractures of the proximal humerus in elderly patients.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder I

Time: 10:30 - 12:00

Room: Meeting Hall I

Abstract no.: 28823

INFRAGLENOIDAL SCAPULAR NOTCHING IN REVERSE TOTAL SHOULDER REPLACEMENT: ANALYSIS OF 60 CASES AND SYSTEMATIC REVIEW OF THE LITERATURE

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Background: The impact of infraglenoidal scapular notching in reversed total shoulder arthroplasty (RTSA) is still controversially discussed. Our goal was to evaluate its possible influence on subjective stability and clinical outcome. We hypothesized that subjective instability and clinical outcome after implantation of RTSA correlates with objective scapular notching. Methods: Sixty shoulders were assessed preoperatively and at minimum 2-year follow-up using the Oxford instability score, Rowe score for instability, Constant score for pain, Constant shoulder score, DASH score, and active range of motion. All shoulders were evaluated by of anterior-posterior and axillary lateral radiographic views. These X-ray scans were classified twice by two orthopaedic surgeons with respect to infraglenoidal scapular notching according to the classification of Nerot. Scores were correlated to the evaluated notching. Results: At mean follow-up of 42 months (range from 24 to 96 months) we did not find significant correlation supporting the hypothesis that subjective instability goes along with with infraglenoidal scapular notching nor did we find significant support for the hypothesis that clinical evaluation correlates with infraglenoidal scapular notching after a mid-term follow-up from 24 to 60 months. Nevertheless, we report significant positive correlations in terms of the Constant pain score and active range of motion with infraglenoidal scapular notching in patients who had a follow-up of more than 60 months. Conclusions: We conclude that patients' subjective impression on their shoulders' stability is not correlating with radiological signs of infraglenoidal scapular notching. Nevertheless, clinical parameters are affected by infraglenoidal scapular notching, at least in the long run.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder I

Time: 10:30 - 12:00

Room: Meeting Hall I

Abstract no.: 29661

USE OF AN ECCENTRIC GLENOSPHERE IN REVERSE TOTAL SHOULDER ARTHROPLASTY: TWO YEARS MINIMUM FOLLOW-UP RESULTS

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INTRODUCTION: The aim of this retrospective study is to evaluate clinically and radiographically the effectiveness of implanting an eccentric glenosphere and if a correct glenosphere positioning would avoid the occurrence of notching. **METHODS:** 40 patients with rotator cuff arthropathy were treated with reverse shoulder arthroplasty with a 36 mm eccentric glenosphere. We have selected 30 patients, with a minimum follow up of 24. The patients were clinically evaluated in term of articularity, functionally with the Constant score and SST and with X-ray before and after surgery. During the follow up we evaluated the presence of notch; we measured the PSNA (prosthesis-scapular neck angle), the DBSNG (distance between the scapular neck angle and glenosphere), and the PGRD distance (peg glenoid distance). Statistical analysis was performed. **RESULTS:** In every patient the range of motion was improved. The AP X-ray did not show inferior scapular notching. The mean DBSNG was 4.3 mm. The mean PSNA was 92 ° and the mean PGRD was 21.2. The Constant score improved from 30 to 74 points and the SST from 1,7 to 8.4 points. **DISCUSSION:** In our study the results indicate that proper positioning of the glenosphere with the inferior part of the metal back that overlaps the lower glenoid rim without overhang, and the implantation of an eccentric glenosphere lowers the center of rotation of 4 mm and avoids contact between the humeral component and the scapular neck during the adduction. Thus, all the patients increased the total joint range of motion.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder II

Time: 14:00 - 15:30

Room: Meeting Hall I

Abstract no.: 28359

COMPARISON BETWEEN BEACH CHAIR AND LATERAL DECUBITUS POSITION IN ARTHROSCOPIC SHOULDER STABILIZATION WITH SUTURE ANCHOR TECHNIQUE

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Purpose: The purpose of this study was to evaluate and compare the clinical results of arthroscopic capsulolabral reconstruction using suture anchor fixation performed in beach chair and lateral decubitus position for anterior dislocation of the shoulder. **Methods:** From December 2004 to September 2007, 38 patients who underwent arthroscopic capsulolabral reconstruction of the shoulder were enrolled, and their clinical outcomes were retrospectively evaluated. In group A (22 patients), the procedure was performed in beach chair position. In group B (16 patients) the reconstruction was done in lateral decubitus position. The average follow-up period was for group A 50.6 months and for group B 49.1 months. The postoperative assessment including ROWE-Score, KOHN-Score, recurrent instability, the level of return to sports activity and the subjective satisfaction with the treatment were compared between the two groups. **Results:** The demographics of the two groups like age at operation, sex, age at onset, number of dislocations before operation were not significantly different from each other for the two groups. The duration of symptoms was significantly higher in group A (50.1 months) compare to group B (36 months). There were no significant differences in ROWE score, KOHN score and subjective satisfaction of surgery. Postoperative ROM of the shoulder was fully recovered in the most of the patients. The mean loss of external rotation compare to the non operated shoulder at the side were 5.4° (group A) vs. 7.5° (group B) and in 90° abduction position 8° (group A) vs. 8.1° (group B). Recurrent instability occurred in none cases in group A and in one case after 12 months in group B. **Conclusion:** Both surgical techniques are suitable for arthroscopic treatment and have no clinical significant differences especially regarding recurrence rate and loss of motion.

Date: 2011-09-08
Session: ESSSE/SICOT - Shoulder II
Time: 14:00 - 15:30
Room: Meeting Hall I

Abstract no.: 27029

THE RELIABILITY OF MRI ARTHROGRAPHY IN THE IDENTIFICATION OF GLENOID LABRAL PATHOLOGY IN CLINICALLY UNSTABLE SHOULDERS

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Background: The shoulder is the most commonly dislocated joint in the body. In previously published work, MR arthrogram (MRA) has shown sensitivities and specificities of 88-100% and 89-93% respectively in detection of glenoid labrum pathology. Our practice suggested a higher frequency of falsely negative reports. We aim to assess the accuracy of this modality in practice. Materials and Methods: We retrospectively reviewed MRA reports of 84 consecutive patients with clinical shoulder instability who had undergone shoulder arthroscopy. All had a history of traumatic anterior shoulder dislocation and had a positive anterior apprehension test on clinical examination. All underwent stabilisation during the same procedure. We compared the findings, using arthroscopic visualisation as the gold standard in the identification of glenoid labrum pathology. Results: 79/84 patients had glenoid labrum damage identified at arthroscopy. Only 49/79 were correctly identified at MRA. All normal glenoid labra were identified. This gave sensitivity of 62% and specificity of 100% in identification of glenoid labrum damage (positive predictive value 100%, negative predictive value 14%). Conclusion: The sensitivity of MRA in this series is significantly lower than previously published work, suggesting that MRA may not be as reliable an imaging modality as previously thought in glenohumeral instability. This study highlights the importance of an accurate history and clinical examination by a specialist shoulder surgeon in the management of glenohumeral instability. Clinical examination by a specialist appears more sensitive than MRA. The need for this costly investigation may not be as high as is currently the case.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder II

Time: 14:00 - 15:30

Room: Meeting Hall I

Abstract no.: 28272

PREDICTION OF CORACOID WIDTH USING A GLENOID WIDTH BASED MODEL: IMPLICATIONS FOR BONE TRANSFER PROCEDURES IN ANTERIOR SHOULDER INSTABILITY

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Chronic anterior shoulder instability with glenoid bone loss can be a challenging problem. Glenoids with significant anterior inferior bone loss require bone grafting to restore stability. The Bristow-Latarjet procedure, which transfers the coracoid to the glenoid, is often performed. Severe bone loss can necessitate higher morbidity iliac crest bone grafting (ICBG) if the coracoid is too narrow to restore glenoid contour. While glenoid width and percent bone loss can be determined using 3-D computed tomography reconstructions, coracoid width cannot. This study defines a ratio between glenoid and coracoid width that can determine if coracoid transfer will yield enough graft to restore glenoid contour. 184 pairs of cadaveric scapula were examined. Coracoid and glenoid length and width was measured using digital calipers. Every specimen was measured twice independently and the results averaged. Measurements for each parameter were averaged with values from a skeleton's contralateral scapula to obtain a single set of values for each pair of scapulae. The average male glenoid was 28.56 mm wide by 37.01 mm high and coracoid width was 11mm. The average male coracoid was 38% of the glenoid width. The average female glenoid was 23.67 mm wide by 33.83 mm high and coracoid width was 10.89 mm. The average female coracoid was 46% of the glenoid width. Using these calculations, an example male patient with a glenoid defect >38% as determined by 3-D CT would need an ICBG, whereas defects <38% could be managed with a Latarjet procedure. Coracoid width can be calculated from glenoid width and the sex-specific coracoid ratio. If this value exceeds the amount of bone loss, the surgeon can be confident that the Bristow-Latarjet procedure can restore the glenoid arc. If it does not, the more invasive iliac bone grafting procedure is indicated.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder II

Time: 14:00 - 15:30

Room: Meeting Hall I

Abstract no.: 29800

GLENOPLASTY FOR RECURRENT ANTERIOR DISLOCATION OF SHOULDER

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Majority of the surgical repairs for shoulder with anterior instability, either anatomic or non anatomic, result in variable degree of restriction of shoulder movements. We report the results of surgical technique which retains the movement of shoulder in all directions. Ninety six adults between 21-40 years of age with recurrent anterior dislocation of shoulder were operated during 1988-2006. The shoulder was approached through transaxillary incision. The scapular neck osteotomy was performed parallel to anterior glenoid rim extending from infraglenoid tubercle to the lateral border of the base of the coracoid process. The osteotomy was prised open and a corticocancellous bone graft measuring 30mmx15mmx10mm was inserted which projected 10 mm anterior and 6mm inferiorly. The shoulder was immobilized in arm chest bandage for 3 weeks followed by active exercises for 12 weeks. Modified Rowe's shoulder evaluation (follow up 2-15 years) revealed excellent results in 90 cases and none recurred. This technique being extracapsular retained all movements of the joint. It required no muscle cutting, blood transfusion or metallic fixation. The success of this procedure is due to anteroinferior bone block and redirection osteotomy of neck of scapula which stabilises the shoulder by compensating for insufficiency of capsulolabral complex and the osseous injury.

Date: 2011-09-08
Session: ESSSE/SICOT - Shoulder II
Time: 14:00 - 15:30
Room: Meeting Hall I

Abstract no.: 28358

ARTHROSCOPIC STABILIZATION FOR TRAUMATIC ANTERIOR DISLOCATION OF THE SHOULDER: SUTURE ANCHOR FIXATION VERSUS KNOTLESS IMPLANT TECHNIQUE

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Purpose: The purpose of this study was to evaluate and compare the clinical outcome of arthroscopic treatment of shoulder instability with a suture anchor and a knotless fixation device. **Methods:** From December 2005 to September 2008, 49 patients who underwent arthroscopic capsulolabral reconstruction of the shoulder were enrolled, and their clinical outcomes were retrospectively evaluated. In group A (16 patients), the stabilization was performed with a suture anchor device. In group B (33 patients) the reconstruction was done with a knotless implant. The average follow-up period was for group A 49.1 months and for group B 31.7 months. The postoperative assessment including ROWE-Score, KOHN-Score, recurrent instability, the level of return to sports activity and the subjective satisfaction with the treatment were compared between the two groups. **Results:** The demographics of the two groups like age at operation, sex, age at onset, number of dislocations before operation, duration of symptoms were not significantly different from each other in both groups. There were no significant differences in ROWE score, KOHN score and subjective satisfaction of surgery. Mean time of operation showed significant differences for group A 63.9 min. and for group B 55.5 min. The mean loss of external rotation compare to the non operated shoulder at the side were 7.5° (group A) vs. 11.5° (group B) and in 90° abduction position 8.1° (group A) vs. 10.5° (group B). **Conclusion:** At a short-term follow-up, differences between arthroscopic shoulder stabilization with a suture anchor and a knotless anchor were not statistically significant. The only significant difference was the operating time. The handling with the knotless device is much easier and faster. But there exists a tendency to a slightly higher loss of external rotation because the soft tissue follows the anchor.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder II

Time: 14:00 - 15:30

Room: Meeting Hall I

Abstract no.: 30099

THE SUPINATION-ELBOW-EXTENSION-TEST FOR HYPERLAXITY AT THE SHOULDER

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Background: There are four established clinical tests for hyperlaxity at the shoulder: Gagey-test, increased external rotation in adduction, drawer test and the sulcus sign. The objective is to assess a new test for hyperlaxity in comparison to other tests. Methods: Prospective clinical investigation of n=100 healthy volunteers. Inclusion: age <50, symptomfree. Exclusion: relevant other disorders or operations. Medical history, ROM, hyperlaxity tests, and Beighton score. Statistical analysis SPSS 17.0 Results: Mean demographic values: age 26.3 Jahre \pm 6.4 (17.8-48.7) (n=76 female, 25.8 \pm 6.7; n=22 male, 28.3 \pm 5); height 173.6cm (158-200); weight 67.2 kg (47-102); BMI 22.2 (16.4-33.5). All subjects showed symmetrical values for hyperlaxity. The SEET was positive in n=36 subjects; in combination with other tests positive/negative: sulcus sign n=3/9; Gagey test n=24/12; ER in ADD n=14/12; drawer test n=30/6. If hyperlaxity is defined as being positive for all four established tests, there are n=14 subjects of whom all are also positive for the SEET. Correlations SEET: Beighton score r=0.36, p=0.001; Gagey test r=0.722, p=0.001; ER in ADD r=0.78, p=0.001; Sulcus sign r=0.74, p=0.001; anterior drawer r=0.61, p=0.001; subjective instability r=0.23, p=0.019; female genre r=0.24, p=0.013. Conclusion: The SEET shows a high correlation to the established methods to assess hyperlaxity at the shoulder, but there is no golden standard to compare to for absolute values of validity. There is rather an individual pattern of positive test in each subject. The SEET is a valuable tool in the armamentarium of clinical investigation of the shoulder.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder II

Time: 14:00 - 15:30

Room: Meeting Hall I

Abstract no.: 28487

MODIFIED L'EPISCOPO PROCEDURE FOR TREATMENT OF ERB'S PALSY

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This study was to analyze the functional outcome of modified Sever L'Episcopo Green technique for treatment of Erb's palsy in children. Elongation of tendons of Pectoralis Major and Subscapularis was performed, with release of glenohumeral capsule in most cases. Besides, transfer of Latissimus Dorsi and Teres Major to posterolateral aspect of upper humerus was conducted, with excision of most of the coracoid process and anterior part of acromion. A series of 19 patients in between March 1988 and November 2009 were treated by this method. Average age at operation was 8 years and 4 months (4 years and 6 months to 16 years). Only one incision anteromedial Henry-Thompson was used. Custom made brace was prepared preoperatively, and was applied immediately postoperatively. According to Mallet classification, there was improvement in glenohumeral joint movements, with total score increased from 11.5 to 20.1. The improvements of abduction and external rotation were statistically significant with $p\text{-value} < 0.005$ through application of paired t-test, comparing pre-operative with post-operative values. Better functional outcome of shoulder movements and a more useful upper limb were achieved in all patients with minor complications.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder II

Time: 14:00 - 15:30

Room: Meeting Hall I

Abstract no.: 29397

**TENDON TRANSFER AROUND THE SHOULDER FOLLOWING
PARALYSIS OF THE BRACHIAL PLEXUS**

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Purpose: To demonstrate that the correct operative technique can improve abduction of the paralyzed shoulder. Methods: The operation most commonly performed was for abduction, namely for paralysis of the deltoid. The second type of operation was performed for external rotation of the upper extremity. The operation consists of 1) transfer of the insertion of the trapezius, with piece of bone to the greater tuberosity 2) levator scapulae to the greater tuberosity 3) latissimus dorsi and teres major transfer to the outer border of the humerus 4) short head of biceps to acromion 5) long head of triceps to acromion. Results: Excellent 8; Good 12; Fair 10. Conclusions: Transfer of the trapezius to the upper humerus has produced marked improvement in shoulder function.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder III

Time: 16:30 - 18:00

Room: Meeting Hall I

Abstract no.: 28221

OUTCOMES WITH COMBINED ARTHROSCOPIC ROTATOR CUFF REPAIR AND CAPSULAR RELEASE FOR PARTIAL-THICKNESS ROTATOR CUFF TEARS WITH SEVERE SHOULDER STIFFNESS

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(Purpose) The purpose of this study was to analyze clinical and structural outcomes of combined arthroscopic rotator cuff repair (ARCR) and capsular release (CR) for partial-thickness rotator cuff tears (PTRCT) with severe shoulder stiffness. (Methods) The subjects were 119 patients with PTRCT with mean age of 55.9 years old. Types of PTRCT were bursal-sided tear (BST) in 80 patients and articular-sided tear (AST) in 39. 48 patients with severe shoulder stiffness, including BST in 32 and AST in 16, underwent ARCR and CR. 71 patients with mild stiffness or without stiffness, including BST in 48 and AST in 23, underwent ARCR without CR. With regard to ARCR, transtendon repair was performed in 34 patients, take-down and repair in 5 and single row repair in 80. Clinical and structural outcomes were assessed on the basis of the UCLA score and postoperative MRI. The average follow-up period was 16.3 months. (Results) The average UCLA score in the 48 patients underwent ARCR and CR improved from 19.8 points preoperatively to 32.9 points postoperatively, and that in the 71 patients underwent ARCR without CR improved from 24.9 points preoperatively to 33.3 points postoperatively. There was no significant difference between the 2 groups in the postoperative UCLA scores at the final follow-up. Postoperative MRI findings revealed that all of the patients in the 2 groups obtained sufficient thickness and no re-tear of the repaired cuff. (Conclusion) This study suggested that combined ARCR and CR for PTRCT is a secure and reliable procedure to predict clinical and structural outcomes satisfactorily. Therefore, this procedure can be considered as a first-line therapy as well as nonsurgical treatments for PTRCT with severe symptoms and shoulder stiffness.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder III

Time: 16:30 - 18:00

Room: Meeting Hall I

Abstract no.: 28625

THE EFFECT OF PLATELET-RICH-PLASMA ON ROTATOR CUFF TENDON HEALING

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Purpose of the study is to show enhanced rotator cuff tendon healing to the bone after local autologous platelet rich plasma injection at rat rotator cuff injury model. Rotator cuff injury was created at sixty-eight rats' left shoulders. Platelet rich plasma was obtained from the blood of the rest 15 rats. Platelet rich plasma or saline was injected to the repair area intraoperatively. The rats were sacrificed two and four weeks after the surgery. Histological analysis dependent on a semiquantative scoring was performed (n:7 per group). Increase of the vascularity, inflammatory cells and degree of the new bone formation, tendon continuity were evaluated. Rest of the tendons (n:10) were mechanically tested. Degree of inflammation and vascularity were less at study group at both time intervals ($p<0.05$). Tendon continuity was better at the study group at 2 weeks ($p<0.05$). Obvious new bone formation was detected at control group at 4 weeks ($p<0.05$). Biomechanically, platelet rich plasma-treated specimens were stronger at 2 weeks ($p<0.05$). The initial tendon to bone remodelling is enhanced by local application of autologous platelet rich plasma. This may represent a clinically important improvement in rotator cuff repair.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder III

Time: 16:30 - 18:00

Room: Meeting Hall I

Abstract no.: 28024

EFFECTS OF SELECTIVE PARALYSIS OF THE SUPRASPINATUS MUSCLE WITH BOTULINUM TOXIN A IN ROTATOR CUFF HEALING IN RATS

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Some studies suggest that poor medium and long-term results in rotator cuff repair are due to increased pre-load in old and/or large rotator cuff lesions. Therefore we performed a selective paralysis of the supraspinatus muscle using botulinum toxin A in rats in order to decrease tension at the tendo to bone interface after rotator cuff repair. The aim of the study was to examine if tendon to bone healing after rotator cuff repair can be beneficially affected by lowering tendon pre-load. Furthermore we wanted to study if postoperative immobilisation has a greater benefit than free mobilization. Seven days prior to surgery we infiltrated the right supraspinatus muscle with 6 units/kg body weight respectively the same volume of NaCl. Sprague-Dawley rats were then operated upon the right shoulder detaching the supraspinatus tendon. In one group we reattached the tendon right away. In another group, to simulate an old lesion, we resected 1mm of tendon tissue and reattached it afterwards. Half of the animals were postoperatively immobilized for 2 days using a cast. Rats were harvested after 8 weeks. The histological examination was performed using hematoxylin-eosin staining and Safranin-O as well as immunohistochemistry (collagen 1 and 3). We were able to demonstrate that tendons at the tendo to bone interface whose muscle had been infiltrated with botulinum toxin A had a higher level of collagen 1. This effect was significant in all animals whose tendon had been shortened 1mm ("old" defect). Postoperative immobilization had no significant effect on histology.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder III

Time: 16:30 - 18:00

Room: Meeting Hall I

Abstract no.: 29860

SHOULDER INSTABILITY AS A CAUSE OF ROTATOR CUFF IMPINGEMENT. AN ENTITY THAT SHOULD BE EMPHASIZED IN OVERHEAD ATHLETES

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Aim: To present shoulder instability as a cause of rotator cuff impingement in overhead athletes and the results of prompt therapeutic interventions. **Materials & Methods:** Thirty one overhead athletes who presented rotator cuff impingement and shoulder instability were included in the study. The patients were divided in two groups. Group A: 17 patients (11 female, 6 male, average age: 21 y.o.) who were received treatment for both rotator cuff impingement and shoulder instability. Group B: 14 patients (9 female, 5 male, average age 24 y.o.), who were initially treated for rotator cuff impingement alone, as shoulder instability was initially misdiagnosed. Patients in group A additionally followed an ongoing strengthening program of the shoulder girdle muscles and modification of their technique where applicable. Average follow-up was 14.2 months (6 to 26) in group A and 9.8 months (4 to 16) in group B. **Results:** Patients in group A presented a significantly better outcome (mean Constant Shoulder score increased from 74 to 94) compared to patients in group B (mean Constant Shoulder score increased from 76 to 82) at the end of follow-up. Fifteen patients (88.2%) in group A were able to participate in unrestricted sports activities where as 7 patients (50%) in group B were able to continue high-level sports activities with few restrictions. **Conclusions:** Shoulder instability should be emphasized as a quite common cause of rotator cuff impingement in overhead athletes. Prompt therapeutic intervention is critical for a significantly better outcome in this high-demanding population.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder III

Time: 16:30 - 18:00

Room: Meeting Hall I

Abstract no.: 30073

ACUTE SUBSCAPULARIS CALCIFIC TENDONITIS MIMICKING SEPTIC ARTHRITIS DIAGNOSED AND MANAGED IN THE EMERGENCY DEPARTMENT UNDER ULTRASOUND GUIDANCE

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Acute severe shoulder pain caused by calcium hydroxyapatite crystals precipitating acute calcific tendonitis is a diagnosis, which should not be forgotten as presentation to the orthopaedic clinic, and emergency department can mimic septic arthritis. We present a case of acute subscapularis calcific tendonitis managed in the emergency department. Our case presents acutely with a short history of severe shoulder pain with marked restricted movements, pyrexia and raised inflammatory markers with normal radiological appearances. The differential diagnosis includes septic arthritis of the glenohumeral joint. Acute calcific tendonitis is known to mimic sepsis but may only be diagnosed after invasive joint aspiration has been performed to exclude sepsis. Our patient was investigated and managed in the emergency department by the Orthopaedic consultant on call using portable Ultrasound (USS). This provided diagnostic as well as therapeutic benefit. The USS revealed a large calcific deposit in the subscapularis tendon, which was not identified on the conventional radiographs. The patient's shoulder was injected with local anaesthetic and steroid with 'needling' to the calcific deposit, after a dry aspiration. The patient's symptoms settled within 24 hours and were discharged from follow up one week later. This case highlights acute subscapularis calcific tendonitis as a differential to consider in the acutely painful shoulder. Also, the diagnosis and treatment may immediately be facilitated by portable ultrasonography in the emergency department. The benefits of USS in the diagnosis and management of acute calcific rotator cuff pathology is sinister pathology can be excluded and effective treatment can be instigated.

Date: 2011-09-08

Session: ESSSE/SICOT - Shoulder III

Time: 16:30 - 18:00

Room: Meeting Hall I

Abstract no.: 29462

CALCIFIC TENDINOSIS OF SUPRASPINATUS TREATED BY RADIOFREQUENCY MICROTENOTOMY

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Objectives: Calcific tendonitis, as a cell-mediated process, involves metaplastic changes resulting in fibrocartilage differentiation of the tendon with poor self-repair capacity. We report a new technique of arthroscopic treatment of supraspinatus calcific tendonitis in attempt to improve the healing potential. The aim of this prospective study was to compare the standard arthroscopic needle technique with a technique using radiofrequency-induced plasma microtenotomy as enhancement of arthroscopic treatment. **Methods:** 20 prospective patients suffering painful rotator cuff calcific tendonitis were divided into two equal groups. Group A was treated by standard arthroscopic technique with needle removal of calcific deposits. Group B patients underwent identical surgery with additional stimulation using bipolar radiofrequency-induced plasma microtenotomy (Topaz-XL Arthrowand, Arthrocare). All patients were clinically assessed for pain, ROM and Constant score, prior, at 3 and 6 months after the operation. **Results:** We have observed inferior clinical outcome measured by postoperative Constant score in the group A when compared with patients from group B with additional microtenotomy. The mean preoperative Constant score in both groups was 53,6 (31-69). The postoperative Constant score in Group A increased to mean 68,3. The mean postoperative Constant score in Group B was 82,5. The above difference of the two patient groups was evaluated as statistically significant. **Conclusions:** This study has shown that a use of bipolar radiofrequency microtenotomy in addition to arthroscopic needle removal of calcific deposits from supraspinatus provides better clinical outcome to patients with a chronic calcific tendinitis irresponsive to conservative treatment measures.

Date: 2011-09-08

Session: Knee - Long-Term Results

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 28488

LONG TERM SURVIVORSHIP OF PFC PRIMARY TOTAL KNEE ARTHROPLASTY: A SURGEON'S EARLY EXPERIENCE!

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Introduction: Total knee arthroplasty is an elegant procedure and has proved to be successful for the management of arthritis in knee joint. We report long term outcome of PFC knee replacement performed by the senior author in the early years of her career. Aims: To assess the long term radiological and functional outcome of the primary TKA. Materials & Methods: We retrospectively reviewed 50 TKA in 45 patients (5 bilateral) operated between 1993 and 1997. Functional outcome was assessed by Oxford Knee Score and radiological outcome by the Knee Society radiological score for aseptic loosening. Results: Of the 45 patients 24 were male and 21 were female. The average age at the time of surgery was 66 years and 4 months (50 to 80 years). Complete survival data was available for all the patients. None of the patients were lost to follow up. The average follow up was 12.5 years with range 8 to 16 years. Osteoarthritis was noted as diagnosis in 40 patients and in rest 5 it was rheumatoid arthritis. All the cases had cruciate retaining implant and patella was not replaced in any of the cases. Statistically significant improvement was noted in average post-operative OHS (16.5) as compared to pre-operative OHS (38.5) ($p < 0.01$) Only 3 patients underwent revision surgery for aseptic loosening. There were no cases of deep infection. Conclusion: Our results show excellent long term results with 97% survivorship with revision as end point for aseptic loosening and for any reason.

Date: 2011-09-08

Session: Knee - Long-Term Results

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 28997

COMPARISON OF 4-YEARS SURVIVAL OF CEMENTED AND CEMENTLESS TOTAL KNEE PROSTHESES

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Background: Although excellent results have been reported with cemented fixation, means to improve the longevity of total knee replacements continue to be of interest. Based on good results obtained for hip, one of the possible choices is the use of cementless fixation. Trabecular tantalum tibial components offer increased bone ingrowth, due to their porous structure similar to that of bone. Monoblock design prevents the back-side wear. Methods: From January 2005 to December 2009, 455 cementless NexGen® total knee replacements with Trabecular Metal Monoblock Tibial component (Zimmer), and 349 NexGen® High-Flex (Zimmer) total knee replacements with bone cement fixation have been implanted. Patient demographic data of both groups were analysed. Results: Mean follow-up for cementless prostheses is 3.6 years, and 3.3 years for cemented version. In the cementless group, 9 out of 455 prostheses were revised: 5 infected, 1 rigid, 1 instable, 1 malpositioned and 1 patella resurfacing. 17 patients (18 knees) died. In the cemented group, 8 out of 349 prostheses were revised: 3 infected, 3 patella resurfacing, 1 periprosthetic fracture and 1 dislocation of PE insert. 15 patients died. Four years survival rate for Monoblock NexGen® is 97.1% and for classical cemented NexGen® 98.1% with no statistically significant difference. Conclusions: The advantage of cementless fixation is shorter operation time and avoidance of adverse effects of cement and direct osseointegration. Possible disadvantage of higher infection incidence due to lack of antibiotic cement is not statistically significant at this follow up.

Date: 2011-09-08

Session: Knee - Long-Term Results

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 30226

COMPARISON OF RESULTS OF AGC TKA BETWEEN CLINICAL STUDIES AND NATIONAL ARTHROPLASTY REGISTERS

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There exists two major data sources for the assessment of outcome and revision rate after total joint arthroplasty, namely clinical studies and national arthroplasty registers. The purpose of the present study was to analyse the outcome of Anatomical Graduated Components TKA reported in clinical studies and to perform a comparison with the outcome reported by National Arthroplasty registers. A systematic literature review was performed using a standardized methodology in order to determine the outcome and revision rate of AGC TKA. A comprehensive meta-analysis of clinical studies and register results were checked for quality of basic data. We found significant differences between the revision rate in terms of revisions per 100 observed component years was significantly lower in clinical studies from the development team of the implant compared to worldwide register data. In fact, they reported a revision rate of 0.18 revisions per 100 observed component years whereas Annual reports of arthroplasty registers report 0.74 revisions per 100 observed component years. A comparison of results from national arthroplasty registers of different countries revealed a significantly higher revision rate for Denmark compared to worldwide register data. A conventional meta-analysis of clinical studies is affected by the influence of the development team and therefore subject of bias. For the assessment of outcome are to be rated superior, and, in terms of reference data for the detection of potential bias factors in the clinical literature, could make an essential contribution to scientific meta-analysis.

Date: 2011-09-08
Session: Knee - Long-Term Results
Time: 10:30 - 12:00
Room: Meeting Hall IV

Abstract no.: 27503

DESIGN RATIONALE AND MID-TERM RESULTS OF THE E.MOTION KNEE SYSTEM

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Design Rationale: The e.motion FP knee is a floating platform design. The design of the femoral components is based on two main radii, one anterior radius for a long and deep patellar groove and only one radius for the main segment of both condyles, representing a ball in socket design. Results: The mid-term results include the first series of 130 consecutive cases. The follow-up period was 66.4 months with a maximum of 78 and a minimum of 55 months. Diagnoses were 70% osteoarthritis and 30 % inflammatory joint diseases. The KSS was 98.6 points preoperatively (clinical 48.6, functional 49.9) and 184.3 points postoperatively (clinical 93.8, functional 90.5). ROM ranged from 80° to 140° with an average of 121.3°. 74.4% of cases had a postoperative ROM of 120° and more. Alignment represented by the mechanical axis was excellent in 89.8% and only 3.4% were unacceptable. With manual instrumentation, an excellent alignment was achieved in only 71.2% and 6.1% outliers were observed. Conclusions: The mid-term results using the e.motion knee system are promising. A majority of patients show excellent function with three quarters of patients flexing beyond 120°. However, it is believed that with regard to patient selection the fully mobile floating platform design is the adequate solution for the younger active patient with sufficient muscular control of the kinematics of such design. Knee navigation facilitates proper alignment of the components. The results favourably compare with literature data.

Date: 2011-09-08

Session: Knee - Long-Term Results

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 28014

FUNCTIONAL OUTCOME OF MINI-ROBOT COMPUTER ASSISTED PRIMARY MOBILE BEARING UNCEMENTED CRUCIATE RETAINING TOTAL KNEE ARTHROPLASTY BETWEEN MEASURED RESECTION AND GAP BALANCING TECHNIQUES: A RANDOMISED CONTROL STUDY

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Aim: Computer navigated Total Knee arthroplasty is routinely performed with gratifying results. New navigation software is now designed to help surgeons balance soft tissues in Total Knee Arthroplasty (TKA). The aim of our study was to compare functional scores at two years between two different techniques of knee balancing. **Material and Methods:** A prospective randomized control study was conducted between February 2007 and February 2008 involving 52 patients. Two different techniques of knee balancing were used namely, measured resection and gap balancing technique. Each group had 26 patients. Oxford and Knee society scores were done at two years to understand if one technique was better than other. **Results:** Oxford and Knee Society Scores improved significantly in both the groups. Gap balancing was associated with slightly better improvement in Knee Society Score (KSS), Functional Knee Society Scores (FKSS) and Revised Oxford Knee Scores (ROKS) postoperatively which were not significant on statistical analysis. In measured resection group KSS, FKSS and ROKS improved from 34.3, 48, 21 preoperatively to 85.9, 89.6, 36.5 respectively. In gap balancing group KSS, FKSS and ROKS improved from 35.4, 50, 22.5 preoperatively to 89.1, 92.4, 40.6 respectively. **Conclusions:** Computer assisted measured resection and gap balancing techniques in TKA reliably improves functional scores postoperatively. Gap balancing technique is associated with slightly better functional results. Both techniques if performed correctly with appropriate patient selection will have satisfactory outcomes.

Date: 2011-09-08

Session: Knee - Long-Term Results

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 29581

RETROSPECTIVE ANALYSIS OF THE RESULTS OF APPLICATION OF TOTAL KNEE IMPLANTS WITH METAL-BASE AND ALL-POLYETHYLENE TIBIAL COMPONENTS

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The question on expediency of knee prosthesis with AllPoly tibial components is still far from a decision. Typical, its application is limited by social indications. However, the follow-up results of AllPoly implants are not worse but sometimes better than on metal tibia. The aim of this study is analyze of long-term follow-up results of total knee replacement (TKR) with different tibial components. METHODS: Follow-up results (from 8 to 12 years) of 809 primary total knee replacements, revisions after these operations and reasons of revisions have been studied. Patient's evaluation included clinical assessment (Knee Score), functional examination and standard x-ray. 2 groups have been allocated. The first group (670 patients) has been formed by patients with TKR with metal-base tibial component. The second group (139 patients) has been formed by patients with TKR with all-polyethylene tibial component. RESULTS: 20 revisions were performed after 809 primary total knee replacements. Reasons of revisions were: periprosthetic infection (11 cases), aseptic loosening (5 cases), contracture (2 cases), failure of collateral ligaments (1 case), idiopathic pain (1 case). 19 revisions (2,8 %) were performed after total knee replacements with application of metal-base tibial components. 1 revision (0,7 %) in patients with periprosthetic infection were performed after application of all- polyethylene tibial components. Knee and functional scores were similar in both groups. DISCUSSION: In spite of higher price of total knee implants with metal-base tibial components and their considerable popularity, application of all-polyethylene tibial components give good results, are easier technically and more reasonable economically.

Date: 2011-09-08

Session: Knee - Long-Term Results

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 29170

A 12- TO 15-YEAR FOLLOW-UP STUDY OF THE ROTAGLIDE MOBILE BEARING TOTAL KNEE ARTHROPLASTY

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We report long-term outcomes of the Rotaglide mobile bearing total knee arthroplasty (RTK). (Method) Between 1995 and 1998, 61 RTK prostheses were implanted at our institution consecutively. Of 34 knees with a median duration to end of follow up of 14.0 years (range 12.4 to 15.2 years), the clinical result using Knee Society Score and radiological analysis using Knee Society Roentgenographic System was evaluated. (Result) The prosthesis had an estimated survival probability of 94.1% at 14 years. There was one case of deep infection and one case of meniscal component failure. The mean Knee score and function score at final follow-up are 90.0 ± 8.3 and 61.8 ± 29.6 . The mean postoperative range of motion at final follow-up was from 0.7° (range $0-20^\circ$) to 117.8° (range $90-135^\circ$). The mean post operative FTA, α angle, β angle, δ angle are $173.8 \pm 3.9^\circ$, $96.4 \pm 2.2^\circ$, $90.9 \pm 3.1^\circ$, $81.3 \pm 2.9^\circ$. Clear zone was recognized in 2 tibia components but no progression was confirmed in the follow-up duration. (Discussion) RTK is mobile bearing total knee which has a meniscal component that is able to glide antero-posteriorly and rotate on the tibial component. Area contact between meniscal component and femoral component can be maintained from 0° to 90° of flexion. RTK gives satisfactory long-term clinical results. No knees were revised for aseptic loosening. This may be a result of the implant design.

Date: 2011-09-08

Session: Knee - Long-Term Results

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 29273

5-7 YEAR RESULTS FOLLOWING TOTAL KNEE ARTHROPLASTY WITH THE COLUMBUS KNEE SYSTEM

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¹University Medical Center, Department for Orthopedic and Trauma Surgery, Freiburg (GERMANY), ²Schwarzwald-Baar-Klinikum, Department for Trauma, Hand and Reconstructive Surgery, Villingen-Schwenningen (GERMANY)

Background: The Columbus total knee arthroplasty system (Aesculap, Tuttlingen, Germany) has been introduced in 2002. Thus far no mid-term results have been published with this system. Aim of this study was to evaluate clinical and radiologic results with a minimum follow-up of 5 years. Patients and methods: 196 consecutive patients underwent cemented cruciate retaining TKA using the Columbus system. Patients were retrospectively assessed for implant survivorship and overall patient survival rate. Patients that survived without implant removal until a 5 year minimum follow-up were assessed for ROM and KOOS scoring. Long leg standing and short film radiographs at time of follow-up were obtained. Results: Mean patient age at time of surgery was 79 years. 52 patients (26.5 %) died for reasons not related to the TKA procedure before minimum follow up without having undergone revision surgery. Revision TKA was performed in 4 patients (2.1 %) for persistent pain (1), aseptic (2) or septic loosening (1). 4 patients were excluded after above knee amputations for PAOD (3) and periprosthetic fracture (1). Out of the remaining 136 patients 115 (85 %) were available for follow-up at a mean 5.8 years (5-7). Mean KOOS scores were 79 (pain), 81 (symptom), 78 (activities of daily life), 69 (quality of life) and 50 (sports and recreation). Mean postoperative alignment was 1.1° varus (-4 – 7°). Conclusion: TKA using the Columbus knee system provides a safe and effective treatment option. Midterm survivorship and clinical results are promising and in the range of other successful TKA systems.

Date: 2011-09-08

Session: Knee - Long-Term Results

Time: 10:30 - 12:00

Room: Meeting Hall IV

Abstract no.: 30060

PRELIMINARY EXPERIENCE WITH THE CUSTOM-FIT TOTAL KNEE ARTHROPLASTY: COMPARISON WITH A MATCHED CONTROL GROUP

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In this case control study study we compared blood loss, operation time, length of hospital stay, and alignment of 40 custom-fit TKA's (total knee arthroplasties) with results of 40 controls, operated on by conventional intramedullary alignment technique. Alignment and percentages of outliers $> 3^\circ$ in mechanical axis of the leg and flexion/extension and varus/valgus of the individual prosthesis components were measured on standing, long-leg and standard lateral radiographs. Mean operation time was 9.8 minutes shorter ($p = 0.001$), blood loss was 60 millilitres less ($p = 0.013$) and length of hospital stay was 0.8 days shorter ($p = 0.031$) for custom-fit TKA compared to intramedullary aligned TKA's. Mean mechanical axis of custom-fit TKA's was 180.7° , with 28.9% outliers and mean mechanical axis of conventional TKA's was 178.8° , with 48.4% outliers. Percentages of outliers in the frontal plane were 5.3% and 30.0% for femoral components and 18.4% and 20.0% for tibial components in the custom-fit TKA's and conventional TKA's, respectively. Percentages of outliers in the sagittal plane were 41.0% and 86.8% for femoral components and 35.9% and 55.3% for tibial components in the custom-fit TKA's and conventional TKA's, respectively. Our results confirm the theoretical advantages of custom-fit TKA over intramedullary aligned TKA. Larger RCT's are needed to define the future role of custom-fit TKA's.

Date: 2011-09-08
Session: Knee - Patella
Time: 14:00 - 15:30
Room: Meeting Hall IV

Abstract no.: 28176

**CONGENITAL DISLOCATION OF THE PATELLA TREATED BY
COMBINED ROTATIONAL HIGH TIBIAL OSTEOTOMY AND KNEE
ARTHROPLASTY**

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Congenital dislocation of the patella is defined as a permanent lateral dislocation of the patella from birth. All of the cases described have extreme external tibial torsion as the major anatomical abnormality. Soft tissue releases and patellar tendon transfers have generally failed to correct the dislocation. Hypoplasia of the trochlea and poor articular cartilage of the patellofemoral joint are associated problems. Symptoms vary from extensor weakness to knee instability. Conventional knee replacement surgery usually fails due to the very abnormal anatomy. Knee replacement components cannot be rotated sufficiently to normalize the extensor mechanism. CT scans are used to assess the location and degree of the rotational abnormality. We have performed combined rotational osteotomy and total knee replacements in nine knees in eight patients. The rotational osteotomy of the proximal tibia is carried out to "normalize" the extensor mechanism, and the knee arthroplasty is carried out simultaneously or sequentially. Our preoperative concerns were limitation of flexion after reduction of the patella, due to a tight extensor mechanism and patellofemoral pain due to abnormal architecture and articular cartilage. All patients achieved over 90 degrees of flexion and all patients achieved higher activity levels and strength.

Date: 2011-09-08
Session: Knee - Patella
Time: 14:00 - 15:30
Room: Meeting Hall IV

Abstract no.: 30221

PATELLAR SUBLUXATION IN CR TYPE TKA WITH NONRESURFACING PATELLA

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Purpose: The purpose of this study was to evaluate patellar subluxation in TKA. **Methods:** The CR type TKA with nonresurfacing patella was performed in 36 consecutive knees with primary medial OA. Patelloplasty included osteophyte resection for good recovery of patellar shape and no drilling of erosive portion. The mean age of the patients was 72.7 years. At 1 year follow-up, JOA (Japanese Orthopaedic Association) score, ROM, and congruity of the patella using the axial views of 30, 60, and 90 degrees were evaluated. The approach was mini-parapatellar approach. The medial retinaculum was sutured with the knee flexed at 60 degrees. **Results:** The mean JOA score was 87.5 points and the knee flexion angle was 132 (103-155) degrees at FU. In the axial view of 30 degrees knee flexion, the mean lateral tilt and lateral displacement were 6.8 degrees and -1.0 mm at the FU. There were no knees with more than -5mm or +5mm lateral displacement. 33 knees had good patellar congruity in all axial views of 30, 60, 90 degrees. 28 knees showed no bony change of the patella. 5 knees had mild sclerotic change of the patella bone and 3 knees had mild radiolucent change. **Discussion & Conclusion:** The rate of lateral subluxation was reported in 30-40% laterally and the rate of good congruity was only in 50-60%. However in our cases, the rate of patellar subluxation was extremely low. This may be one reason why the angle of medial retinaculum suturing was performed at 60 degrees.

Date: 2011-09-08
Session: Knee - Patella
Time: 14:00 - 15:30
Room: Meeting Hall IV

Abstract no.: 29740

PATELLOFEMORAL INSTABILITY TREATED BY ARTHROSCOPIC TROCHLEOPLASTY – THE NEW TECHNIQUE WITH EARLY PROMISING RESULTS

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The dysplastic trochlear is a developmental condition characterized by an abnormally flat or dome-shaped trochlea and it is recognized as a significant cause of patella instability. Surgical correction of the shape of the Trochlear Groove is frequently performed. The described methods in the literature involve open arthrotomy to normalize and maintain the trochlear morphology achieving normal alignment and tracking of the patella. Open procedures carries a significant risk of arthrofibrosis. We describe an arthroscopic procedure to create a neo-trochlea using gouges, spherical and conical hooded burrs. We studied prospectively a series of 4 consecutive patients with patello-femoral instability secondary to trochlear dysplasia, who were treated by an Arthroscopic trochleoplasty by a single surgeon between 2007 and 2008. Postoperatively the patients were rehabilitated in accordance with our routine Patello-Femoral microfracture protocol. CT scanning at one year showed a complete neo-cortex and cartilage sequenced MRI at 12 months showed complete fill with fibro cartilage. Pre- and post-operative scores (KOOS, Kujala) were assessed by the patients and a satisfaction questionnaire was completed. The results showed a statistical improvement in the outcome at the 3 year follow up. Overall, patients (100%) were satisfied with the outcome of their procedure and there have been no adverse events. To our knowledge this technique has not been described before in the English literature and the early results of arthroscopic trochleoplasty are encouraging and offer an alternative to open approaches. Larger numbers and longer follow ups are needed to confirm the long term benefit.

Date: 2011-09-08
Session: Knee - Patella
Time: 14:00 - 15:30
Room: Meeting Hall IV

Abstract no.: 29569

CLINICAL AND FUNCTIONAL OUTCOME OF TOTAL KNEE ARTHROPLASTY (TKA) WITH OR WITHOUT PATELLAR RESURFACING – ASIAN PERSPECTIVE

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BACKGROUND AND PURPOSE: Patellar resurfacing in total knee arthroplasty remains controversial. Present literature regarding the clinical outcomes of patellar resurfacing in TKA in Asian population is limited. Hence, the objective of our study was to assess the clinical and functional outcome after primary non-resurfaced and resurfaced TKA in Asian population and to compare with the western population. **METHODS:** We retrospectively analyzed the results of 155 non-resurfaced and 105 resurfaced TKA operated during December 2008 to December 2009 in our institute. Knee Society score / WOMAC / SF-36 and functional outcomes were measured both preoperative and postoperative follow up period. **RESULTS:** Both groups were comparable in terms of mean age (nonresurfaced) 66.15 and 65.81 (resurfaced) and Preop (Mean scores nonresurfaced – SF-36: 29.75/49.46 Knee score 43.78, 34.84 & WOMAC - 55.79) and (Mean scores resurfaced – SF-36: 30.1/ 48.85, Knee score 43.43 35.81 & WOMAC – 56.15). Postoperative knee and function scores showed significant improvements in both groups; however there were no significant difference between the groups, except for the rate of anterior knee pain. Complication rates like DVT, superficial infection were similar in both the groups. **CONCLUSION:** The results of our study indicate that resurfacing of the patella has no clinical effect on pain and function after a TKA; however the rates of anterior knee pain and stair climbing were better in the resurfaced group. The results of our study are comparable to western population.

Date: 2011-09-08
Session: Knee - Patella
Time: 14:00 - 15:30
Room: Meeting Hall IV

Abstract no.: 28940

OCCURENCE OF DVT IN PATIENTS WITH PATELLA FRACTURES

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Patella fractures are relatively rare in orthopaedic trauma, representing 1% of all fractures. Although there is ample literature regarding the prevention of venous thrombotic events (VTE) associated with lower extremity trauma, the vast majority of these patients have sustained long bone fractures. There is no clear deliniation of how the VTE risk in patients with isolated patella fractures should be managed. Methods: We describe three patients who underwent surgical treatment of patella fractures at our institution over the last two years, and who developed either deep vein thrombosis (DVT) or pulmonary embolus (PE) after hospital discharge. Results: One patient sustained a fatal PE 7 days after surgical treatment of a closed patella fracture. Autopsy later revealed bilateral DVTs, segmental pulmonary emboli, and a saddle embolus. The second patient developed a proximal DVT following surgical fixation of an isolated closed patella fracture. The DVT was treated successfully over the course of the next 6 months with anticoagulation methods. The third patient presented with a fatal PE 12 days after undergoing surgical fixation of an open patella fracture. During the treatment course of these three patients, a variety of accepted prophylactic measures were employed by the different treating surgeons. Discussion and Conclusion: We recommend that treating surgeons assess thoroughly patient risks for developing VTE. Surgeons should consider initiating and documenting prophylactic measures both for surgically treated patella fractures and patients who may be immobilized for the non-operative treatment of closed patella fractures. Further studies should assess the incidence of the VTE associated with patella fractures, treated either operatively or non-operatively, with aim of providing more consistent strategies for the prevention of VTE in this patient population.

Date: 2011-09-08
Session: Knee - Patella
Time: 14:00 - 15:30
Room: Meeting Hall IV

Abstract no.: 30144

PATELLAR RESURFACING VERSUS NON-RESURFACING IN STAGED REVISION OF THE INFECTED TOTAL KNEE ARTHROPLASTY

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Background: The aim of this study was to investigate outcomes of surgical management with unresurfaced patella in the 2nd staged infected TKA. Methods: The study included 49 knees of 48 patients with 2nd staged septic revision TKA from January, 2007 to June, 2008. We divided these patients into the patellar resurfacing group(Group A) which had 22 patients (23 knees) and patellar retention group(Group B) had 26 patients (26 knees) and compared the clinical results. We evaluated these two groups using the KSS score, WOMAC score and anterior knee pain rating scale. Recurrence of infection rate was also investigated. Results: Mean Preoperative KSS score, Knee function score and WOMAC score were 43.07, 34.81 and 41.04 in Group A and 45.25, 38.75 and 44.45 in Group B, respectively. The value of those outcomes after reimplantation was significantly improved into 66.12, 54.58 and 70.46 in Group A and 69.4, 61 and 77.8 in Group B, respectively. There were no statistically significant differences between the two groups. 3 knees had recurrent infection. These infections occurred in a patient who received patella resurfacing and no cases of infection occurred in retention group. Conclusions: The unresurfaced patella did not increase the risk of recurrence in the 2nd staged infected revision arthroplasty and did not show significant clinical differences from resurfaced patella. The results of our study showed that preservation of original patellar bone can be considered as an alternative option for effective patellar managements in staged septic revision TKA.

Date: 2011-09-08
Session: Knee - Patella
Time: 14:00 - 15:30
Room: Meeting Hall IV

Abstract no.: 29870

COMPARING THE MID-VASTUS AND MEDIAL PARAPATELLAR APPROACHES IN TOTAL KNEE ARTHROPLASTY: A META-ANALYSIS

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Background: Proponents of a mid-vastus (MV) approach for primary total knee arthroplasties (TKA) stress its importance in preserving function of the extensor mechanism with earlier rehabilitation postoperatively. We conducted a meta-analysis of RCTs comparing the standard medial parapatellar (PP) and mid-vastus (MV) approaches in primary TKA to substantiate the validity and relevance of this contention. Methods: The study was conducted according to the guidelines described in the Cochrane handbook for systematic reviews. Results: We included 14 studies involving 1177 patients with mean age of 69.5±2 for the MV and 68.9±2.8 for the PP groups. Using a MV approach led to significant improvement in flexion (mean difference (MD) 9.90, 95% confidence interval (CI) 7.94 to 11.86, P<0.000001) and visual analogue scale scores (MD -1.72 95%CI -2.08 to -1.36, P<0.00001) in the first week postoperatively, significant reduction in days to straight leg raise (MD -2.02, 95% CI -3.72 to -0.31, P=0.02) and number of lateral releases (risk difference -0.09 95%CI -0.17 to -0.01, P=0.02) with no increase in complication rates. MV approach lengthened duration of surgery by MD of 8.48 minutes (95%CI 0.52 to 16.44, P=0.04). Conclusion: We conclude that the MV approach offers superior range of movement and pain control over the standard PP approach in the immediate postoperative period after TKA with no increase in complication rates.

Date: 2011-09-08
Session: Knee - Patella
Time: 14:00 - 15:30
Room: Meeting Hall IV

Abstract no.: 28305

**PATELLOFEMORAL HEMICAP RESURFACING ARTHROPLASTY:
LITERATURE REVIEW AND CLINICAL RESULTS**

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Introduction: Majority of localised cartilage defects affect the over 40 year olds with articular cartilage defects identified in 50% of routine knee arthroscopies. These middle aged patients are neither fit for biological repair methods with traditional resurfacing. This remains a serious problem for every orthopaedic surgeon. Different biomechanical studies have shown that untreated defects have lead to progressive degenerative changes and increased contact pressures. Minimally invasive anatomic resurfacing device HemiCAP (Arthrosurface Inc., Franklin, MA, USA) prosthesis is an alternative for focal chondral defects. Methods and Patients: All patients who had received HemiCAP were identified from our theatre records. Clinical data was collected from patient electronic notes. Telephone based patient survey was carried out to determine patients satisfaction of the procedure and longterm physical outcome. Functional outcome was assessed using Oxford knee scores. Results: The study population were all aged less than 50 years (n7). Indication for HemiCAP was pain having failed conservative management. Majority of the patients had intact collaterals and cruciate ligaments on pre-operative arthroscopy. Minimal blood loss was reported during surgery. Early mobilisation was recorded in 100% of the cases. 42% required further surgery because of ongoing pain. Subgroup analysis of persistence of knee and arthroscopic findings of meniscus, collaterals and cruciates tear showed although statically insignificant, an increased recurrence rates leading to failure. Only one patient reported nil relief from knee pain following HemiCAP insertion. Conclusion: Our early clinical study provides evidence that HemiCAP is a promising solution to isolated articular cartilage defect in young patients. There is however, paucity of data on clinical outcomes of this device. However, perhaps this should be avoided if there is arthroscopic damage to other knee ligaments because of increased failure rates.

Date: 2011-09-08
Session: Knee - Patella
Time: 14:00 - 15:30
Room: Meeting Hall IV

Abstract no.: 28013

COMPUTER ASSISTED PRIMARY TOTAL KNEE ARTHROPLASTY BETWEEN OBESE AND NON OBESE PATIENTS: IS NAVIGATION THE ANSWER TO KNEE ARTHROPLASTY IN OBESITY?

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Aim: Total Knee Arthroplasty (TKA) in obese patients has been under rigorous scrutiny due concerns of less satisfying results and increased risk of perioperative complications in this cohort. We conducted a prospective study to observe functional scores between obese and non obese patients at two years after computer assisted TKA. Average stay, time for wound to be dry and perioperative complications were also compared. **Material and Methods:** A prospective study was conducted between February 2007 and February 2008 involving 50 patients. Two different groups of 25 each were made on the basis of Body mass Index (BMI less or more than 30). Oxford and Knee society scores were obtained at two years to observe difference in functional scores between these groups. **Results:** Both non obese (Gp1) and obese patients (Gp2) had significant improvement in their preoperative Knee Society Score (KSS), Functional Knee Society Scores (FKSS) and Revised Oxford Knee Scores (ROKS) ($p < 0.001$). Obese group scored better than non obese group in all the three knee scores. Improvement in KSS, FKSS and ROKS scores in Gp1 when compared with Gp2 was statistically not significant with p-value of 0.63, 0.32 and 0.42 respectively. **Conclusions:** Navigated TKA in obese patients in present study had slightly better functional scores at two years. Obese patients should preferably have navigated TKA to help precise component placement with appropriate soft tissue balancing which is difficult to achieve with conventional non navigated surgery.

Date: 2011-09-08
Session: Knee - Patella
Time: 14:00 - 15:30
Room: Meeting Hall IV

Abstract no.: 27501

DOES AN EXPERIENCED KNEE SURGEON BENEFIT FROM THE USE OF A NAVIGATION SYSTEM IN TKA?

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Objective: The aim of the study was to evaluate whether a well trained knee arthroplasty surgeon would benefit from years of clinical experience with navigation in terms of alignment accuracy. Material: Three consecutive series of 75 TKA's per group of one single surgeon were compared with respect to component alignment. One group (A) was recruited from the time prior to introduction of navigation technology, the two other groups dated from a period eight years later. Group B included manual cases whereas group C included navigation. Alignment was evaluated radiographically at first review. Results: The groups were comparable with each other. Alignment of the mechanical leg axis was significantly better in group B compared with group A ($p < 0.01$) and significantly superior in group C with respect to group B ($p < 0.01$). When the very good cases of each group [mech. axis ($0 \pm 3^\circ$), single femoral and tibial axes ($90 \pm 2^\circ$)] were compared the differences were significant as well ($p < 0.05$). Conclusions: Axis alignment is superior when navigation was used. The results of the historical series are comparable with those of the literature at that time. The significant difference between groups A and B indicates that an experienced knee surgeon may derive considerable benefit from the use of a navigation system with respect to his manual skills in total knee arthroplasty. The intraop. data made available by a navigation system are doubtlessly more exact in comparison to conventional instrumentation sets, thus contributing to a learning effect.

Date: 2011-09-08
Session: Knee - Balancing
Time: 16:30 - 18:00
Room: Meeting Hall IV

Abstract no.: 28095

ISOLATED LATERAL LIGAMENT LAXITY IN PRIMARY TOTAL KNEE ARTHROPLASTY: COHORT STUDY OF STEMMED VERSUS UNSTEMMED IMPLANTS

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Introduction: The role of stemmed implants in the setting of isolated lateral laxity in primary total knee arthroplasty is unclear. We present a cohort study to assess the effect of unstemmed, constrained TKA for isolated lateral laxity. **Methods:** 1745 primary TKA performed by the senior surgeon were reviewed. 39 knees in 33 patients with isolated lateral laxity managed with unstemmed components were compared to matched stemmed controls (37 knees in 28 patients). Lateral instability was defined intra-operatively based on >7mm gap in mid-flexion/ full extension/ figure-of-four with well-positioned components. Primary outcome measures were clinical failure for aseptic loosening (with need for revision as the endpoint) and any radiographic signs of loosening. **Results:** Average follow-up was 43 months for the unstemmed group (UG) and 25 months for the stemmed group (SG). UG and SG were matched for age, gender, BMI, arthritis etiology, and comorbidities. The incidence of isolated lateral ligament laxity in this cohort was 4%. There was no difference in clinical outcomes between cohorts. There was no evidence of radiographic loosening; no revisions were performed for aseptic loosening in either group. **Conclusion:** A post/constraint can be used without stems to compensate for isolated lateral laxity. There is no significant increased risk of loosening with increased constraint, as lateral instability is primarily a swing-phase phenomenon. The goal is limiting varus thrust with improved gait kinematics and patient comfort. Further biomechanical testing and long-term clinical results are needed.

Date: 2011-09-08
Session: Knee - Balancing
Time: 16:30 - 18:00
Room: Meeting Hall IV

Abstract no.: 29902

GAP CHANGES AFTER POPLITEUS TENDON RESECTION DURING TOTAL KNEE ARTHROPLASTY (TKA): A CADAVERIC STUDY IN THAI FEMALE KNEES

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We evaluated the effect of isolated complete resection of the popliteus tendon during TKA on the flexion and extension gaps. In addition, we measured the distance of femoral attachment of popliteus tendon in relation to femoral condyles. Standard TKA was performed in 14 Thai female cadavers. Before the step of bone cuts, the distance from the most distal femoral attachment of popliteus tendon to the distal lateral femoral condyle (DFa-DLFC distance) and the distance from the most posterior femoral attachment of popliteus tendon to the posterior lateral femoral condyle (PFa-PLFC distance) were measured. After all bone cuts were done, the flexion and extension gaps were measured under 98 Newtons tension in the conditions of intact popliteus tendon and complete tendon resection respectively. The mean DFa-DLFC distance was 8.9 mm (range, 6.4 - 10.5 mm) and the mean PFa-PLFC distance was 11.5 mm (range, 9.5 - 14.0 mm). We found that 35.7% of cadavers had DFa-DLFC distances less than 9 mm. After resection of the popliteus tendon, the gap significantly increased in both knee flexion and extension. However, the increase values were less than 2 mm. The routine of 9-mm distal femoral bone cut tends to cause popliteus tendon injury during TKA in small knee that lead to statistically significant increase of knee flexion and extension gaps in medial and lateral sides. However, the value of difference was less than 2 mm which does not have clinical significance.

Date: 2011-09-08
Session: Knee - Balancing
Time: 16:30 - 18:00
Room: Meeting Hall IV

Abstract no.: 28462

POSTERIOR STABILISED IMPLANTS IN PRIMARY TOTAL KNEE REPLACEMENT

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Introduction: The purpose of this consecutive multicentre prospective case series study was to evaluate the short term clinical, functional, and radiological outcome of a posterior stabilised primary total knee arthroplasty (balanSys® PS, Mathys Ltd Bettlach, Bettlach, Switzerland). Methods: 266 (254 monolateral, 6 bilateral) consecutive patients (m/w=1:2; mean age 70.0 yrs; range 44-87 yrs) were treated for osteoarthritis. The follow-up consisted of clinical as well as radiological evaluations, preoperatively, and at 6 weeks, 6 months, 1 and 2 years postoperative. Results: Follow-up information is until now available for 205 cases. 183 cases reached a follow-up time of at least 24 months. The Knee Society Score increased from preoperatively 108.7 to 172.6 points. The mean VAS for pain (0-10) decreased from 7.4 preoperatively to 1.2. The mean VAS for satisfaction increased from 3.5 preoperatively to 8.9. Most striking with this design was the rapid recovery of the patients : - KSS, preoperative : 109, 3m :147, 6m : 166, 12 m: 172 - Knee score, preoperative : 58, 3m : 80, 6m : 87, 12 m: 89 - VAS pain, preoperative : 7.4, 3m : 2.8, 6m : 1.9, 12 m: 1.4 - VAS satisfaction, preoperative : 3.5, 3m : 7.3, 6m : 8.1, 12m: 8.5 Statistical analysis used the Wilcoxon 2 sided test and the Chi-square-test. As major complications we had to revise two patients for instability due to malalignment, and 1 for loosening. 13 patients showed postoperative stiffness. Conclusion: This type of posterior stabilised total knee prosthesis shows promising radiological and clinical short term results, with a rapid recovery and with an acceptable rate of adverse events. In our series patients without patella replacement show a significantly better function score than patients with a replaced patella, although this needs further analysis.

Date: 2011-09-08
Session: Knee - Balancing
Time: 16:30 - 18:00
Room: Meeting Hall IV

Abstract no.: 29120

LONG-TERM RESULTS OF A ROTATING-PLATFORM POSTERIOR STABILIZED TKR DESIGN

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Introduction: Although volumetric wear reduction has been demonstrated in knee simulator studies (ref), there is no long-term in vivo evidence supporting wear reduction and durability with uni-directional rotating platform PS design. This is the first long-term report of this implant, a prospective study investigating clinical and radiographic survivorship with 10 years follow-up. Material and Methods: Between January 2000 to March 2001, 118 consecutive patients (141 knees) received cemented RP TKRs. All patients were followed prospectively using clinical and radiographic criteria as defined by the Knee Society. At minimum nine years follow-up 20 patients were deceased, 11 were lost to follow-up and two refused to participate in the study, leaving 85 patients (100 knees) for final analysis. Results: Good to excellent results were achieved in 95% of patients. There were no cases of malalignment, spinout, aseptic loosening or osteolysis. The mean ROM improved from 111.2 ± 15.2 to 119 ± 3.8 . The mean WOMAC score was 30 ± 14 , KSS scores improved from an average of 48 to 96. Anterior knee pain was present in 15% of cases. The incidence of asymptomatic crepitation and painful crepitation requiring scar excision was 10% and 4% respectively. During this period we had one case of infection and one revision for fracture. Kaplan-Meier survivorship at 10 years for mechanical failure and failure for all failures was 100% and 95.7% respectively. Discussion and Conclusion: Ten-year follow-up of RP-PS design demonstrates excellent clinical and radiographic results with no failures for mechanical reasons.

Date: 2011-09-08
Session: Knee - Balancing
Time: 16:30 - 18:00
Room: Meeting Hall IV

Abstract no.: 28518

REVISION KNEE PROSTHESES FOR DIFFICULT PRIMARY TOTAL KNEE REPLACEMENT: INDICATIONS AND OUTCOME

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Introduction: Revision knee prostheses can compensate for deficient medial and lateral collateral ligaments and deficient bone stock of the proximal tibia and distal femur. These revision prostheses can be used in difficult primary total knee replacement TKR. Material and methods: We have employed revision knee prostheses in twenty seven primary TKR in twenty three patients with average age of 56 years (range 53 to 68). Four patients had bilateral knee replacements. The underlying etiologies for knee arthritis in this series were rheumatoid arthritis (11 knees), advanced osteoarthritis with varus deformity $> 25^\circ$ in (11 knees) and complicated intra-articular fractures (5 knees). The NexGen LCCK revision system was used in all cases (Zimmer, USA). Tibial augments were used in 21 cases; stems were used in all tibial trays and 22 femoral components. The WOMAC and Oxford knee function scores were used for prospective assessment of these patients. Results: At average 23 months follow up (range 12-46 months) all patients except one were satisfied with the outcome. Significant improvement of the WOMAC and Oxford scores were recorded ($P < 0.05$). The arc of movement has improved from (15-74 degrees) pre to (0-95 degrees) post. One patient had repeated instability of her prosthesis and remained in a knee immobilizer. Conclusion: Revision implants can be used as a salvage solution for difficult primary TKR. Functional improvement in knee function is comparable to primary non-constrained prostheses. The effect of using a prosthesis that is constrained to varus and valgus on the long term survival of these implants remains to be seen.

Date: 2011-09-08
Session: Knee - Balancing
Time: 16:30 - 18:00
Room: Meeting Hall IV

Abstract no.: 29139

HOW RELIABLE IS FIXED VALGUS DISTAL FEMORAL RESECTION IN PRIMARY TOTAL KNEE ARTHROPLASTY?

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Introduction: To restore the lower limb mechanical axis in total knee arthroplasty (TKA) the distal femoral valgus resection angle should be equivalent to the angle between the femoral anatomical (intramedullary) and mechanical axes (FAM angle). Most conventional TKA instrumentation guidelines recommend a fixed distal femoral valgus resection angle of either 5° or 6°. Aims: To determine the distribution of the FAM angle in patients undergoing primary TKA and analyse with respect to the pre-operative varus or valgus alignment. Methods: The study consisted of 20 consecutive patients undergoing 25 primary TKA. All patients had preoperative CT scanograms of both lower limbs. The FAM angle and the mechanical femoral tibial angle were measured in both lower limbs in all cases. Results: The mean age was 61.7 years. Twelve of the 40 limbs had varus > 10°. The coronal plane deformity ranged from 22° varus to 11° valgus. The FAM angle was between 5° and 9°, with a median of 6°. The FAM angle was 6° in 45% of cases, 5° in 15%, 7° in 25% and > 7° in 15%. There was a statistically significant difference in mean FAM angle between the two groups (Varus > 10° and varus < 10°/ valgus). Discussion: These data suggest that the recommended fixed 5° or 6° distal femoral valgus resection angle is not reliable in TKA for varus > 10° and may require adjustment.

Date: 2011-09-08
Session: Knee - Balancing
Time: 16:30 - 18:00
Room: Meeting Hall IV

Abstract no.: 30188

CONDYLAR DIFFERENTIAL IN PLANNED TIBIAL CUTS IN TOTAL KNEE REPLACEMENT

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Tibial cut is a vital and crucial step in ensuring adequate and appropriate proximal tibial resection, which is essential for mechanical orientation and axis in total knee replacement. Tibial cut must be individually reliable, reproducible, consistent and an accurate predictor of individual anatomical measurements. Conventional tibial cuts of tibia with fixed measurements can not account for individual variations. While computer navigated total knee replacement serves as a medium to achieve this objective, the technology is not universally applicable for differing reasons. Therefore we evolved the concept and technique of Condylar Differential in planned tibial cuts in conventional total knee replacement, which accounts for individual variations and reflects the individual mechanical orientation and alignment. First a vertical line is drawn on digital or plain weightbearing anteroposterior radiograph for mechanical axis of tibia. Then horizontal lines are drawn across the lowest reproducible points of medial and lateral tibial condyles perpendicular to the mechanical axis of tibia. The distance between these two horizontal lines represents the Condylar Differential. Condylar Differential, adjusted to the nearest millimeter, is maintained in executing the tibial cuts, if necessary successive cuts. We applied this technique in 37 consecutive total knee replacements since August 2009 and found that it is simple, consistent, and effective and individualises the tibial cut for optimal templating of tibia. We encountered no problems, adopting this technique. Condylar Differential contributes to optimal individualized tibial cut in conventional total knee replacement and is a useful alternative to computer navigated option in this respect.

Date: 2011-09-08
Session: Knee - Balancing
Time: 16:30 - 18:00
Room: Meeting Hall IV

Abstract no.: 29504

HINDFOOT ALIGNMENT VARIATION BEFORE AND AFTER TOTAL KNEE ARTHROPLASTY – RESULTS OF A PILOT STUDY

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Introduction: Limb alignment to balance the weight transmission across the knee joint is essential part of total knee replacement surgery. Conventionally the hip-knee-ankle (HKA) axis is considered for correction; however the weight transmission to the ground also involves the joints distal to ankle. Heel alignment will thus play an important part in weight transmission. Genu varum deformities in osteoarthritis are associated with heel valgus deformity and we hypothesize that this deformity persists even after correction of the knee deformity after TKR. Material and methods: patients with primary knee osteoarthritis genuvarus deformity $>10^{\circ}$ but $<30^{\circ}$ were included in the study. Preoperative and three months post operative scanogram and Cosby's ankle radiographs are taken. The HKA and the tibio-calcaneal angles were measured and compared using paired t test. Preoperative genu varum was also correlated with preoperative tibio-calcaneal angle using Pearson's correlation Results: mean HKA improved from a preoperative value of 16.53° (valgus) to 1.36° (valgus). The tibio-calcaneal angle slightly increased postoperative from 13.16° (valgus) to 14° thus the knee alignment returned to normal HKA, however the heel valgus did not change at three months post surgery. This will further lateralize the weight transmission axis. Conclusion: This is a small sample, short follow up pilot study; however it does indicate that the heel valgus deformities may persist after total knee replacement. This may be needed to be considered while preoperative planning, however a longer follow up will be required to assess the complication rates and clinical result.

Date: 2011-09-08
Session: Knee - Balancing
Time: 16:30 - 18:00
Room: Meeting Hall IV

Abstract no.: 27615

POSTOPERATIVE LATERAL LIGAMENTOUS LAXITY AFTER TKA IN THE VALGUS KNEE

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INSTRUCTION: Maintaining good medial and lateral soft tissue balance in the valgus-deformed knee is considered one of the most important factors for successful total knee arthroplasty (TKA). However, this theory is based on the hypothesis that the balance remains unchanged after TKA. We therefore evaluated this hypothesis. **MATERIALS AND METHODS:** Thirty-seven knees (RA, n=33; OA, n=4) showing valgus deformity in 37 women were treated using TKA. Median valgus deformity was 15 degree. Lateral laxity was measured by stress radiograph immediately after TKA (IA), and at 3 months (3M), 6 months (6M), and 12 months (12M) after surgery. **RESULTS:** Mean valgus laxity was 5.0 degree at IA, 4.8 at 3M, 4.1 at 6M, and 4.2 at 12M. In cases showing valgus laxity 5 degree or more at IA, values were 6.9 degree, 6.2, 4.9, and 4.8, respectively. In cases with valgus laxity 3 degree or less at IA, values had increased with time, 2.4 degree, 2.9, 3.0, and 3.6, respectively. Mean varus laxity had changed as 5.5 degree, 4.1, 4.2, and 3.9, respectively. **DISCUSSION:** Keeping the ideal level of lateral balance in TKA is not always possible, particularly in knees showing severe deformity. These findings clarify that lateral soft tissue balance can be controlled automatically even cases in which balance is not ideal during surgery, if ideal alignment is acquired by TKA.

Date: 2011-09-08
Session: High Tibial Osteotomy
Time: 10:30 - 12:00
Room: Meeting Hall V

Abstract no.: 30361

MEDIAL OPEN-WEDGE HTO VS MEDIAL UKA

Alex STAUBLI
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Realignment HTO holds a central position within the therapeutic spectrum for early and medium-grade medial varus osteoarthritis: The group of patients for whom more than one of the above-mentioned procedures would be suitable, is quite large. Degree of osteoarthritis: The realignment osteotomy causes the main weight-bearing zones and the high pressure points to shift from the painful compartment of the joint to the opposite side, which is still intact. Thus, the results are more favorable for moderate osteoarthritis than for advanced unicompartmental osteoarthritis. Patellofemoral osteoarthritis: Many patients with unicompartmental osteoarthritis also show degenerative changes in the medial patellofemoral section of the knee joint. However, if clinically the pain on weight-bearing in the femoro-tibial section of the joint is the major concern, these retro-patellar changes should not be the determining factor to decide against a joint-preserving procedure. Ligament stability: In most cases, the combination of an unicompartmental osteoarthritis with significant knee instability can be treated successfully by a high tibial osteotomy. Varus deformity: In which case high tibial osteotomy [HTO], in which case sled prosthesis?: Regarding the indication for osteotomy or sled prosthesis one should keep in mind that the axial correction osteotomy is especially effective whenever a preexisting bony malalignment is to be corrected. Especially if the osteotomy is carried out at the site of deformity, the joint lines of the proximal and distal tibia are corrected, and thus knee and ankle joints are aligned almost horizontally. Age of the patient: In central Europe, age limits of 65 years for men and 55 years for women are generally advised for juxta-articular high tibial osteotomies. The multi-center follow-up study for high tibial osteotomies using the here shown TomoFix plate have demonstrated very good results even for patients older than 60 years.

Date: 2011-09-08
Session: High Tibial Osteotomy
Time: 10:30 - 12:00
Room: Meeting Hall V

Abstract no.: 30303

OPENING WEDGE TIBIAL OSTEOTOMY FOR LARGE VARUS DEFORMITY

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The results in fifty three knees that had been treated by proximal tibial opening wedge osteotomy for large varus deformity and osteoarthritis of the medial compartment were evaluated after a mean length of follow up of 10 years (range, eight to twelve years). We used a porous beta-tricalcium phosphate (β -TCP) wedge because it is resorbable and osteoinductive. All osteotomies were completely consolidated and complete osseointegration of the remnant of the β -TCP wedge took place. After ten years, forty (81 per cent) of the fifty three knees had an excellent or good result, and in thirteen knees there was recurrent pain for which six had an arthroplasty. Although the results deteriorated with time, time was not the only determinant of the result. Alignment, measured as the hip knee ankle angle on radiographs of the whole limb that were made with the patient bearing weight, was also a determinant of long term results. The best results were obtained in the knees that had a hip knee ankle angle of 183 to 186 degrees. In these knees, there was no pain and no progression of the arthrosis in either the medial or the lateral tibiofemoral compartment. Of the three knees that had an angle of more than 186 degrees, all five had progressive degenerative changes in the lateral compartment. In the undercorrected knees (an angle of less than 183 degrees), the results were less satisfactory, and there was a tendency toward recurrence of the varus deformity and progression of the arthritis of the medial compartment. Therefore, proximal tibial osteotomy is a very suitable operation even for patients who have gonarthrosis of the medial compartment and a large varus deformity.

Date: 2011-09-08
Session: Russian Symposium
Time: 14:00 - 15:30
Room: Meeting Hall V

Abstract no.: 30525

RECONSTRUCTION OF THE DYSPLASTIC HIP AT ADOLESCENTS

Alexander BELETSKY, O.A. SOKOLOV
(BELARUS)

Peculiarities of clinical and radiological conditions of displastic hip joints with account of surgical intervention influence on the degenerative-dystrophic process in the hip joint. To improve the quality of surgical aid to adolescents with displasia of the hip joint by substantiation, development and inculcation into practice of a complex system of modern reparative-restoration interventions on pelvic and femoral bones which provide reorientation of separate parts or the whole hip joint on three planes with restoration of its stability, normal correlations and congruence of articular surfaces. 222 patients at the age of 10-19 with displasia of the hip joint, 319 operations performed on pelvic and femoral bones. Classification of displasia in adolescents with 4 types and algorithm of treatment measures is suggested. Results of surgical treatment of displasia of the hip joint in adolescents by development and inculcation into practice of modern reparative-restoration interventions on pelvic and femoral bones are improved. There are suggested and inculcated into practice new ways and technologies of performing osteotomy-osteoclasia of the ischium and osteotomy of the pubis at triple pelvic osteotomy, bone-plastic reconstruction of the proximal part of the femur, posterior rotational and double lengthening osteotomy of the femur, reconstruction of the supra-acetabular area, plate for osteosynthesis of the greater trochanter.

Date: 2011-09-08
Session: Russian Symposium
Time: 14:00 - 15:30
Room: Meeting Hall V

Abstract no.: 30526

ARTHROSCOPY IN DIAGNOSTICS AND TREATMENT OF KNEE JOINT PATHOLOGY IN CHILDREN

Mikhail GERASIMENKO, Alexander BELETSKY
(BELARUS)

The purpose of this lecture - to describe modern concepts and local experience in performing the mini-invasive operative techniques in cases of rheumatic, orthopaedic and traumatologic pathology of the knee joint in children on the basis of Minsk Clinical Center of traumatology and orthopaedics of 6th city hospital of Minsk. From July, 2005 to May 2011 243 arthroscopic and semiarthroscopic operations were performed at 230 patients. Middle age of patients was 14,3 years (from 2 till 17 years). There were 115 girls and 115 boys among patients. 129 operations (53,1 %) were performed because of pathology of the right knee joint, the others 114 (46,9 %) because of pathology of the left knee joint. 151 from 230 patients (65,7 %) marked a trauma (household or sports) in the anamnesis which provoked the development of pathology. The basic types of a pathology demanding operative arthroscopic intervention were the followings: 1) recent and old damages of meniscuses (partial meniscectomy or organ-saving operation were performed), anterior crucial ligament and collateral ligaments (32,5 %), 2) chondral and osteochondral fractures of the patella, condyles of femur and tibia (18,1 %, attempt of refixation or removal of fragment), 3) synovitis of various genesis (18,1 %, target biopsy with following pathomorphological and immunohistochemical research), 4) chondromalacia of articulate surfaces of the patella, condyles of femur and tibia of various grades (9,1 %), 5) Koenig disease (8,7 %, different tactics in different stages), 6) congenital anomalies of meniscuses (6,2 %, modeling resection), 7) lateral patellar instability (5,8 %, lateral release was performed, in some cases supplemented with reefing of medial patellar retinaculum), etc. No serious postoperative complications among patients were observed. In absolute majority of cases (94,3 %) the positive effect from carrying out of arthroscopy was observed.

Date: 2011-09-08
Session: Russian Symposium
Time: 14:00 - 15:30
Room: Meeting Hall V

Abstract no.: 30292

**NEW POSSIBILITIES OF USING TITANIUM ALLOYS IN
ENDOPROSTHESIS OF LARGE JOINTS**

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Titanium alloys used in hip joint in a long time. However, to this day there are some limitations when applied to the node movement, with cement fixation implants and feet when using a titanium porous coating cups and legs. Russia has developed a new technology changes the structure of titanium alloys, which changes its physical and mechanical properties without breaking the biocompatibility with the human body. The name of this technology – termohidroguenium treatment of titanium alloys. In addition, the modified titanium alloy by vacuum plasma deposition of nitrogen ions is applied nitride ceramics, which provides similar results with an oxide ceramic. New technologies have been used successfully in clinics in Russia for 12 years. A new titanium alloy used in more than 4,000 hip replacement operations.

Date: 2011-09-08
Session: Russian Symposium
Time: 14:00 - 15:30
Room: Meeting Hall V

Abstract no.: 30301

DYNAMIC LSZ INSTRUMENTATION IN TREATMENT OF CHILDREN SCOLIOSIS

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Study Design: Retrospective analysis of the clinical and radiological results of dynamic spine system of Laka, Sampiev, Zagorodniy (LSZ) in treatment of idiopathic scoliosis. Background Data: We invented and introduced into the clinical practice dynamic spine system – LSZ. This instrumentation can be applied to actively growing child's spine without fusion, and does not restrict the growth of the spine in the postoperative period. Objectives: Evaluate the effectiveness of dynamic system LSZ (Laka Sampiev Zagorodniy). Methods: We evaluated results of 500 patients with idiopathic scoliosis who were operated with LSZ instrumentation between 2005 and 2009 with a minimum 24-month follow-up period. The patients' age ranged from 8 to 12 years (mean 11,4 years). Evaluation of the results of correction was performed according to the radiologic studies in the early and late postoperative periods. Results: The mean initial thoracic curve was 56° (35-113°). The mean value of instrumented vertebrae was 9,6. The average frontal correction of the main curve was 76,5%. Normalization of thoracic kyphosis was noted in 78% of patients (mean 41°, range 25 ° -38°). Mean correction of apical vertebra rotation was 37,57%. The surgery time was 60-80 min, range of blood loss 200-300 ml. There were no means of external immobilization in the postoperative period. There were no significant changes in results of correction at 2-year follow up. The mean increasing of height was 5,3 cm. There were not detected neurological and vascular complications in any case. Conclusions: LSZ instrumentation can be successfully applied in conditions of active growing of the spine in the case of early detected scoliosis when the using of stabile systems is difficult. This technique allows achieving high correction of scoliotic deformity and keeping it in the postoperative period.

Date: 2011-09-08
Session: Spine - Special Topics
Time: 14:00 - 15:30
Room: Panorama Hall

Abstract no.: 29952

IN-VIVO DEMONSTRATION OF SPONTANEOUS APICAL VERTEBRAL DEROTATION IN THORACIC ADOLESCENT IDIOPATHIC SCOLIOSIS

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The University of Hong Kong (HONG KONG)

Introduction: Adolescent idiopathic scoliosis (AIS) is a three-dimensional coupling deformity. Various studies have reported vertebral rotational effects with different implant constructs and surgical techniques for AIS. However, none of them has considered the spontaneous coupling effect on vertebral de-rotation produced by correction of coronal deformity. Method: Twenty-five AIS patients with Lenke type 1 with Cobb angles greater than 45° who underwent posterior spinal fusion with instrumentation without direct apical de-rotation were prospectively assessed. Cobb angles (CA) and apical vertebral rotations (AVR) in standing, supine and fulcrum bending positions preoperatively, and in supine position postoperatively, were assessed on x-rays and CT scans. Results: The study entailed 80% females and 20% males (mean age, 15.5 years). The mean preoperative CA (AVR) in standing, supine and fulcrum bending positions were 56 (24), 41 (18), and 20 (10) degrees, respectively. The differences were statistically significant ($p < 0.05$). The mean postoperative CA (AVR) was 15 (8) degrees. The mean difference in AVR between fulcrum bending and post-operation was 2 degrees ($p = 0.06$). The postoperative supine AVR was significantly positively correlated with postoperative CA ($r = 0.82$), and negatively correlated with change in curve magnitude ($r = -0.49$), correction rate ($r = -0.83$) and fulcrum bending correction index ($r = -0.45$) ($p < 0.05$). Conclusions: Spontaneous apical de-rotation occurred concomitantly with correction of the coronal deformity. The amount of spontaneous AVR correction can be predicted with fulcrum bending radiographs. Such spontaneous de-rotation should be considered when assessing the effects with different implants and surgical strategies.

Date: 2011-09-08
Session: Spine - Special Topics
Time: 14:00 - 15:30
Room: Panorama Hall

Abstract no.: 27236

DISTAL ADDING-ON PHENOMENON IN LENKE 1A SCOLIOSIS: RISK FACTOR IDENTIFICATION AND TREATMENT STRATEGY COMPARISON

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Summary: Distal adding-on is often accompanied by unsatisfactory clinical outcomes and high risk of reoperation. However, very few studies have focused on distal adding-on and its attendant risk factors and optimal treatment strategies remain controversial. Aims: To identify risk factors for the presence of distal adding-on in Lenke 1A scoliosis and compare different treatment strategies. Methods: Wilcoxon rank-sum test, Fisher's exact test and Spearman's correlation test were used to identify the risk factors for adding-on. A multiple logistic regression model was built to identify independent predictive factor(s). Five methods for determining lowest instrumented vertebra (LIV) were compared in both the Adding-on group and No adding-on group. Results: Out of 278 patients reviewed, 45 met the inclusion criteria. Multiple logistic regression results indicated that preoperative LIV+1 deviation from CSVL was an independent predictive factor. Among the five methods, choosing EV as LIV was nearly unable to prevent distal adding-on; choosing EV+1 as LIV resulted in fusing many more segments than necessary; only choosing DV as LIV showed satisfactory outcome from both perspectives. Conclusion: In Lenke 1A type scoliosis, the selection of LIV is highly correlated with the presence of adding-on; incidence increases dramatically when the preoperative LIV+1 deviation from CSVL is more than 10 mm. Choosing DV (the first vertebra in cephalad direction from sacrum with deviation from CSVL of more than 10 mm) as LIV may provide the best outcome as it not only prevents adding-on but also conserves more lumbar motion.

Date: 2011-09-08

Session: Spine - Special Topics

Time: 14:00 - 15:30

Room: Panorama Hall

Abstract no.: 29382

CORRELATION OF ADULT SPINAL SAGITTAL IMBALANCE AND LIFE QUALITY ASSESSED WITH SF-36

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Objective: To evaluate the correlation of spinal sagittal imbalance and life quality. Methods: Radiographic analysis of 48 consecutive symptomatic patients (Males 12, Female 36, 66.2±8.5 yrs) with spinal sagittal imbalance was performed using posteroanterior and lateral standing radiographs. Measurements included C7PL, thoracic kyphosis (TK), thoracolumbar kyphosis (TLK), lumbar lordosis (LL), pelvic tilt (PT), Pelvic incidence (PI), sacral slope (SS) and lumber-sacral joint angle (LSA). Life quality was assessed with SF-36 questionnaire. Pearson correlation was performed to analysis the correlation. Results: C7PL had significant correlation with Physical Functioning and General Health. PI had significant correlation with Bodily Pain, Vitality, Social Functioning and Role Emotional. TK had significant correlation with Physical Functioning ($r=-0.292$, $P<0.05$), General Health ($r=-0.389$, $P<0.01$). LL had significant correlation with Physical Functioning ($r=0.428$, $P<0.01$), General Health ($r=0.340$, $P<0.05$) and Vitality ($r=.373$, $P<0.01$). PT had significant correlation with Vitality ($r=-0.385$, $P<0.01$) and Social Functioning ($r=-0.417$, $P<0.05$). No significant correlation was shown between TLK, SS, LSA and the SF-36 categories. Conclusion: C7PL, TK, LL, PI and PT are significant parameters correlate to life quality. PI is the most important one that affects bodily pain. TK, LL and C7PL are the main parameters affect general health. PI, PT and LL affect vitality most. Correcting these parameters when treating sagittal imbalance is important to gain better life quality.

Date: 2011-09-08

Session: Spine - Special Topics

Time: 14:00 - 15:30

Room: Panorama Hall

Abstract no.: 27475

TRANSARTICULAR SCREW FIXATION FOR ATLANTOAXIAL INSTABILITY – MODIFIED MAGERL'S TECHNIQUE IN 38 PATIENTS

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Magerl's technique of transarticular screw fixation is the gold standard for treatment of symptomatic atlantoaxial instability. Traditionally this technique combines placement of transarticular screws and posterior wiring construct. The aim of this study is to evaluate clinical and radiological outcomes in subjects of atlantoaxial instability who were operated using transarticular screws and iliac crest bone graft, without the use of sublaminar wiring. We evaluated retrospectively 38 subjects who were operated using transarticular screw fixation. The subjects were followed up for pain, fusion rates, neurological status and radiographic outcomes. Instability in 34 subjects was secondary to trauma, in 3 due to rheumatoid arthritis and 1 had tuberculosis. Neurological deficit was present in 17 subjects. Most common presenting symptom was neck pain, present in 35 of the 38 subjects. Postoperatively residual neck and occipital pain was present in 8 subjects. Neurological deficit persisted in only 7 subjects. Vertebral artery injury was seen in 3 subjects. None of these subjects had any sign of neurological deficit or vertebral insufficiency. Three cases had nonunion. At the latest follow up, subjectively, 24 subjects had good result, 6 had fair and 8 had bad result. On objective grading, 24 had good result, 11 had fair and 3 had bad result. The mean follow up duration was 41 months. Thus, transarticular screw fixation is an excellent technique for fusion of the atlantoaxial complex. Omitting the posterior wiring construct achieves equally good fusion rates and avoids the complications of sublaminar wire passage.

Date: 2011-09-08
Session: Spine - Special Topics
Time: 14:00 - 15:30
Room: Panorama Hall

Abstract no.: 29660

IS SPINAL DYSRAPHISM A PROBLEM IN CASES OF CONGENITAL KYPHOSIS AND KYPHOSCOLIOSIS?

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Association of congenital scoliosis with spinal dysraphism is well established in literature. However, this lacks clinical studies depicting relation of types of congenital kyphosis and spinal dysraphism. The objective of this retrospective study is to find out actual incidence of dysraphism in different types of congenital kyphosis and vertebral anomalies. Sixty five cases of congenital kyphosis or kyphoscoliosis were encountered between June-2001 and September 2010. Cases of post MMC kyphosis and syndromic kyphosis were excluded. The study included fifty cases, whose MRI of spine were available. Clinical data, X-rays and MRI of these patients were evaluated to find out types of kyphosis, types of vertebral anomalies, abnormal neurological findings and abnormal findings on MRI. : Failure of formation (Type-I) was the most common vertebral abnormality (60%). Abnormal neurological examination was present in 12% of cases. Intraspinial abnormalities on MRI were found in 33.33% of congenital kyphosis which increases to 39.62% in congenital kyphoscoliosis, making it an average of 37.33% in all types of cases. Diastematomyelia was the commonest intraspinal anomaly. Average angle of kyphosis at presentation with positive MRI finding was 54.42°. Patients with failure of segmentation (Type-II) had highest association with intraspinal abnormality. Recommendations/ Conclusions: Presence of abnormal neurological examination is a poor indicator of spinal dysraphism. Disparity in incidence of abnormal neurology (18%) and positive MRI (32%) indicates that MRI is essential tool to diagnose spinal dysraphism. Authors recommend MRI spine for all cases of congenital kyphosis because of its frequent association with spinal dysraphism.

Date: 2011-09-08
Session: Spine - Special Topics
Time: 14:00 - 15:30
Room: Panorama Hall

Abstract no.: 27817

SIMULTANEOUSLY ANTERIOR DECOMPRESSION AND POSTERIOR INSTRUMENTATION BY SINGLE EXTRA PLEURAL RETROPERITONEAL APPROACH IN THORACOLUMBAR LESIONS

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We evaluated the morbidity of extrapleural retroperitoneal approach to perform anterior decompression and posterior instrumentation simultaneously by single "T" incision in thoracolumbar junction for spinal trauma (n=23) and tuberculosis (n= 25). All underwent single stage anterior decompression, fusion and posterior instrumentation via extrapleural retroperitoneal approach by single 'T' incision. Mean duration of surgery and mean intra-operative blood loss in traumatic group and tubercular spine was 269 minutes and 918 ml and 208 min and 1100ml respectively. The means preoperative kyphus angle improved from 23.30 to 9.3 immediately after surgery in traumatic group and 550 to 230 in tubercular spine which deteriorated by 2.50 at final follow up in both group. One patient developed deep wound infection which was treated by debridement and removal of hardware. Wound dehiscence occurred in only 2 cases. None of the patient in both groups required intensive unit care. Simultaneous exposures of both posterior and anterior column for posterior instrumentation and anterior decompression can be performed in single stage by extra pleural retroperitoneal approach by 'T' incision safely in thoracolumbar spinal lesions and is an easy alternative in with reduced morbidity as chest and abdominal cavities are not violated, ICU care not required and diaphragm not cut.

Date: 2011-09-08
Session: Spine - Special Topics
Time: 14:00 - 15:30
Room: Panorama Hall

Abstract no.: 29933

ASSESSMENT OF FIBER TRACT INTEGRITY IN SPINAL CORD BY DIFFUSION TENSOR IMAGING EVALUATION OF DTI DATAMETRICS AND TRACTOGRAPHY OF NORMAL SPINAL CORD, ACUTE AND CHRONIC SPINAL CORD INJURIES

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Routine magnetic resonance imaging (MRI) sequences have limited value for predicting functional outcomes in spinal cord injury (SCI). The role of Diffusion Tensor – Magnetic Resonance Imaging (DT-MRI) to quantify the extent and severity of nerve fibre tract damage in cervical spinal cord pathologies was assessed. In the first phase of the study, the protocols were standardized using freshly acquired spinal cord specimens of calves and one cadaver. In the second phase, healthy human volunteers were evaluated to form a standard database to compare with patients having cervical spinal cord pathology. In the third phase, DTI was done in ten cervical spondylotic myelopathy patients and three acute SCI. Fractional Anisotropy (FA) and Apparent Diffusion Coefficient (ADC) values were found to be more reliably corresponding to the physiological status of the cord. In acute SCI, the mean FA values were significantly decreased and ADC values increased at the site of cord injury. In cervical spondylosis, the FA values showed a decreasing trend with increasing compression. ADC values showed a corresponding increase as the compression increased. The changes in FA & ADC values were not limited to the areas of compression and the values were found to be altered over the entire area of spinal cord in patients with severe compression. Our study has documented the usefulness of both tractography and DTI datametrics. It encourages more concentrated effort in documenting the values and identifying characteristic changes specific to pathological conditions.

Date: 2011-09-08
Session: Spine - Special Topics
Time: 14:00 - 15:30
Room: Panorama Hall

Abstract no.: 29817

ASSOCIATION BETWEEN THE POLYMORPHISM OF VDR GENE AND DEGENERATIVE DISC DISEASE OF THE LUMBAR SPINE IN A CHINESE HAN POPULATION

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Background Degenerative disc disease (DDD) of the lumbar spine is very common diseases involving genetic and environmental factors. Till now, the association between Vitamin D receptor (VDR) gene polymorphic phenotype and lumbar DDD is still not clear. To evaluate the potential influence of VDR gene polymorphisms on lumbar DDD, a case-control study was conducted on the Han population. Methods Eight known single-nucleotide polymorphisms (SNPs) of VDR gene were genotyped among 118 patients and 112 healthy controls on a Chinese Han population by VeraCode GoldenGate Genotyping Assay SNPstream technology. The 8 markers with minor allele frequency above 5% were analyzed by the allelic and genotypic association analysis, the genotype-phenotype association analysis, and the haplotype analysis. Results Between lumbar DDD cases and controls, there were no significant differences of the allele frequency analysis, genotypic frequency analysis and haplotype analysis of all the 8 markers (all $P > 0.05$). In the unconditional logistic regression analysis, no SNPs showed significant in Codominant, Dominant and, Recessive, Overdominant or Log-additive model (all $P > 0.05$). Conclusion: These results suggest that polymorphisms of the studied SNPs of VDR gene may not associate with lumbar DDD in a Chinese Han population.

Date: 2011-09-08
Session: Spine - Fractures
Time: 16:30 - 18:00
Room: Panorama Hall

Abstract no.: 28422

NEGLECTED TRAUMATIC DISLOCATION OF THE SUBAXIAL CERVICAL SPINE

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The optimal method for the management of neglected traumatic bifacetal dislocation of the subaxial cervical spine has not been established. We treated five patients in whom the mean delay between injury and presentation was four months (1 to 5). There were three dislocations at the C5-6 level and one each at C4-5 and C3-4. The mean age of the patients was 48.2 years (27 to 60). Each patient presented with neck pain and restricted movement of the cervical spine. Three of the four had a myelopathy. We carried out a two-stage procedure under the same anaesthetic. First, a posterior softtissue release and partial facetectomy were undertaken. This allowed partial reduction of the dislocation which was then supplemented by interspinous wiring and corticocancellous graft. Next, through an anterior approach, discectomy, tricortical bone grafting and anterior cervical plating were carried out. All the patients achieved a nearly anatomical reduction and sagittal alignment. The mean follow-up was 2.6 years (1 to 4). The myelopathy settled completely in the three patients who had a pre-operative neurological deficit. There were no graft dislodgement or graftrelated problems. Bony fusion occurred in all patients and a satisfactory reduction was maintained. The posteroanterior procedure for neglected traumatic bifacetal dislocation of the subaxial cervical spine is a good method of achieving sagittal alignment with less risk of iatrogenic neurological injury, a reduced operating time, decreased blood loss, and a shorter hospital stay compared with other procedures.

Date: 2011-09-08
Session: Spine - Fractures
Time: 16:30 - 18:00
Room: Panorama Hall

Abstract no.: 28544

PROBLEMS IN DIAGNOSING CERVICAL SPINE INJURY, SPINAL CORD INJURY, OR BOTH AND RELATED MEASURES: A STUDY OF 9468 CASES OF CERVICAL SPINE TRAUMA

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Various problems are encountered in the process of diagnosing cases of cervical spine injury, spinal cord injury, or both. In this study, we surveyed cases of cervical spine trauma to study measures for ensuring that cervical spine injury, spinal cord injury, or both are not overlooked. We conducted a survey of 9468 cases of cervical spine trauma that visited the emergency outpatient unit of our hospital. Among the 9468 cases of cervical spine trauma, we observed disturbance of consciousness, alcohol consumption, and distracting pain in another region in 12%, 5%, and 15% of the cases, respectively. Moreover, cervical spine injury, spinal cord injury, or both were observed in 196 cases (2.1%). In 48 cases diagnosed with cervical spine injury, spinal cord injury, or both at a later date, the proportion of cases with severe head injury, extremity-pelvic fracture, multiple injuries and distracting pain in another region was significantly high, and the start of treatment was delayed in 14 cases. Considering the current conditions of emergency medical care and the particularities of emergency outpatient care, it was believed that it is necessary to increase awareness regarding easy-to-miss cases and provide thorough guidance for young doctors-in-training and perform cervical spine fixation in cases in which these conditions cannot be completely ruled out. Moreover, it was believed that it is important to establish the habit of performing examinations and radiographic interpretation using consistent standards while keeping in mind the possibility of easy-to-miss cases.

Date: 2011-09-08
Session: Spine - Fractures
Time: 16:30 - 18:00
Room: Panorama Hall

Abstract no.: 29746

SURGICAL TREATMENT OF LOWER CERVICAL COLUMN TRAUMATIC FRACTURES

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Objective: To evaluate the surgical management in Lower Cervical Column Fractures with structural affectation of the vertebra and spinal cord. Analysis: The acute traumatic injuries of the lower cervical spine and the spinal cord are cause of serious disability, morbidity and mortality due to an increase of complex accidents, resulting structural alterations in raquis, between a the zone of C3-T1 with wide mobility, susceptible to injury of the three columns (Denis), leading to a slight damage of spinal tissue, incomplete or complete, being an important factor to obtain the complete initial diagnosis and establish the early surgical treatment to decrease the magnitude of the immediate and posterior complications. Meeting objectives of neural liberation and spinal restructuring when the organic state of the patient allows it. Materials and Methods: Retrospective study of 230 patients with surgical treatment of lower cervical spine fractures and neurological injury, from January 2000 thru June 2010, using mechanistic classification of Allen and Ferguson, and the classification of ASIA for neurologic injury. Conclusions: The surgical treatment demostates advantages to diminish complications. The total neurological injury represents a high percentage of organic complications diminishing the capacity of rehabilitation. There's a high rate of mortality. The anterior approach with reduction and fixation with plate turned out to be the most used and represents the best technique. The neural liberation and early spinal restructuring determine benefits allowing neurological recovery.

Date: 2011-09-08
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Time: 16:30 - 18:00
Room: Panorama Hall

Abstract no.: 27310

ELECTRONEUROSTIMULATION CAPABILITIES IN VICTIMS OF VERTEBRAL CEREBRO-SPINAL INJURIES

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The objective of the work consists in the demonstration of the capability of epidural electrostimulation in complex treatment of victims of vertebral cerebro-spinal trauma in acute and follow-up periods of spinal cord wound dystrophy. In the work the analysis of the results of treatment of 356 victims of vertebral cerebro-spinal trauma aged from 16 up to 71 years is represented. Among them 293 arrived in the acute and early period of the trauma, and 63 - in the follow-up period of spinal cord wound dystrophy. The assessment of neurologic disorders was studied according to the scale ASIA/IMSOP. In 101 (28,4 %) patients rough neurologic disorders were observed - group " AB ". 87 (24,4 %) patients formed group "C". The last patients were included into group "D" - 168 (47,2 %) persons. Besides necessary surgical interventions epidural electrodes were implanted in 121 patients with acute trauma and in 63 - with its consequences above and below the level of the spinal cord lesion for electrostimulation conduction. As the result of the conducted electropulse influence on the spinal cord in the acute period of the trauma we succeeded in achieving positive outcomes in 80,9 % of victims, and that is 11,7 % better, than in the comparison group. That allowed us to restore lost functions of the spinal cord more completely in more than the half of the patients with consequences of vertebral cerebro-spinal trauma.

Date: 2011-09-08
Session: Spine - Fractures
Time: 16:30 - 18:00
Room: Panorama Hall

Abstract no.: 29983

PEDICLE SCREW FIXATION FOR UNSTABLE THORACIC SPINE FRACTURES: CLINICAL AND RADIOLOGICAL EVALUATION OF 120 CASES

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Background and purpose: The stabilization of unstable thoracolumbar (TL) fractures with pedicle screws (PS) have been well documented in the literature, but the evidence of PS application for unstable thoracic spine (TS) fractures is still lacking. In this retrospective cohort study, we analyzed our clinical and radiological data of unstable TS fractures treated with PS fixation. Materials and Methods: After entering a certain diagnosis and surgery code to the hospital registry system, 120 prospective patients were recruited for the time period of January 2002 to October 2010. 66 patients (19 Female, 47 Male) met our inclusion criteria as unstable fractures between Th1-TH11. Th12 fractures were excluded due to its anatomical consideration as a part of TL region. Patient journals, operation notes and radiological examinations were investigated. Outpatient visits were obtained after 3 months, 1 and 2 years. Results: The mean age was 39.3±4.3. In total, 477 PSs were administrated with 89.4% allo or auto-graft bone application. Mean operation time was 131.3±10.9 minutes. There were no intraoperative vascular or neural complications. Only 1 (1.5%) patient had an implant removal surgery after 5 months due to screw engagement to disc space. The mean segmental kyphosis angle was 21.2°±1.7 preoperatively, 14.6°±1.89 (p< 0.05) postoperatively and 22.9°±1.6 at 2 years. Conclusion: In the hands of an experienced institution, PS fixation is a safe and effective method for to correct and prevent further kyphotic deformity after traumatic unstable TS fractures.

Date: 2011-09-08
Session: Spine - Fractures
Time: 16:30 - 18:00
Room: Panorama Hall

Abstract no.: 29405

ANTERIOR COLUMN RECONSTRUCTION IN BURST FRACTURES OF THORACO-LUMBAR REGION: RATIONALE AND INDICATIONS

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Introduction: Burst fractures typically occur in young population and account for 64%-81% of thoracolumbar fractures. They are associated with acute neurological deficit in 48%-77% of cases & delayed onset deficit in 2%-21% of cases. Spinal fixation without anterior column fixation in early 1990 resulted in hardware failure (up to 10-15%) and significant loss of correction. Load sharing classification recognized the need for anterior column reconstruction in these fractures. The rationale for this is that the ongoing neural compression may recover better with effective decompression. Study: The prospective study was carried out from Jan 2007 to December 2008. Twenty four patients (two column involvement in 17, three in 7) with an average age of 30-35 years were operated. These patient were followed up clinically, functionally (Donald J. Prolo's scale) & radiologically by CT&MRI. Fusion was assessed using criteria of Kevin et al. Results: The deformity correction on average was 70% and there was only loss of 4° correction on 2 year follow up. Ninety two percent achieved fusion and 46% improved neurologically to Frankel's Grade D-E. Fifty four percent achieved complete and modified rehabilitation. Conclusion: Anterior column reconstruction in burst fractures with significant communitation as shown by load sharing classification, results in maintenance of correction, decrease in hardware failure, earlier rehabilitation and good fusion rates.

Date: 2011-09-08
Session: Spine - Fractures
Time: 16:30 - 18:00
Room: Panorama Hall

Abstract no.: 28418

SIMULTANEOUS ANTERIOR DECOMPRESSION AND POSTERIOR INSTRUMENTATION BY EXTRAPLEURAL RETROPERITONEAL APPROACH FOR THORACOLUMBAR LESIONS – A SERIES OF 52 CASES

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Transthoracic, transdiaphragmatic approach for thoracolumbar (TL) junction has significant morbidity, as it violates thoracic cavity; requires cutting of diaphragm and a separate approach for posterior instrumentation. We evaluated clinical outcome and morbidity of extrapleural retroperitoneal approach to perform anterior decompression and posterior instrumentation by single "T" incision in TL lesions (trauma and tuberculosis). 50 patients, mean age 29.1 years of tuberculosis (n= 26) and trauma (n=24) underwent anterior decompression and posterior instrumentation by extrapleural retroperitoneal approach by using "T" incision in right lateral position. The anterior exposure of VB was performed anterior to the transverse process and anterior decompression and posterior shortening and Hartshill instrumentation was performed simultaneously in TB cases. Posterior pedicle screw fixation was done in prone position in trauma cases first, later turned right lateral for anterior decompression by same "T" incision. Mean surgery time in trauma cases was 269 minutes with intraoperative blood loss 918 ml. Preoperative mean ASIA motor, pinprick and light touch improved from 63.3 to 74.4, 86 to 94.4 and 86 to 96 at 6 month followup respectively. Preoperative anterior vertebral height loss improved from 44.7% to 17.5% and kyphosis from 23.30 to 11.50 at final followup. One patient developed deep wound infection and flap necrosis. The operating time in TB was 220 minutes with intraoperative blood loss 1100 ml. Preoperative kyphosis was corrected from 550 to 230. Nine of 11 with paraplegia showed excellent neural recovery. No patients required intensive unit care. Wound dehiscence occurred in 2 malnourished cases. Simultaneous posterior instrumentation and anterior decompression and fusion with or without posterior column shortening for kyphosis correction can be performed by extrapleural retroperitoneal approach by 'T' incision in TL lesions and decompression with reduced morbidity.

Date: 2011-09-08
Session: Spine - Fractures
Time: 16:30 - 18:00
Room: Panorama Hall

Abstract no.: 28507

**INITIAL PERCUTANEOUS SPINAL INSTRUMENTATION IN
POLYTRAUMATIZED PATIENTS, THE CONCEPT OF DAMAGE CONTROL
SPINAL SURGERY**

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Introduction: Spinal fractures are frequently encountered in polytraumatized patient. Timing of surgery in such patients is controversial. Early intervention is relatively not safe due to the surgery-added stress and inflammatory response, while late surgery has the risk of limited preoperative mobilization associated with more morbidity. The use of percutaneous spinal instrumentation minimizes surgery-related inflammatory response and stress; that allows early intervention in polytraumatized patients. Methods: Between Dec. 2006 and Dec. 2008, 20 polytraumatized patients were operated upon using initial percutaneous instrumentation and a second stage late intervention in cases where it was indicated (14 patients). The second stage was anterior thoracoscopic decompression and fusion (including corpectomy in 6 cases). Polytrauma was defined as patients having Injury Severity Score ≥ 16 . After early resuscitation and life support measures, posterior spinal instrumentation was conducted. Results: Twenty patients were operated (14 males, 6 females), age ranged from 18 to 65 (mean = 32.5). Associated injuries included head injuries (11 patients), chest trauma (13 patients), abdominal trauma (6 patients), fracture pelvis (2 patients), fractures in the extremities (10 patients), or soft tissue injury (4 patients). Our study included 11 cases with fractures in the thoracolumbar junction, 5 in the thoracic region and 4 in the lumbar region. The average ICU stay postoperatively was 7days; average hospital stay was 21.4 days. One patient died one day postoperatively (ISS was 52). At one year follow up we had fusion in 13 cases, 1 case did not show definite fusion although did not had metal failure or clinical symptoms. No complications related to secondary added trauma in form of multiple organ failure or systemic infections. Conclusion: Initial spinal instrumentation using percutaneous systems in polytraumatized patients showed good early outcomes.

Date: 2011-09-08
Session: Spine - Fractures
Time: 16:30 - 18:00
Room: Panorama Hall

Abstract no.: 29527

MRI PATTERN OF VERTEBRAL FRACTURES DUE TO OSTEOPOROSIS, INFECTION AND MALIGNANT TUMORS

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No previous studies discussed the significance of the MRI pattern of vertebral collapse in differentiation between vertebral compression fractures due to malignancy, osteoporosis and infections. MRI was used in evaluation of 152 atraumatic vertebral compression fractures in 80 patients: 85 malignant, 34 osteoporotic and 33 infective. Central collapse of the fractured vertebral body was the commonest pattern in malignant fractures (57 vertebrae, 67 %), followed by uniform collapse (21 vertebrae, 24.7 %), then anterior wedging (5 vertebrae, 5.9%) and lastly posterior wedging (2 vertebrae, 2.4 %). In osteoporotic fractures, anterior wedging was the commonest pattern (18 vertebrae, 53 %), followed by central collapse (11 vertebrae, 32.3 %), then uniform collapse (4 vertebrae, 11.8 %), and lastly posterior wedging (1 vertebra, 2.9 %). In vertebral compression fractures due to spinal infection, anterior wedging was the commonest pattern (20 vertebrae, 60.6 %), followed by uniform collapse (12 vertebrae, 36.4 %), while only one vertebra (3 %) was centrally collapsed. Central collapse of the vertebral body is highly suggestive of malignant compression fracture while anterior vertebral wedging is highly suggestive of a benign compression fracture.

Date: 2011-09-08
Session: Spine - Fractures
Time: 16:30 - 18:00
Room: Panorama Hall

Abstract no.: 28299

**CRESCENT FRACTURE DISLOCATION OF THE SACROILIAC JOINT:
USE OF ILIOSACRAL SCREWS**

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Introduction: Crescent fracture dislocations are a well-recognized subset of pelvic ring injuries which result from a lateral compression force. They are characterized by disruption of the sacroiliac joint and extend proximally as a fracture of the posterior iliac wing. They are classically fixed using open reduction and plating. We hypothesized that iliosacral screws can provide stable fixation in Day type II and III types. Methods: A clinical study was conducted with the aim of assessing the clinical results and functional scores of 43 patients, 34 males and 9 females, age range 16 to 64 years who sustained 44 Lateral compressions pelvic fractures operated between April 2000 and June 2010 (one patient sustained bilateral fractures). X-rays and CT pelvis were used for all patients. We used a classification by Day et al 2007 with three distinct types of crescent. Percutaneous iliosacral screws (IS) were used in 22 fractures, plates in 22 fractures and we added LCII (lateral compression screws) in 2 cases. Results: Average Follow up period was 53 months (Range 4 – 126 months). 2 patients died and 1 patient lost to follow up. The clinical results were good in all cases, healing rate was 100%. The average Majeed functional score was 82.4 in 40 patients. Discussion & Conclusion: Percutaneous IS screw fixation is a good option for types II and III crescent fractures, with fewer complications than the plate option, while plating should be used for type I crescent fracture.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques I

Time: 10:30 - 12:00

Room: Terrace I

Abstract no.: 29370

ISMISS SESSION – PRESIDENTS OPENING ADDRESS

Hansjoerg LEU

Bethania Spine Base, Zurich (SWITZERLAND)

Since legal registration in 1989 by the founding members Hijikata/Jp, Kambin/US and Schreiber/CH, the International Society for Minimal Invasive Spinal Surgery (ISMISS / www.ismiss.com affiliated to SICOT as special branch) aims to foster minimal invasive technologies and seeks for exchange of controlled information and methodical instruction in the evolving field of this type of spinal surgery. Beside its uprise in Europe and US, since the nineties a rapid growth was to observe in Asia. Interested groups and active surgeons brought up new techniques and reported their experiences to periodically organized meetings under the auspices of ISMISS. The goal remains to allow first hand information on new techniques, their concepts with well defined indications and results. As in other evolving fields of surgery, minimal invasive operative techniques challenge today former golden standards and deserve our critical evaluation and responsibility for well defined indications, anatomically sound instrumentation and respective documented clinical practice. So all over the world several established courses are now periodically organized under the auspices of ISMISS under such commitment. Beside technical and operative aspects also clinical analysis of indications, relevant learning-curves and follow-up criteria deserve our interest in worldwide economically restricted conditions and an evident need for outcome quality control. So also a need became evident for ISMISS to define and publish (see under www.issmiss.com) common sense definitions and guidelines, helping so all active partners in the field of minimal invasive spinal surgery to orient themselves in the rapid evolution of this field.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques I

Time: 10:30 - 12:00

Room: Terrace I

Abstract no.: 28914

ENDOSCOPY IN DDD: FACTS SINCE 1982 AND STATE OF THE ART

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In 1979, based on Japanese uniportal microtubular percutaneous technique of closed percutaneous nucleotomy, the minimal invasive intradiscal endoscopic decompression was introduced. Additional biportal endoscopy was engaged so in 1982 for visual monitoring of intervertebral tissue elaboration. Beside decompressive indications, in 1987/88, in combination with percutaneous external pedicular fixation, endoscopy controlled interbody fusion was introduced. Experiments with modified urologic workingscopes designed for cystoscopic applications demonstrated in 1990, that endoscopic applications are possible also in non-preformed anatomical spaces when some hyperpressive irrigation was used for local atraumatic tissue spacing. So we introduced coaxial foraminoscopy for the first time in February 1991 for the treatment of a foraminal sequestered herniation. Since then the technology with improved endoscopic tools and irrigation systems as well as high-frequency coagulation under irrigation became almost standardized for this specific range of indication. After a steep learning curve today the optimal indications and contraindications are clearly defined with all forms of extra-, intra- and medioforaminal herniations. Our first clinical series of 240 standardized cases brought successful primary results in 185 cases, including the steep learning curve. Hereby in the foraminal applications, the results trend to "black or white": either the sequester is removed or not. Relatively freshly sequestered fragments without local scar-adhesions are easier to remove. Detailed knowledge of foraminal anatomy is mandatory. Hospital stay could be reduced to 2 to 3 days; out-patient care is possible nowadays as well. In 1997, endoscopic cervical discectomy was conceived by Fontanella in Italy. In 2002 pioneering authors as Ruetten in Germany brought up the interlaminar microtubular endoscopic lumbar decompression, what definitely extended the range of this minimal endoscopic approach also to more mediolateral forms of lumbar disc herniation. So the available complementary endoscopic techniques today challenge definitely in well trained hands the conventional golden standards as the classic microdiscectomy.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques I

Time: 10:30 - 12:00

Room: Terrace I

Abstract no.: 28681

LATERAL AND FAR LATERAL HERNIAS (FORAMINAL AND EXTRAFORAMINAL) CURRENT ASPECTS NEW TRENDS ACCORDING TO A PARTICULAR SERIES OF 64 FULL-ENDOSCOPIC DISCECTOMIES

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Aim: to show new aspects of foraminal hernias according to a retrospective study of our patients files who were operated on with the full-endoscopic technique in our practice. Inclusion criteria: cruralgias (for the L4-L5 level or above) or sciatica L5 (for the L5-S1 level) with a corresponding imaging of lateral hernia; at least 3 months of medical treatment. Levels of 64 lateral hernias operated on with full endoscopy: mostly the two last disks. Sex ratio (31/33). Localization on the axial plane: 8 foraminal and paramedian hernias, 34 foraminal, 9 foraminal and extraforaminal, 13 extraforaminal. Localization on the sagittal plane: ascending 10mm: 4 times (1 foraminal, 2 extraforaminal, 1 retrocorporeal), descending: 1. The operation protocol was local anesthesia with sedation, in prone or lateral position, C arm and endoscopic control. Reoperations are frequent for at 14% and for DDD at 9.3%. When we compare the results with 306 paramedian hernias operated on with the full endoscopic technique during the last 8 years by one of us, we can see that the pain is a little higher at the beginning and a little lower after two years. The age for paramedian hernias was 46.11 versus 49.45 for foraminal hernias. There were many more multi-level operations for paramedian 30% versus 6% for lateral hernias. After a period of good results of three to sixty months, reoperations are more frequent for lateral hernias than for paramedian hernias. Conversely, multilevel hernias are more frequent in paramedian hernias than in lateral hernias.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques I

Time: 10:30 - 12:00

Room: Terrace I

Abstract no.: 29200

NEW GRID POSITIONING SYSTEM (GPS) GUIDANCE FOR ENDOSCOPIC TRANSFORAMINAL MICRODECOMPRESSIVE LUMBAR DISC SURGERY IN THE MORBID OBESE PATIENT

John CHIU

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Introduction: Morbid obesity is characterized by an individual having a body mass index (BMI) of 40 or higher. The morbidly obese patient poses many unusual surgical/anatomical challenges during endoscopic minimally invasive spine surgery (MISS), especially to target the lesion with precision and accuracy through a surgical portal of entry. The problem that faces the surgeon performing MISS is that it is done with limited surgical exposure and visualization of the surgical field. Methods: In response a logical and simple Grid Positioning System (GPS) was developed to provide a precise surgical trajectory/approach for the disc lesion to undergo decompression. GPS involves 3D geometric triangulation of 3 different planes guided by fluoroscopy for introduction of surgical instruments along a geometric line toward the lesion without compromising healthy anatomical structures. This system facilitates MISS, especially in the morbidly obese. 156 morbidly obese surgical patients with 254 intractable symptomatic herniated lumbar discs underwent endoscopic MISS, guided by GPS. Results: Overall result 90% patients with good to excellent results. Fair results 6.4% patients, average satisfaction score is 93%. Conclusion: Applying the concept of Grid Positioning System (GPS) to MISS can help the surgeon to facilitate the MISS process by quickly identifying the surgical portal of entry to the disc without compromising vital anatomical or neural structures and accomplish needed spinal microdecompression, especially in medically high-risk patients including the morbidly obese and even those with prior surgeries. It can be very effective in surgical treatment of degenerative spine and herniated lumbar discs condition.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques I

Time: 10:30 - 12:00

Room: Terrace I

Abstract no.: 29329

MINIMAL INVASIVE SURGICAL TREATMENT OF COMPRESSION SYNDROMES IN PATIENTS WITH UNCOVERTEBRAL ARTHROSIS

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Pain syndrome in cervical spine is very often caused by uncovertebral joint arthrosis. Materials and Methods: 59 patients with uncovertebral arthrosis were treated in Sytenko Institute of Spine and Joints Pathology with the symptoms of spinal nerve and arteria vertebralis channels compression. All patients were divided into two groups in order to conduct parallel comparison: group A-47 patients with the spinal nerve channel stenosis, group B-12 patients with the arteria vertebralis channel stenosis. The diagnostics of the preoperative period included the clinical, X-Ray computer tomography and angiographic investigations. All have done operations were united into groups: groups A-transforaminal epidural steroid injection of rentgenological control or C-arm (47 patients); groups B – stabilizing operations – 8 patients and decompressive – stabilizing operations – 4 patients. Results and discussion: An excellent results of transforaminal epidural steroid injection of control or C-arm(groups A) were observed in 32 patients, good – 11 patients, satisfactory – 4 patients. Reccurent surgical treatment – 4 patients. An excellent results of surgical treatment in group B were observed in 4 patients, good – 6 patients, satisfactory – 2 patients. Conclusions: So different kinds of surgical treatment, such as decompressive – stabilizing operations in patients with the arteria vertebralis channel stenosis and transforaminal epidural steroid injection in patients with spinal nerve channel stenosis are the most effective methods of treatment.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques I

Time: 10:30 - 12:00

Room: Terrace I

Abstract no.: 29204

ENDOSCOPIC ANTERIOR CERVICAL DISCECTOMY/FORAMINOPLASTY WITH INTRAOPERATIVE NEUROPHYSIOLOGICAL MONITORING (IOM)

John CHIU

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Introduction: To demonstrate outpatient anterior endoscopic microdecompressive cervical discectomy and foraminal decompression (foraminoplasty), by utilizing GPS (grid positional system), can treat herniated cervical discs and cervical foraminal stenosis efficaciously and successfully. Materials and Methods: Since 1995, 2066 patients (3730 Discs), who failed at least 12 weeks of conservative care were treated. Levels were C2 to C7, inclusive. All patients demonstrated unilateral radicular pain of a specific dermatome, single level or multiple levels, confirmed with EMG/NCV. MRI or CT scans demonstrated the herniated cervical disc. The surgical technique of anterior endoscopic microdecompressive cervical discectomy foraminal decompression (foraminoplasty) and laser thermodiskoplasty (non-ablative lower Holmium laser energy for disc shrinkage and tightening) are described. The surgical approach guided and facilitated with GPS is explained. Results: For single level, 94% had good to excellent symptomatic relief and spinal motion preservation. 6% of patients had some persistent neck and upper extremity residual but diminished pain associated with parasthesia, after surgery. Average time to return to work was ten to fourteen days. There were no intraoperative complications. Postoperatively, one with transient Horner's syndrome and one transient hoarseness voice were noted. Conclusion: Anterior endoscopic microdecompressive cervical discectomy and foraminal decompression with mechanical decompression and lower level non-ablative Holmium laser for disc shrinking and tightening effect (laser thermodiskoplasty) with GPS has proven to be safe, less traumatic, easier, and efficacious with significant economic savings. It preserves spinal motion. It is an effective alternative or replacement for conventional open cervical spinal surgery for discectomy.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques I

Time: 10:30 - 12:00

Room: Terrace I

Abstract no.: 29250

MUST YOU IMMEDIATELY MAKE A FUSION ON A FORAMINAL HERNIA?

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Aim: to discuss the necessity of making a fusion for a foraminal hernia. **Material and methods:** we studied a series of sixty-four foraminal hernias operated on by the same author during the last twenty-two years (7.2% out of all of the discal hernias). The patients that have been operated since 2002 were given a visual analogic scale and OSWESTRY before the operation, one, three, six, twelve months and two years later. The imaging was standing x-ray, CT scan, MRI. The inclusion criterion was a radiculalgia corresponding to the hernia's position. The hernia was occupying more than half of the foramen. **Results:** the sex ratio was 31/33. Mean age was 49.45 older than the patients who were operated for paramedian hernia (46.11). The percentage of reoperations on 306 patients using discectomy for paramedian hernias was 3% versus 14% in the case of 64 patients with foraminal hernias. The percentage of reoperations by fusion was 9.3% for foraminal hernias and only 2.6% for paramedian hernias with an interval of twenty-three months in average. **Discussion:** older patients are more liable to have foraminal hernias which need to be operated by fusion. A unilateral discal narrowing is most probably the factor which is the witness of an advanced degenerative discopathy. **Conclusion:** when we discuss therapeutical indications with patients, we must take account of the probability of reoperation will be higher if we choose a simple discectomy than if we choose a fusion.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques I

Time: 10:30 - 12:00

Room: Terrace I

Abstract no.: 27537

MINIMALLY INVASIVE TRANSFORAMINAL INTERBODY FUSION FOR DEGENERATIVE LUMBAR DISORDERS

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The main goal of minimally invasive lumbar fusion is to reduce the approach-related morbidity including back muscle injuries and extensive soft tissue dissection. In this decade, percutaneous pedicle screwing techniques have developed to minimize the soft tissue damage that is necessary to expose the anatomic landmarks for screw insertion in the conventional procedures. On the other hands, transforaminal lumbar interbody fusion (TLIF) approach has the advantage reducing the risk of neural damage because of the lateral entry point. This lateral entry point to the disc also makes revision surgery easier and safe. From 2005, 160 patients with degenerative lumbar disorders (spondylolisthesis, lumbar canal stenosis, degenerative scoliosis, lumbar disc herniation) have been treated by minimally invasive TLIF (MIS-TLIF) through 22 or 26mm tubular retractor with percutaneous pedicle screwing. The mean postoperative follow-up period was 39.4 months. The fusion was performed on 1 level in 120 cases, 2 levels in 33 cases, 3 levels in 5 cases and 4levels in 2 cases. Operative time, blood loss, preoperative and postoperative JOA scores and postoperative pain scale were compared with the conventional PLIF. The back muscle damage was evaluated by STIR image of postoperative MRI and also compared between MIS-TLIF and conventional PLIF. Operative time and JOA scores were not different between MIS-TLIF and conventional PLIF. Blood loss and postoperative pain and the back muscle damage were evidently less in MIS-TLIF. These results suggested that MIS-TLIF can decrease iatrogenic soft tissue injury and approach-related morbidity.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques I

Time: 10:30 - 12:00

Room: Terrace I

Abstract no.: 30242

OUR EXPERIENCE OF MINIMALLY INVASIVE SPINAL TECHNIQUES IN TREATMENT OF DIFFERENT SPINAL DISORDERS

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(RUSSIA)

67 patients with different spinal disorders were treated using mini-invasive spinal techniques. All patients depending on diagnosis were divided in 3 groups. The first group: 31 patients with spondylitis. In 9 cases pathological process was localized in thoracic spine, in these cases we use thoracoscopic technique to make debridement of affected vertebral segment and local application of hydroxyapatite with antibiotic. In 30 cases spondylitis was in lumbar spine. In these cases we use fluoroscopic guided percutaneous debridement of pathological site using original tubular retractors and instrumentation, finishing with the same – local introducing in formed after debridement cavity hydroxyapatite with antibiotic. The second group – 7 patients 11-13 y.o. with juvenile scoliosis (30-50° Cobb angle right-site thoracic curve). We use thoracoscopic technique to perform first step of surgery – discectomy at 4-5 levels at the top of the curve on convex side. This method leads to decrease of deformity progression. The second step of surgical treatment in these patients was minimally invasive instrumental dorsal correction. The final deformity correction and fusion was performed in these cases after the finishing of vertebral growth period. The third group – 29 patients with degenerative changes in lumbar spine, with root compression symptoms and degenerative spondylolisthesis. To perform root decompression, posterior instrumentation and TLIF we use special expandable tubular retractors and instrumentation for percutaneous screw placement. These minimally invasive surgical techniques allow achieving good clinical results with minimal surgical trauma of soft tissues. This moment is especially relevant in obese patients.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques I

Time: 10:30 - 12:00

Room: Terrace I

Abstract no.: 30315

WHAT WE HAVE TO KNOW TO SAFELY PERFORM LUMBAR TRANSFORAMINAL PERCUTANEOUS PROCEDURES

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Recently with the increment of lumbar transforaminal percutaneous procedures there were increasing necessity to better understand the exact anatomy of the foramen zone more known as “triangular safe zone”, and the relationship between the vertebral pedicle that is the most important radiologic landmark in lumbar transforaminal percutaneous procedures and the adjacent neural structures (thecal sac and nerve roots). We did two theses in Orthopedic Institute of Medicine School of University of São Paulo. The first one was done in 2000 and the second one in 2002. Based on these two theses, we concluded that the “triangular safe zone” admits progressively larger external diameter working cannula from L2-L3 to L5-S1 and the height (medial limit) was formed by the lateral border of the thecal sac, not corresponding to the medial pedicular border; the base (inferior limit), by superior endplate of the inferior vertebra; and the hypotenuse (lateral limit) by the spinal nerve. The size of lumbar vertebral pedicle increases from L2 to L5 in both longitudinal and transversal diameter. The transversal diameter of the pedicle is smaller than the longitudinal. The lumbar vertebral pedicle has close relationship with the root that emerges below it and the most distal portion of the pedicle is adjacent to the root and its medial border is adjacent to the dura-mater. Since 2000 we’ve done lumbar transforaminal percutaneous procedures and we could realize that the procedures are relatively safe after learning the anatomy of the foraminal zone, but, the good clinical outcomes depended on the proper indication, availability of the equipment and adequate hospital facilities.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques I

Time: 10:30 - 12:00

Room: Terrace I

Abstract no.: 28641

**AUTOMATED PERCUTANEOUS LUMBAR DISCECTOMY VS
ENDOSCOPIC DISCECTOMY; LONG-TERM RESULTS**

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Purpose: To evaluate the longterm results of automated percutaneous lumbar discectomy vs endoscopic discectomy **Method:** Patients with lumbar disc disease (n=114) underwent automated percutaneous lumbar discectomy (APLD) between years 2004-2006. The ninety-four patients who have regular follow-ups were included in the study. Success was defined as performance of daily activities without backpain. Re-operation at peroperative or postoperative period was accepted as failure. Kaplan- Meier survival statistical analyses was done. Patient satisfaction and pain reassessed by Oswestry disability index (ODI) and Visual Pain scales. Intervertebral disc space, disc degeneration (Mobic) re-assessed by X-ray and MRI findings in the last follow-up, at year 2010. **Results:** The mean follow-up time was 42 months. The patients who had an open surgery immediate after APLD (n=14) and patients who had endoscopic discectomy (n=8) peroperatively at APLD were accepted as failure. According to ODI, pain scales and radiological findings, 22 patients accepted as failure at 4 years follow-up. **Conclusion:** APLD relieved the pain by decompressing the high intradiscal pressure but it can lead the inefficient intervertebral suspension and facet joint wear. It is strongly possible that this mechanical failure can be responsible for long term failures. We concluded that vertebral functional unit should be evaluated instead of possible loosening tension effect of disc. If needed, the APLD surgery might be combined with interspinous or pedicular distraction devices.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques II

Time: 14:00 - 15:30

Room: Terrace I

Abstract no.: 30247

**ADVANCED MINIMALLY INVASIVE SPINE SURGERY (MISS) IN KOREA
WITH PERSONAL ACHIEVEMENT**

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With the advent of modern surgical techniques, the use of MISS techniques for the treatment of spinal affections has experienced an exponential growth over the past few years. Percutaneous endoscopic cervical discectomy using a WSH working channel scope provides an effective alternative for the treatment of noncontained cervical disc herniation using high quality of optics, and a side-firing laser. Minimally invasive transcorporeal decompression is an emerging technique for multisegmental cervical spondylotic radiculopathy; it provides an adequate anterior decompression of the spinal cord through a limited bony resection while preserving motion and instability. Percutaneous endoscopic thoracic discectomy provides more direct route to the lesion with less morbidity so that it can be applied to treatment of soft thoracic disc herniation. Percutaneous endoscopic lumbar annuloplasty is targeted for posterior decompression and posterior annuloplasty to treat LBP due to internal disc disruption or degenerative disc disease with mild protruded disc. Percutaneous endoscopic lumbar discectomy with a 6.5 mm working channel endoscope is performed for large sized extruded migrated or ruptured lumbar disc herniation. Interspinous Locker® Fixation (ILF) after microdecompression is a less invasive, non-fusion technique in the management of unstable spinal stenosis. Percutaneous lumbar interspinous spacer is a new technology that stabilizes spine in a similar effect as ILF. These minimally invasive image-guide procedures under the aid of endoscope appear very promising. We expect the range of applications of these MISS procedures to expand for the management of complex spinal pathologies.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques II

Time: 14:00 - 15:30

Room: Terrace I

Abstract no.: 29325

MONOCLONAL ANTIBODY TUMOR NECROSIS FACTOR (TNF) IN THE TREATMENT OF DISC HERNIATION

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Sytenko Institute of Spine and Joint Pathology, Kharkov (UKRAINE)

Introduction: Recently, different authors obtained encouraging results about Monoclonal antibody against tumor necrosis factor in patients with disc herniation. Therefore, we initiate the study to confirm the efficacy of infusion of infliximab for treatment of cervical disc herniation. Patients and Methods: 7 patients with severe and moderate unilateral radicular pain were observed. Each patient has MRI-confirmed cervical disc herniation. Exclusion criteria included: tuberculosis, serious infections. The patients received single dose of 3 mg/kg intravenous infliximab infusion. We used MRI of cervical spine in 1 week, and in 12 weeks after treatment. Results: The significant hand pain reduction was observed in two patients (VAS: from 9 to 3,5). In three patients were observed satisfactory treatment results (VAS: from 9 to 6). Two patients had inadequate treatment results and required spine surgery. No adverse effects we observed. Conclusions: Based on our results in 71,42% patients were observed hand pain reduction (at the average: VAS point), perifocal inflammation decreasing, which was confirmed with C-reactive proteines level.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques II

Time: 14:00 - 15:30

Room: Terrace I

Abstract no.: 29323

REPAIR OF INTERVERTEBRAL DISC IN MINIMAL INVASIVE SPINE SURGERY

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Introduction: Cells and tissue engineering were developed in the experiment and used in the clinical practice for treatment of patients with degenerative diseases of spine. However, a chain of questions exist concerning with optimal choice of cell transplants and features of transplantation into intrvertebral discs (IVD). Goal: To study repair of IVD in the condition of using of cultured cells of annulus fibrosus at experimental and clinical conditions. Materials and methods: Experimental investigation included receipt of annulus fibrosus cells from IVD of tail of rats (3 and 12 months of age), their cultivation and following transplantation into defects of IVD of lumbar spine (L3-L4) with or without dynamic neutralization. Defects in IVD of control animals were empty. Results were analyzed with polarization histochemistry, TEM, morphometry. Cells obtained from IVD of lumbar spine of patients with degenerative diseases of spine after surgery. Cultured cells during 14 days were injected into area of stabilization of spine segment by dynamic implant. Results were evaluated with X-ray and MRI. Results: Transplantation of cultured cells of annulus fibrosus into IVD of young rats delays destructive process and promotes repair. Transplantation of cultured cells obtained from IVD of mature animals into IVD of young recipients suspends destructive process but repair is delayed. High of disc was greater at using cells of young animals. Using of cultured cells for patient's treatment allows getting positive results. Conclusion: Optimal variant for improvement of repair of IVD was combination of biological (transplantation of cultured cells) with biomechanical (dynamic neutralization) methods.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques II

Time: 14:00 - 15:30

Room: Terrace I

Abstract no.: 29202

**BIOLOGIC VERTEBRAL AUGMENTATION AND RECONSTRUCTION
WITH MORCELIZED BONE GRAFT**

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California Spine Intitute, Thousand Oaks (UNITED STATES)

This presentation is to discuss the percutaneous outpatient vertebral augmentation (VA) and reconstruction with a polyethylene intravertebral mesh (OptiMesh® Spineology, Inc., Stillwater, MN, USA) and biologic morcelized bone graft, the surgical indications, operating technique, case illustrations and clinical outcome. In the past vertebroplasty and kyphoplasty have provided excellent pain relief for vertebral compression fracture (VCF), but with a high incidence of complication; i.e., leakage of Polymethylmethacrylate (PMMA) into spinal canal or vasculature, cardiopulmonary complication, and adjacent vertebral fracture. This percutaneous VA system, is designed, developed, and used for VCF treatment without above complications, and is a true biologic vertebral reconstruction. An OptiMesh® consists of, multi-strand polyester mesh or sac to be packed with specially ground bone chips or morcelized bone chips inside the mesh device to create a hyperdense graft pack for restoring height resulting in pain relief. This minimally invasive outpatient percutaneous OptiMesh® VA provides an efficacious and controlled delivery mechanism to stabilize and treat painful osteoporotic, traumatic and neoplastic VCF. In addition it can easily be used as an excellent intravertebral spacer and for intravertebral spinal fusion/fixation.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques II

Time: 14:00 - 15:30

Room: Terrace I

Abstract no.: 29882

PERCUTANEOUS KYPHOPLASTY: SUN YAT-SEN UNIVERSITY 10-YEAR EXPERIENCES

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From 2000 to 2010, we have treated over 250 cases with more than 400 vertebrae, including osteoporotic compression fractures, traumatic fractures and vertebral tumors with Percutaneous Kyphoplasty (PKP). Indication of PKP: The main indication of PKP is osteoporotic compression fractures and vertebral tumors with severe back pain. Advantage of PKP vs. PVP PKP has lower cement leakage rate than PVP in our patients. Balloon expansion provides a low pressure cavity inside the compressed vertebral body, which allows more sticky cement injection with lower pressure. Mechanical augmentation vs. Hydraulic Augmentation: Augmentation is mostly done by hydraulic pressure and mechanical pressure, which are represented by Balloon system and sky system, respectively. Unipedicular approach vs. Bipedicular approach: In our experience, unipedicular approach with expanded abduction angle of punctation is able to cross the midline of vertebral body and provide symmetrical cement distribution in more than 90% of our cases. Cement volumes of injection: In our experience, less than 3 ml cement in thoraces and 5 ml in lumbar are enough to receive satisfied pain relief and vertebral body height restore. Substitutes of bone filler materials: In our experience, PMMA has more stable chemical and physical characters and is easier for injection. It is the first choice for old patients and patients with spinal tumors. Control of cement leakage: In our experience, using a novo Vessel-X bone void filling container system, the cement leakage rate is close to zero and the clinical efficacy is similar to traditional PKP.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques II

Time: 14:00 - 15:30

Room: Terrace I

Abstract no.: 29880

VERTEBRAL AUGMENTATION WITH A NOVEL BONE VOID FILLING CONTAINER SYSTEM: A BIOMECHANICAL STUDY

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Objective: To investigate the biomechanical properties and cement leakage control of Percutaneous Kyphoplasty (PKP) with a novel bone void filling container system. **Methods:** A novel bone void filling container system was designed for better cement leakage control of PKP. Two types of the container were tested in the current study, which were monolayer container and multilayer container. Twenty-eight thoracic or lumbar vertebral bodies' specimens from 4 fresh frozen spinal cadavers were randomly divided into 4 groups. After bone mineral density (BMD) was measured, simulated compressive fractures were experimentally created on each vertebra and initial biomechanical properties were acquired. **Results:** There was no significant difference in BMD, initial strength and stiffness in the four groups. The augmented strength increased significantly than initial. The augmented stiffness also increased significantly than the fractured level. However, it didn't reach the initial level. The augmented vertebral body height recovered and has no significant difference from initial level. No significant difference was found in strength, stiffness and height between each group after augmentation. The multilayer container expanded in the vertebral body well and was able to contain most of the injected cement within a predominated area; however, the monolayer container just partially expanded and was unable to contain the injected cement within a predominated area. **Conclusion:** The novel bone filler container used in PKP is able to recover the fractured vertebrae mechanical properties and restore the vertebral body height. The multilayer container showed considerably less cement leakage and better cement placement in the vertebrae body.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques II

Time: 14:00 - 15:30

Room: Terrace I

Abstract no.: 29612

THE ADVISABILITY OF THE APPLICATION OF PERCUTANEOUS TRANSPEDICULAR SCREW FIXATION IN THE TREATMENT OF METASTASIS TO VERTEBRAL COLUMN BASED ON SELECTED CASES FROM THE MATERIAL OF ORTHOPAEDIC AND TRAUMATOLOGY WARD IN SZCZECIN

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Minimal invasive surgery is a method that minimizes the interference with biological environment. Percutaneous fixation of vertebral column provides the possibility of decreasing complications rate as well as a solid fixation of chosen spine region. Therefore, this method is highly recommended for the elderly and for the cachectic patients with systemic cancer. In our ward the minimal invasive fixation has been used since 2010. Our observations are based on a group of 5 patients with metastasis to vertebral column. The average age in this group was 61. Percutaneous screws were implanted on 4 or 5 levels. We did not observe any perioperative complications, though early reoperation was needed because of paresthesia caused by screw insertion in the recess. No problems with the healing of the wounds have occurred. Visual Analog Pain Score was evaluated preoperatively, 6 and 12 weeks after the surgery. All five patients reported a significant pain reduction. In 1 case pain subsided. In three cases pain decreased to the level that the use of narcotic drugs was no longer needed. VAS showed significant ($p > 0,05$) improvement comparing to preoperative value. All the patients survived the shortest period of observation of 4 months. The remission of symptoms continues, which has been considered as a desired effect of the treatment.

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Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques II

Time: 14:00 - 15:30

Room: Terrace I

Abstract no.: 29805

VESSELPLASTY FOR THE TREATMENT OF OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURES

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Objective: Deramond (1984) introduced percutaneous non fusion technique to treat osteoporotic vertebral fractures. Many techniques are developed to restore the vertebral body height by using tools to create pressure inside the vertebra. The new technique uses a non stretchable PET container and injects cement inside the container then left as an implant body expander. The new SrHA cement is used in this technique. The purpose of this study is to review the theory, surgical techniques, and results of 5 years using this new technique. Methods: This new Vessel-X™ system is a percutaneous non fusion technique to allow the delivery of a non-stretchable Bone Filler Container (BFC) into the vertebral body, then inflated by injecting viscous BFMs, and left as an implant body expander. The optimum pressure need to lift the end plate is the pressure to counteract the resistance of surrounding bone. When the pressure is over the surrounding bone resistance, the BFMs start to penetrate the pores and interdigitate, thus stabilizing the BFC to the surrounding bone. Results: A total of 250 cases of VCFs that have been treated using this new technique included 29 cases using SrHA cement is reported. Conclusions: The Vesselplasty is a new technique to treat osteoporotic vertebral fractures using BFC system. This technique allows the stabilization and restoration of vertebral body height of VCFs, with the advantage in controlling the volume of the injected BFMs, also the pressure inside BFC, and preventing the leakage of BFMs.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques II

Time: 14:00 - 15:30

Room: Terrace I

Abstract no.: 29327

MINIMAL INVASIVE SURGICAL TREATMENT OF THE LATERAL RECESS STENOSIS

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Purpose of study: To improve the results of minimal invasive surgical treatment with the patients suffering from degenerative diseases of the lumbar spine on basis of more accurate determination of zone and size decompression of lateral recess stenosis. Methods used: As the material for the clinical research we used the examination data of 110 patients suffering from the lumbar spine degenerative diseases. All the patients have been clinically examined, including neurological examination, Oswestry disability index study; roentgenometrical study of regular and functional spondylograms, spiral computer and magnetic resonance imaging tomography of the lower lumbar spine. Classical methods of statistical data manipulation have been used for analysis. Summary of findings: Clinical, roentgenological, computer-tomographic, magnetic resonance tomographic signs have been studied, which allowed us to determine more accurately the zone and the size of decompression of nervous roots compression in the lateral section of the vertebral canal. The character of the arc-shaped process joints asymmetry which brings on the development of lateral degenerative stenosis has been revealed. Our research established the possible variants of the vertebral canal trefoil form and specific peculiarities of facet joints constitution leading to the development of the lateral recess stenosis. We studied the mechanisms of the disease's development with the help of mathematical modeling using the finite element method. The obtained data allows executing adequately the release of nervous roots by minimum size resection.

Date: 2011-09-08

Session: ISMISS/SICOT: Minimally Invasive Spinal Techniques II

Time: 14:00 - 15:30

Room: Terrace I

Abstract no.: 29203

MINIMALLY INVASIVE SPINE SURGERY (MISS): A SURGEON'S PERSPECTIVE ON TECHNOLOGICAL CONVERGENCE AND DIGITAL OR CONTROL SYSTEM

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Introduction: Degenerated lumbar disc and spinal stenosis are common problems requiring decompressive lumbar surgery. Open spinal discectomy is associated with significant morbidity, long-term convalescence, prolonged general anesthesia and wide dissection of tissues that can cause bleeding, scarring and eventual destabilization of spinal segments. The less traumatic endoscopic minimally invasive lumbar spine surgery is free from these potential complications. Methods: The endoscopic spine surgical procedure, its surgical indications and its operative techniques including tissue modulation technology (i.e. laser and radiofrequency application) are presented. It requires seamless connectivity to perform the surgical procedures, Surgical ePR Control System (SECS), SurgMatix®, a new integrated image-data based OR control system has been developed and utilized to facilitate this endoscopic MISS and creates organized control instead of organized chaos. Results: Among a series of 5336 MISS patients (10,255 discs) the surgical result for endoscopic MISS has been extremely gratifying for both the patient and the surgeon. There was no postoperative mortality, and morbidity of less than 1%. The potential risk and potential complications are presented. Endoscopic microdecompression can effectively decompress herniated discs and treat spinal stenosis with foraminoplasty. Conclusion: Endoscopic microdecompression can effectively decompress herniated discs and spinal stenosis with foraminoplasty for treatment of spinal stenosis. It also provides an excellent and effective access or platform for spine arthroplasty, spinal disk replacement, artificial disk, vertebralplasty, spinal fixation/fusion, disc re-growth technology and perhaps genome therapy. This minimally invasive, less traumatic, outpatient endoscopic MISS treatment leads to excellent results, faster recovery, and significant economic savings.

Date: 2011-09-08

Session: Spine - Surgery of the Degenerative Lumbar Spine

Time: 16:30 - 18:00

Room: Terrace I

Abstract no.: 28667

BONE DENSITY VARIATION ABOVE INTERSPINOUS INSTRUMENTATION

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(PORTUGAL)

Introduction: Interspinous (IS) spacers as been used for a long time but to our knowledge no one studied BMD (bone mineral density) variation above that type of instrumentation. Material and Methods: 20 patients with degenerative lumbar disease, soft lumbar stenosis and several inclusion criteria where assessed using ODI (oswestry disability index), EQ-5D (Euroquol group form), ZDS (Zung self rating depression scale), MSPQ (modified somatic perception questionnaire) and VAS at 3 time points pre surgery, one and two years after surgery. Spine bone mineral density (BMD) at adjacent instrumented levels was assessed 13 months in between using DEXA in a side evaluation. Specifically for BMD assessment we selected a physically active control group with no lumbar pathology and the same overall general features of our study group. We then perform the same measurements in both groups at the same time points. Statistic analysis using Friedman, Wilcoxon Matched-Pairs Signed-Ranks, T-Test and Mann-Whitney Tests was done considering significance level 0.05. Results In the study group there was a significant sustained improvement in ODI, EQ-5D and VAS ($p < 0,001$) as well as in ZDS ($p = 0,004$ and $p = 0,006$), but no significant variation in MSPQ ($p = 0,197$). As for BMD in study group there was a slight but not statistically significant increased in lateral spine measured values, however in control group we found a statistically significant decrease ($p = 0,013$). Discussion: The study group improved significantly their clinical status after IS instrumentation and this might influence the obtained BMD value. On the other hand the always fit control group had a normal aging population expected BMD decrease value. Conclusion: IS spacers seem to be effective in clinically improving degenerative lumbar disease and soft lumbar stenosis patients and they also might benefit BMD values above instrumentation levels.

Date: 2011-09-08

Session: Spine - Surgery of the Degenerative Lumbar Spine

Time: 16:30 - 18:00

Room: Terrace I

Abstract no.: 28918

DID REPEAT MRI SCANNING AFFECT MANAGEMENT OF SURGICAL LEVEL DECOMPRESSION OF THE LUMBAR-SACRAL SPINE?

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Introduction: MRI imaging is carried out to identify levels of degenerative disc disease, and in some cases to identify a definite surgical target at which decompression should take place. We wanted to see if repeat MRI scans due to a prolonged time between the initial diagnostic MRI scan of the lumbar sacral spine, and the MRI scan immediately pre-operatively, due of the desire for a 'fresh' MRI scan pre-operatively, altered the level or type of procedure that they would have. Methods: This was a retrospective observational cohort study. Inclusion criteria- all patients with more than one MRI scan before their surgical procedure on the lumbar sacral spine, these were limited to patients that had either, discectomy, microdiscectomy, laminotomy decompression, laminectomy decompression and fusion, and posterior lumbar interbody fusion. Exclusion criteria: all patients with anterior approaches, all patients without decompression and all non lumbar sacral patients. Outcome measures were if there was a change between the two pre-operative MRI scans, which would have changed the operative level of decompression, added other levels of decompression or type of surgery than primarily decided. Results: 84 patients were identified with our inclusion criteria with two pre-operative MRI scans. The repeat MRI did not change the surgical target for all 84 patients ($p < 0.05$). Conclusion: Repeat MRI scanning does not alter the surgical target level, and therefore does not change management. It can delay the initial primary procedure which can lead to progressive neurology, which may be irreversible and should be avoided unless the distribution of neurology has changed.

Date: 2011-09-08

Session: Spine - Surgery of the Degenerative Lumbar Spine

Time: 16:30 - 18:00

Room: Terrace I

Abstract no.: 27508

PROPERTIES OF SENSITIVITY AND MOTOR RESTORATION AFTER PERCUTANEOUS ENDOSCOPIC REMOVAL OF SPINAL DISC HERNIATION IN PATIENTS WITH LUMBAR OSTEOCHONDROSIS

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The goal of this work is to study properties of restoration of temperature and pain sensitivity in dermatomas of cauda equina roots, improvement of lower limb muscle function after percutaneous endoscopic removal of spinal disc herniation in patients with lumbar osteochondrosis. The study includes 35 patients managed by percutaneous endoscopy. Control group was managed by inter-laminectomy (58 patients). Temperature and pain sensitivity in dermatomas of cauda equina roots and lower limb muscle strength were measured before treatment, short-term and long-term after the surgery. Study of short-term results of temperature and pain sensitivity in dermatoma of the compressed root showed that pain sensitivity was 8% higher in patients treated by inter-laminectomy. Long-term results showed a reverse tendency. The number of patients with improvement of pain sensitivity was 23% larger in the percutaneous endoscopy group of patients. Motor analysis of strength of lower limb and indicator group of muscles of the compressed root showed that the number of patients with improvement was 13% higher after inter-laminectomy then after endoscopy. According to the long term result, the lower limb muscle strength differed from norm more in patients after endoscopy then in the control group. Thus, long term result of temperature and pain sensitivity recovery is higher after percutaneous endoscopic removal of spinal disc herniation then after inter-laminectomy. However, recovery of lower limb muscle function was lower then in the control group.

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Session: Spine - Surgery of the Degenerative Lumbar Spine

Time: 16:30 - 18:00

Room: Terrace I

Abstract no.: 29494

EXTENDED FENESTRATION SURGERY IN DEGENERATIVE LUMBAR CANAL STENOSIS

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Therapy for lumbar spinal canal stenosis remains difficult. Decompression by total laminectomy is the treatment of choice for central canal stenosis in the lumbar region. It is critical that sufficient bone is removed to free the nerve roots, but the extent of decompression should be as small as possible, in order to prevent postoperative instability. However, too limited a decompression can be accompanied by re-growth of bone that affects the long term results. Also total laminectomy at multiple levels may result in instability of the spine. So, extended fenestration has been described in Japanese literature as a solution to the limitations of laminectomy. AIM: To evaluate the clinical results of extended fenestration surgery in degenerative lumbar canal stenosis based on JOA score MATERIAL AND METHODS: 15 cases of degenerative lumbar canal stenosis were operated with extended fenestration surgery. Patients were selected on the basis of JOA score < 15. Pre op MRI was done in all the cases. Average age of the patients was 44.10 years. L4-L5 level was involved in 40% of cases and L5-S1 in 30% of cases while 30% had both L4L5 and L5S1 involved. RESULTS: All patients were evaluated at the end of 6 months. The Japanese Orthopaedic Association (JOA) score increased from 8.90 points before operation to 28.30 points at the time of the study on average. (p < 0.005). CONCLUSION: Extended fenestration surgery is a safe procedure. It does not cause spinal instability and can be performed without any sophisticated instruments.

Date: 2011-09-08

Session: Spine - Surgery of the Degenerative Lumbar Spine

Time: 16:30 - 18:00

Room: Terrace I

Abstract no.: 29835

DYNAMIC STABILISATION FOR GRADE I & II DEGENERATIVE LUMBAR SPONDYLOLISTHESIS WITH STENOSIS: EARLY CLINICAL RESULTS OF A NEW DYNAMIC STABILISATION SYSTEM

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Introduction: We present our experience of 22 patients with low grade degenerative spondylolisthesis with stenosis (21 Grade I and 1 Grade II) who were treated using a new stabilization systems {Scient'x IsoBar TTL Dynamic Rod Stabilization and the Inlign™ Multi-Axial pedicle Screws (Disc Motion Technologies - DMT)}. Methodology: The pain intensity was evaluated using the Visual Analogue Score for back pain (VAS-BP) and leg pain (VAS-LP) and functional outcomes using Oswestry Disability Score (ODS). Overall improvement in general patient's health was assessed using the Bodily Pain (SF36-BP) component of the SF -36 questionnaires. Statistical analysis was completed using SPSS 16.0 statistical package (SPSS Inc, Chicago, IL). Results: There were 3 male and 19 female patients and average age at operation was 68.95 years (57-79 years). The average duration of follow up was 16.18 months (8-37 months). Decompression and instrumentation involved 1 level (7 cases), 2 levels (9 cases), 3 levels (1 case) and 4 levels (5 cases). The ODS improved from 49.45 ± 14.35 pre-operatively to 22.91 ± 6.38 post operatively ($p < 0.001$). There was statistically significant improvement noted in VAS-BP ($p < 0.001$), VAS-LP ($p < 0.001$) and SF36-BP ($p = 0.002$). Conclusion: The recent dynamic stabilisation systems were developed with an intention to stabilise the spondylolisthetic segment and preventing adjacent level degeneration. The study results clearly demonstrate that central decompression and dynamic stabilization using TTL/DMT system for degenerative lumbar spondylolisthesis is a safe, reliable method and offers good outcomes.

Date: 2011-09-08

Session: Spine - Surgery of the Degenerative Lumbar Spine

Time: 16:30 - 18:00

Room: Terrace I

Abstract no.: 30218

A NOVEL MINIMALLY INVASIVE APPROACH TO LUMBOSACRAL SPINE

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Back pain is one of the commonest common musculoskeletal disorders with huge socio-economical implications, in our modern day living. Mechanical back pain contribute vast majority of cases with limited treatment option available. Spondylolisthesis is a recognizable cause of mechanical derangements at Lumbosacral level, provide satisfactory surgical treatment outcome. Traditionally open surgery is the main stay of treatment with in situ fusion. This is associated with significant Soft Tissue Trauma, Blood Loss, increased Operating Time, delay in post operative recovery & Wound Healing Problems. To overcome these issues we described a novel minimal invasive approach to Lumbosacral spine called percutaneous Paracoccygeal - Presacral Approach. In 15 patients we did CT Angiograms & MRI Lumbosacral Spine to define Axial, Coronal & Saggital safe zone, then performed the procedure in 03 Cadavers. We found that this procedure can be performed with precautions in patients to help reduce morbidity associated with open procedure.

Date: 2011-09-08

Session: Spine - Surgery of the Degenerative Lumbar Spine

Time: 16:30 - 18:00

Room: Terrace I

Abstract no.: 28913

CAUDAL EPIDURAL STEROID INJECTIONS FOR THE MANAGEMENT OF LOWER BACK PAIN AND SCIATICA: A REGIONAL SURVEY

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Introduction: Low Back Pain affects seven out of 10 people at some time in their lives. Clinical trials have shown a variety of results relative to technique, drug doses, and frequency and timing of treatments and efficacy rate. Despite this caudal epidural steroid injection has become firmly established and is widely practiced in the management of sciatica. Despite being commonly used as one of the treatment modality of chronic back pain there is no clear guideline regarding technique, drug doses, frequency, timing of treatments and efficacy rate being quoted to patient for caudal Epidural Steroid injection. Aim: The aim of our study was to conduct a regional survey to illustrate the variation in performing caudal epidural injections. Material and Method: A questionnaire was sent to 33 consultants from south east of England who performs Caudal epidural steroid injections for pain relief. Results: We got the response from 28 consultants (Response rate 85%) There was considerable variation in the use of fluoroscope, use of anesthetic agent and steroid and efficacy rate quoted to the patients. Discussion and Conclusion: Despite the longevity of the practice of Caudal Epidural steroid injections for the management of back pain, there remain a number of unresolved issues. Our study reflects the variation in the actual procedure being undertaken and the medications used throughout the region. We conclude that there is substantial variation in epidural injections which may have substantial bearing on clinical outcomes. We hope that this study will raise awareness regarding lack of uniformity in conducting this procedure and that it may in the future lead to a clear guideline for these procedures.

Date: 2011-09-08

Session: Spine - Surgery of the Degenerative Lumbar Spine

Time: 16:30 - 18:00

Room: Terrace I

Abstract no.: 28189

THREE DIMENSIONAL COMPUTED TOMOGRAPHY (3D-CT) AND RADIOGRAPHS ASSESSMENT OF INTERBODY FUSION

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Objective: To evaluate the clinical application of 3D CT and radiographs in assessment of interbody fusion after posterior lumbar intervertebral fusion. **Methods:** Forty three patients were treated with PLIF in single segment. The mean age was 47.2 years. The interbody fusion was performed by autograft in 26 cases and autograft plus PEEK cages in 17 cases. The preoperative diagnosis was isthmic spondylolisthesis in 21 cases, degenerative spondylolisthesis in 15 cases. Lumbar disc herniation associated with instability in 3 cases, revision after primary lumbar discectomy in 3 cases and far lateral disc herniation in 1 case. The interbody fusion levels were L3/4 in 6 cases, L4/5 in 17 cases and L5/S1 in 20 cases. Twentv-four patients underwent two-1level internal fixation, while 19 cases accepted three-1level fixa tion. The lateral static radiograph, flexion-extension radiographs and 3D—CT was performed at follow-up visit. The modified Brantigan grade was used to assess the fusion rate. The interbody stability was assessed by flexion-extension radiographs. **Results:** The mean follow-up was 18 months. The fusion rates in X-rays and 3D-CT were 64% and 40% respectively. The mean Brantigan grade in X-rays and 3D-CT were 2.70+1.10 and 2.19±1.16 respectively. The grade was significantly lower in 3D CT ($P<0.05$). The Brantigan grades in 3D-CT were also significantly lower than those in X-ray between the groups of isthmus spondylolisthesis and degenerative spondylolisthesis, two-1level and three-1level intemal fixation, and autograft only and autograft plus PEEK cages. There were only 3 cases showing dynamic instability. The other cases (93%) had no instability according to dynamic X-rays, even those were confirmed of nonunion of the bone graft. **Conclusion** The lumbar 3D-CT is more accurate in assessment of interbody fusion. It is necessary to perform the 3D-CT before removal of intemal fixation.

Date: 2011-09-08

Session: Spine - Surgery of the Degenerative Lumbar Spine

Time: 16:30 - 18:00

Room: Terrace I

Abstract no.: 30072

LOW BACK PAIN: A COMPARISON OF PHYSICAL THERAPY AND SURGERY. WHAT DETERMINES FUNCTIONAL OUTCOME AT TWO YEARS? AN OBSERVATIONAL STUDY

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The rise in disability due to back pain has been exponential with escalating medical and societal costs. The objective of this study was to determine the prognostic value of clinical factors on outcome in patients with low back pain examining the physical health scales of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) in patients undergoing physical therapy and surgery for low back pain. A prospective cohort study with two-year follow-up was undertaken at a multidisciplinary back pain clinic employing physiotherapists, clinical psychologists and surgeons. Over a twelve-month period, 283 consecutive patients with simple low back pain were recruited. SF-36 physical functioning score improved by 10.7 points (95% confidence interval 8.36 to 12.95). Those with episodic rather than continuous pain were more likely to have recovered at six months (odds ratio 2.64 confidence interval 1.25 to 5.60). After adjustment for base-line differences, the chiropractic group had less severe symptoms than the surgery group at four weeks ($P=0.02$), and there was a trend toward less severe symptoms in the physical-therapy group ($P=0.06$). About 75 percent of the subjects in the therapy groups rated their care as very good or excellent, as compared with about 30 percent of the subjects in the surgery group ($P<0.001$). The Role Limitations–Physical and Bodily Pain scales of the SF-36 appeared to lack sufficient reliability and scale width for clinical application. The physical therapy and surgery had similar effects. Whether the limited benefits of these treatments are worth the additional costs is open to question.

Date: 2011-09-08

Session: Spine - Surgery of the Degenerative Lumbar Spine

Time: 16:30 - 18:00

Room: Terrace I

Abstract no.: 29876

GINKGOLIDE B PROMOTES PROLIFERATION AND FUNCTIONAL ACTIVITIES OF BONE MARROW-DERIVED ENDOTHELIAL PROGENITOR CELLS: INVOLVEMENT OF AKT/ENOS AND MAPK/P38 SIGNALING PATHWAYS

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Objective: Bone marrow-derived, circulating endothelial progenitor cells (EPCs) contribute to angiogenesis in various diseases. There is strong evidence that reduced blood flow to the margins of the intervertebral disc (IVD) is associated with early onset and progressive degeneration. Pharmacological intervention to enhance the number and functions of EPCs could be a novel treatment for degenerative disc diseases. In this study, we investigated the effects of Ginkgolide B on proliferation and differentiation of EPCs, and the involved signaling pathway in vitro. Methods: EPCs proliferation, migration, adhesion and in vitro angiogenesis activity were assessed with WST-8 assay, transwell chamber assay, cell counting and in vitro angiogenesis kit, respectively. Apoptosis was detected with annexin V and propidium iodide staining. The protein expression of angiogenesis-related makers was detected by Western blot, and related gene expression was determined by real-time RT-PCR analysis. Results: Ginkgolide B treatment resulted in a promotion of proliferation and endothelial gene expression in EPCs in vitro. VEGF-induced migration response and the capability to incorporate into the vascular networks were markedly enhanced in Ginkgolide B-treated EPCs. Ginkgolide B protected EPCs from H₂O₂-induced cell death. Ginkgolide B induced the phosphorylation of eNOS, Akt and p38 which in turn promoted the cell proliferation and function. Conclusion: The present study demonstrates that Ginkgolide B, at a near medical applied dose, increases the number and functional activities of EPCs with involvement of Akt/eNOS and MAPK/p38 signal pathways. This should be a new promising approach for the treatment of degenerative disc diseases.

Date: 2011-09-08

Session: Trauma - Pelvis & Proximal Femur

Time: 08:00 - 09:30

Room: Club A

Abstract no.: 28361

DEBRIDEMENT VERSUS LABRAL REPAIR IN FAI

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Biomechanical and finite-element model analyses have shown that the acetabular labrum may contribute to hip joint stability, hip joint congruity, and function to distribute synovial fluid through a sealing function. In a sheep model, surgically induced labral tears were repaired with a single suture anchor, and all specimens were later found to heal by way of fibrovascular scar tissue to the capsule or underlying acetabular bone (or both) (PHILIPPON et al 2007). FAI has become a well-recognized disorder that is associated with chondrolabral disruption and progressive degeneration of the hip joint. There has been only one published study evaluating labral refixation versus debridement (ESPINOSA et al. 2006). This study was done with an open dislocation technique that is well described in the literature for management of FAI. There are limited data indicating good short-term results and no long-term follow-up after arthroscopic labral repair/refixation in humans. Recently published data by LARSON and GIVEANS (2009) found significantly better outcomes at 1 and 2 years in the refixation group when compared with the labral excision group. They also found an increase in radiographic degenerative changes over the study time period (up to 2 years) with labral excision compared with labral refixation. This was a consecutive series of patients, and it may be that improvements in the latter refixation group were the result of a combination of labral preservation and improved technique for managing this disorder over time. Although other variables could have influenced the outcomes, these preliminary results indicate that labral refixation resulted in better HHS outcomes and a greater percentage of good to excellent results compared with the results of labral debridement. The different knotting techniques of labral refixation will be demonstrated and the indications described.

Date: 2011-09-08

Session: Trauma - Pelvis & Proximal Femur

Time: 08:00 - 09:30

Room: Club A

Abstract no.: 28196

OUTCOMES OF PLATE FIXATION IN PUBIC DIASTASIS: OUR EXPERIENCE WITH 19 PATIENTS AND REVIEW OF LITERATURE

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Pubic diastasis, high energy antero-posterior compression (APC) injury, has been managed based on the Young and Burgess classification system. The fixation methods in APC II injury have been a subject of controversy with some authors proposing a need to address the partial breach of the posterior pelvic ring elements. The study included a total of 19 patients with pubic diastasis managed by us from May 2006 to December 2007. There was a single patient with type I APC injury who treated conservatively. Type II APC injuries (13 patients) were treated surgically with symphyseal plating using single anterior/superior plates or double perpendicularly placed plates. Type III injuries (5 patients) in addition underwent posterior fixation using plates or percutaneous sacro-iliac screws. The outcome was assessed clinically (Majeed score) and radiologically. The mean follow-up was for 2.9 years (6 months to 4.5 years). In the 13 patients with APC II injuries, the clinical scores were excellent in one (7.6%), good in 6 (46.15%), fair in 4 (30.76%) and poor in 2 (15.8%). Radiological scores were excellent in 2 (15.38%), good in 8 (61.53%), fair in 2 (15.38%) and poor in one patient (7.6%). Among the 5 patients with APC III injuries, there were 2 patients each with good (50%) and fair (50%) clinical scores while one patient was lost on long term follow up. The radiological outcomes were also similar. Complications included implant failure in 3 patients, postoperative infection in 2 patients, deep venous thrombosis in one patient, and bladder herniation in one of the patients with implant failure. The outcomes were similar between isolated anterior and combined symphyseal plating techniques in APC II injuries. Single anterior symphyseal plating along with posterior stabilisation provides a stable fixation in type III APC injuries.

Date: 2011-09-08

Session: Trauma - Pelvis & Proximal Femur

Time: 08:00 - 09:30

Room: Club A

Abstract no.: 27336

OUTCOME OF SURGICAL MANAGEMENT OF UNSTABLE PELVIC FRACTURES

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AIM OF STUDY – To evaluate the functional and radiological assessment of unstable pelvic fractures treated by internal fixation methods. DESIGN – Prospective clinical study
MATERIALS AND METHODS – Twenty one patients with unstable pelvic fractures were treated surgically and analysed functionally and radiologically with an average follow up of 24.6 months (12-31 months) between January 2007 and December 2009. Sixteen out of twenty one patients sustained Tile's type C pelvic injury and the remaining were type B injuries. RTA was the commonest mode of injury accounting for 15 patients. All patients were assessed functionally using S.A Majeed scoring system and radiologically using Slatis and Karaharju grading. RESULTS – At the end of final follow up we had excellent and good results in 85.7% of patients both functionally and radiologically. The Excellent/Good outcome of type C pelvic fractures was 87.5% and type B pelvic fractures was 80%. Sacroiliac pain was present in 33.3%, superficial wound infection and implant loosening in 14.3%, sciatic nerve palsy in 9.5% and loss of reduction in 4.8% of patients. CONCLUSION – An active approach to the treatment of patients with unstable pelvic fracture is based on correct diagnosis, comprehensive multidisciplinary care, urgent primary stabilisation and early definitive fixation by internal osteosynthesis offers a prospect of survival and good functional outcome for the patient.

Date: 2011-09-08

Session: Trauma - Pelvis & Proximal Femur

Time: 08:00 - 09:30

Room: Club A

Abstract no.: 28262

PATHOLOGY OF NEGLECTED FEMORAL NECK FRACTURE

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Background: Neglected femoral neck fracture continues to a problem in developing countries. The changes which occur in the region of the fracture with passage of time have a bearing on the choice of line of treatment and its outcome. Clinical material: The study is based on 552 patients of femoral neck fracture treated by replacement arthroplasty. There were 351 male on 201 female patients with average age of 59 years (range 32-93 years). The duration of fracture was 1 day to 2 years. Recent skiagram was available for all 552, MRI/CT scan in 82 operative findings in 525. Gross study of excised femoral head 433. Histology of femoral head in 50, Histology of intact part of retinaculum in 30. Histology of ligamentum teres in 9. Observations: Skiagram shows Sclerosis of fracture margin in 12-18 weeks, Absorption of femoral neck in 12-18 weeks, AVN in 16 weeks. MRI/CT scan: Odema of femoral head was seen upto 3 weeks, sign of AVN after 12 weeks, increase in fracture gap after 3 weeks, cup or moon shaped proximal fragment after 24 weeks. Observation at operation: Dark coloured blood or blood stained synovial fluid seen during 1-2 weeks, yellow colour synovial fluid seen in 2-4 weeks. Gross examination of femoral head: Fracture surface cancellous upto 20 weeks, growth of synovial membrane on to the fracture surface in 18 cases after 20 weeks, AVN on cut surface after 12 weeks. Histology of femoral head: Necrotic bony trabeculae seen after 12 weeks. Retinaculum Contained blood vessels of 1-2 mm diameter in size. No appreciable proliferation of cells. There as no evidence of any attempt at union fibrous cartilaginous of bony seen any case. The only connection between the proximal and distal fragment was with unruptured part of the retinaculum.

Date: 2011-09-08

Session: Trauma - Pelvis & Proximal Femur

Time: 08:00 - 09:30

Room: Club A

Abstract no.: 27381

THE USE OF ELLITTICA HEMIARTHROPLASTY FOR THE TREATMENT OF DISPLACED FEMORAL NECK FRACTURES IN PATIENTS OLDER THAN 60 YEARS

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Elliptic head hemiarthroplasty was realized in 1972 to reproduce the anatomic femoral head shape. Many functional anatomy studies showed that this shape fills better the acetabulum during walking. We evaluated 79 patients with femoral neck fracture treated with Ellittica hemiarthroplasty, with 3.4 years of mean follow up. We obtained 24% excellent results, 73% good results with the modified Harris Hip Score and 84% of no radiological changes at the acetabulum. This hemiarthroplasty has good functional and radiological radiological results, with no luxations or revision surgery.

Date: 2011-09-08

Session: Trauma - Pelvis & Proximal Femur

Time: 08:00 - 09:30

Room: Club A

Abstract no.: 29911

RESULTS OF MIS USING ADJUSTABLE SLIDING HIP SCREWS IN HIP FRACTURES

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The MIS (minimum incision surgery) of hip fractures are usually difficult to decide the angle and correction of the lag screw position. The AS hip screws have been used since 1997 in Japan. These implants have angled adjustable plate from 125 to 145 degrees and are used for MIS within 3 cm incision. Patients and methods: 343 cases since Dec. 2004 to Dec. 2008 followed to bone union. Follow up was 3 month to 1 year. Average follow up 1.2 years. Those cases included 144 cases of MIS (2cm-3cm) and 199 cases of standard incision (10-15cm). For unstable type fractures implants had adjustable brim support and added augmentations into the fracture site using β -TCP. Results: There were no implants failures in 343 cases. There were no statistical differences between MIS groups and standard incision groups regarding operation time, hospital stay (days), cutting out, bone union and TAD (tip apex distance). Discussion: We recognized MIS using AS hip screw were same clinical results of standard incision surgery for hip fractures. There are learning curves about MIS, which are big problems, these kinds procedures. Our study performed by 10 surgeons included less than 2 years experienced. And the surgeons were selected randomize. The AS hip screw is possible to be used for successful MIS of hip fractures at the first time. In conclusions: The AS hip screws are considered the best implants for MIS of hip fractures.

Date: 2011-09-08

Session: Trauma - Pelvis & Proximal Femur

Time: 08:00 - 09:30

Room: Club A

Abstract no.: 29738

RISK FACTORS FOR LAG SCREW CUT-OUT IN INTERTROCHANTERIC FRACTURES

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Introduction: The purpose of the present study was to identify risk factors for lag-screw cut-out following osteosynthesis of intertrochanteric fractures. Materials and methods: The study was a retrospective case-control study using a sex and age matched control group. Fractures were classified according to Evans and OTA/AO classifications. Operative treatment was performed using dynamic hip-screw or cephalomedullary nailingsystem. All patients were followed at least 3-4 months postoperation. The following risk factors were assessed: Fracture-type, quality of reduction by blinded assessment using a visual analogue scale, tip-apex distance (TAD) according to Baumgaertner, lag-screw positioning and comorbidity. Results: 35 cases with lag-screw cut-out and 122 controls without cut-out were identified. 124 women and 33 men with a mean age of 84.9 and 82.3 years respectively. Cut-out were significantly more frequent in OTA/AO type 31-A3 fractures (odds ratio (OR) 4.13; 95% CI: 1.5; 11.36). Quality of reduction was significantly related to the risk of cut-out. The mean TAD was 26.5 mm in the case group and 21 mm in the control group. This difference was significant (Mann-Whitney test $p=0,046$) Assessment of the lag-screw positioning showed that a central/central or central/inferior position was associated with a reduced risk for cut-out (OR 16.9; 95% CI 5.38; 53.09). None of the studied comorbidities were identified as a risk factor. Conclusion: This study showed that fracture-type, quality of reduction, TAD and lag-screw positioning were the most important risk factors for cut-out.

Date: 2011-09-08

Session: Trauma - Pelvis & Proximal Femur

Time: 08:00 - 09:30

Room: Club A

Abstract no.: 29946

IPSILATERAL FRACTURES OF THE PROXIMAL FEMUR AND THE FEMORAL SHAFT

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Between the years 1994 and 2008, 171 ipsilateral fractures were operatively treated in 169 patients with an average age of 56 years. The group comprised 108 men and 61 women. The fracture was fixed by the long Gamma nail in 18, by the long PFN in 147 and by the long PFH in 3 cases. In two patients a reconstruction nail was used on one side and a combination of DHS and condylar plate on the other. External fixation was used in a patient with severe burns. In one case the fracture was fixed by a Proximal Femoral LCP. Types of fractures were evaluated on the basis of the authors' own classification of 1998. In 68% of cases the injury was caused by high-energy trauma. The minimum follow-up period was 12 months. Of 129 fractures, 127 (98 %) healed within 12 months after the injury. In 125 cases treated with a reconstruction nail there were 13 complications (10 %) and in four patients treated by another method, complications occurred in three cases. Excellent results were achieved in 63 %, good in 29 %, fair in 6 %, poor in 2 %. Conclusion In case of fractures of the femoral shaft, in high-energy trauma particularly, it is necessary to check the patient for a potential proximal femur fracture. There is no generally accepted classification. There is no consensus concerning the treatment. The group was treated almost exclusively with the reconstruction nail. In 2 % we used another method of internal fixation.

Date: 2011-09-08

Session: Trauma - Pelvis & Proximal Femur

Time: 08:00 - 09:30

Room: Club A

Abstract no.: 27713

SELDYNAMISABLE INTERNAL FIXATOR (SIF) ONE NEW AND MINIMALLY INVASIVE METHOD IN FEMORAL FRACTURES TREATMENT

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Dynamisation is recognized condition which encourages bone union. Because of that many doctors routinely remove one screw from interlocking nail, two months after primary operation to provide axial dynamisation. Dynamisation is happened in about 15-25%, according to the literature, but we still can not predict which patient or fracture will need dynamisation. The aim of this study is to present one new selfdynamisable implant and method for internal fixation of different femoral fractures. Material and Method: Between 2000 to 2008, 849 patients with 871 fractures receiving selfdynamisable internal fixator developed by Mitkovic, for proximal, diaphyseal and distal femur fractures were included in the study. Results: The average operative time was 44 minutes (23-119), average fluoroscopy time was 12 seconds (6-92) while average blood loss of 90 milliliters (60 to 250 milliliters) when minimally invasive technique used. None of the patients developed complications during the intraoperative period. Healing time was 3.9 months (3-9). Healing was achieved in 99.1%. Superficial infection developed after 7 fixations (0.9%) while deep infection developed in 4 patients (0.5%). The screw breaking occurred 6-18 weeks after 19 fixations (2.6%). Cut out phenomenon happened in 24 cases. Spontaneous axial dynamisation was observed in seventy-one patient (23.8%), 5 millimeters on average (2 to 12 millimeters). Conclusion: SIF is one effective method for the treatment of femoral fractures. This method is particularly valuable for treatment of comminuted fractures with regard to minimally invasive surgery. Key Words: Femur, Fracture, Selfdynamisable Internal Fixator, Dynamisation, Minimally invasive surgery.

Date: 2011-09-08

Session: Trauma - Pelvis & Proximal Femur

Time: 08:00 - 09:30

Room: Club A

Abstract no.: 28269

MINIMALLY INVASIVE PLATE OSTEOSYNTHESIS (MIPO) FOR FIXATION OF FEMORAL FRACTURES

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Introduction: Indirect reduction and MIPO technique is a well established procedure in the treatment of femoral fractures. The objective of the study is to evaluate the clinical, radiographic as well as the complications of MIPO technique in fixation of femoral fractures. Methods: A prospective study was done for fixation of femoral fractures using MIPO technique. The study included 50 patients with 32 males (64%) and 18 females (36%). The mean age was 31 years range (16–71 years). 42 cases were closed injuries (84 %) while 8 cases (16 %) were open injuries. 30 cases (60 %) were isolated injuries while 20 (40%) cases were associated with other injuries. The mean follow up period was 13 months (8 – 24 months). Results: Satisfactory fracture reduction, clinical and radiographic outcome has been achieved in most cases. Average healing time was 16 weeks (range 12 – 40 weeks). Complications included 3 cases of malalignment (all were within acceptable range), 3 cases of delayed union, 2 cases of deep infection, 1 implant failure, and 1 periprosthetic fracture. Discussion and conclusion: MIPO technique is a useful and effective technique for fixation of femoral fractures. In our series, the technique achieved satisfactory clinical and radiographic results with no major complications related to the technique.

Date: 2011-09-08
Session: Cartilage Repair
Time: 10:30 - 12:00
Room: Club A

Abstract no.: 30368

HYALOGRAFT AND BIOMIMETIC CONSTRUCTS AND NEW SCIENCE

Elezaveta KON, Giuseppe FILARDO, Alessandro DI MARTINO, Silvio PATELLA, Berardo DI MATTEO, Francesco PERDISA, Giulio ALTADONNA, Federica BALBONI, Maurilio MARCACCI
(ITALY)

Cartilage reparative treatments are mostly directed to the recruitment of bone marrow cells to obtain potential cartilage precursors and allow to form only a fibrous-cartilaginous tissue; the bioengineered approach aims to regenerate the damaged tissue and restore a biologically and biomechanically valid articular surface. The clinical use of autologous chondrocyte transplantation reported encouraging clinical results, especially in the femoral condyle, that have to be weighed against the number of problems that can be observed with the standard ACI methods, such as surgical complexity and biological problem related to the cell culture. To address these problems the so-called second generation ACI technique was developed. Essentially, the concept is based on the use of biodegradable polymers as temporary scaffolds for the in vitro growth of living cells and their subsequent transplantation onto the defect site. The clinical application of this tissue engineered approach is well documented, even though the results are still controversial. In case of OCD or osteochondral lesions a more complex surgical procedure is required because of the two different tissues involved, characterized by different intrinsic healing capacity. To repair the whole osteochondral unit, several authors have already highlighted the need for biphasic scaffolds. We performed a clinical trial on a recently developed composite scaffold which mimics the biochemical and biophysical properties of the different layers of native osteochondral structures and induces "in situ" cartilage regeneration. However, these biomimetic cell-free "intelligent" constructs are still under investigation and only few of these have been introduced into the clinical practice.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament I

Time: 14:00 - 15:30

Room: Club A

Abstract no.: 28563

THE CLINICAL LOCATION OF TUNNELS AFTER ANATOMIC DOUBLE-BUNDLE ANTERIOR CRUCIATE LIGAMENT (ACL) RECONSTRUCTION ANALYZED BY THREE-DIMENSIONAL COMPUTED TOMOGRAPHY (CT)

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Background: Recently some cadaver studies have improved the accuracy of the insertions in anatomic double-bundle anterior cruciate ligament reconstruction. Our aim was to assess the position of anteromedial (AM) and posterolateral (PL) tunnels after actual anatomical double-bundle ligament reconstructions using three-dimensional computed tomography (CT). Methods: CT scans of 54 patients were performed and three-dimensional models were created. Tibial tunnel positions were measured in anterior-to-posterior and medial-to-lateral directions on the tibial plateau. The femoral tunnel central apertures of the medial wall on the lateral femoral condyle were measured using the anatomical coordinate axes method (ACAM) and the quadrant method. Results: On the tibial side, the centers of AM and PL tunnels were located $37.6\pm 6.0\%$ and $53.2\pm 5.2\%$, respectively, from the anterior ridge of the tibial plateau, and $47.4\pm 2.4\%$ and $49.8\pm 2.4\%$, respectively, from the medial edge. On the femoral side, with the ACAM, in the posterior-to-anterior direction the AM and PL tunnels were located $33.6\pm 9.4\%$ and $20.2\pm 4.8\%$, respectively, and in the proximal-to-distal direction they were $22.7\pm 8.3\%$ and $54.4\pm 11.6\%$, respectively. With the quadrant method, AM and PL tunnels were measured at $24.6\pm 11.2\%$, and $52.2\pm 7.7\%$, respectively, from the femoral roof, and $23.0\pm 5.0\%$ and $31.7\pm 6.1\%$, respectively, from the proximal condylar edge. Conclusion: Compared with previous cadaver data, our femoral AM tunnel locations were anteriorly placed.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament I

Time: 14:00 - 15:30

Room: Club A

Abstract no.: 30184

DOUBLE BUNDLE ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION USING EZLOC FEMORAL FIXATION DEVICE

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Double bundle anterior cruciate ligament reconstruction (DBACL) has now been popular. Despite a relatively difficult and complex procedure, virtually Endobutton is the only device for graft fixation at the femur. EZLoc is an alternative device for DBACL. It has superior mechanical strength and rigid fixation against the lateral femoral cortex with lever arm. In this paper, we will present a technical tricks and pitfalls of DBACL with EZLoc femoral fixation device. We have used EZLoc in 19 patients who underwent DBACL in our institution. Average operation time is 130min including menisectomy or meniscus repair. There was one case the lever arm opened in the femur bone tunnel. In this case, EZLoc did not move and leave within the bone but no joint laxity was observed. In two cases, the lever arm opened in the joint cavity and re-insertion of the passing pin was necessary. There were two cases, in which EZLoc was pulled out entire length and pushing back was required. No breakage or migration of the hardware was observed. Clinical results were excellent and no laxity was found in any case. We recommend EZLoc femoral fixation device for DBACL as far as the graft and device are passed through the tunnel smoothly.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament I

Time: 14:00 - 15:30

Room: Club A

Abstract no.: 29252

TUNNEL POSITIONS AND GRAFT SIZE IN ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTIONS PREDICT PROBABILITY OF GRAFT IMPINGEMENT

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Introduction: There is a recent trend in lateralizing the femoral tunnel clock position and anteriorizing the tibial tunnel position during ACL reconstruction. However, it is not known whether this will lead to an increased chance of impingement. Method: The effect of changing the tunnel position on impingement was studied in a virtual reality model using commercially available software. CT knees were performed in 4 patients. Four femoral tunnel points (12, 11, 10 and 9 o'clock) and 12 tibial tunnel points (30%, 40%, 50% and 60% points along the midline, 5 mm medial and 5 mm lateral) were selected. Potential impingement of the graft was examined with a graft diameter ranging from 6 mm – 10 mm for each paired ACL tunnel position. Result: A total of 960 virtual ACL reconstructions were studied. Potential impingement was noted in 69.9%. Lowering the femoral clock position, anteriorizing the tibial tunnel and increasing graft size were all associated with impingement ($P < 0.001$). The odds ratios (OR) of impingement with 9 and 10 o'clock femoral tunnel when compared with 11 o'clock were 2 and 1.4 respectively. The OR of impingement at 40% tibial position was 2.6 when compared with 50% position. A graft at or bigger than 9 mm in diameter was associated with impingement at all tunnel position (OR = 2.3). Conclusion: Excessive lateralization of femoral tunnel clock position and anteriorization of tibial tunnel position should be cautioned during ACL reconstruction.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament I

Time: 14:00 - 15:30

Room: Club A

Abstract no.: 27055

**ANTEROMEDIAL BUNDLE INFLUENCES INTERNAL TIBIAL ROTATION
MORE THAN POSTEROLATERAL BUNDLE – A CADAVER STUDY**

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Introduction: ACL consists of the anteromedial (AM) and the posterolateral (PL) bundle. The purpose of this study is to evaluate the influence of both bundles on anterior-posterior translation (APT) and internal (IR) and external (ER) rotation. Methods: Knee stability was measured on 48 fresh cadaver knees using navigation system at 30°, 60°, 90°, and 120° of flexion. APT, IR, and ER were recorded in the intact condition, in the AM-deficient, PL-deficient, and in the ACL-deficient conditions. KT-1000 was used to evaluate APT. Rotation measurements were done with the rollimeter (2,5 Nm). Results: At 30° of flexion: In the intact knee APT was 6,3 mm on average. After AM cut APT increased to 9,1 mm and after PL cut APT increased to 6,4 mm. After AM and PL cuts mean APT was 10,2 mm. In the intact knee IR was 11,1° on average. After AM cut IR increased to 13,9° and after PL cut IR increased to 13,1°. After AM and PL cuts mean IR was 15,7°. In the intact knee ER was 10,1° on average. After AM cut ER increased to 12,6° and after PL cut ER increased to 10,6°. After AM and PL cuts mean ER was 12,9°. At 60°, 90°, and 120° of flexion similar values were measured without statistically significant difference; all values gradually decreased with increased flexion. Conclusion: We cannot agree with many other authors that PL controls IR more than AM.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament I

Time: 14:00 - 15:30

Room: Club A

Abstract no.: 30210

A MATHEMATICAL MODEL OF THE OPTIMAL TIBIAL TUNNEL POSITION FOR DOUBLE BUNDLE RECONSTRUCTION OF THE ANTERIOR CRUCIATE LIGAMENT

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Independent tibial as well as femoral bone tunnels should be created in double-bundle anterior cruciate ligament reconstruction (DBACLR). However, the tunnel position is impacted by the size and inclination of the bone tunnels. The purpose of the current study was to evaluate the biophysical relationship between the tibial bone tunnels in various diameters and inclinations. Using actual bone tunnel diameter of anteromedial (AM) and posterolateral (PL) bundles, tunnel inclination and deviation angles, we calculated the wire interval (WI), which is the distance between the centers of the tunnel outlet for the AM and PL bundles, and whole anteroposterior diameter (WAPD), which is the distance between the anterior border of the AM outlet and the posterior border of the PL outlet, when two millimeters of bone septum is preserved between two outlets. The WI and WAPD were approximately 9-12 mm and approximately 18-21 mm, respectively. We found that if the actual diameters, inclination angles, and deviation angles of AM and PL tunnels are 8mm, 6mm, 45 degrees, 55 degrees, 30 degrees and 60degrees, respectively, WAPD and WI will be 20.6mm and 11.3 mm, respectively, and therefore the graft can be implanted within the original footprint in most cases.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament I

Time: 14:00 - 15:30

Room: Club A

Abstract no.: 30125

**LACKING RE-INNervation OF THE RUPTURED ACL-GRAFT
– A CAUSE OF GRAFT-FAILURE?**

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INTRODUCTION: Rupture of the ACL after reconstructive surgery is multifactorial. Surgical technique such as tunnel mal-positioning, graft preparation and tensioning, or material failure are possible causes. Metabolic factors are discussed, however only re-vascularization partially understood. Re-innervation of the graft has been found in animal models, and ACL-hamstring arc to be re-established in humans. However, re-innervation as a potential cause of ACL re-tear has never been analysed. **METHODS:** 17 patients (28.8 +/- 8.2 years) and 20 knees, at least 5.6 years (range 0.3 to 16.3) after primary ACL reconstruction, were included. Several biopsies were taken 43.8 days (range 8 to 101) after re-tear from the proximal, the mid and the distal portion of the failed graft. Immunohisto-chemical analysis (HE and S-100) were performed to assess for nervous tissue in the graft. **RESULTS:** nerve fibres were inexistent in 17 grafts, 3 grafts showed only little signs of re-innervation. The three patients with re-innervation of their torn graft suffered high-energy contact injury. No significant difference was found for time between primary surgery and re-rupture, graft choice, and time between re-rupture and biopsy with regard to re-innervation. **DISCUSSION:** only patients with high energy contact injury of their ACL graft showed re-innervation. In all other patients, no nervous tissue could be detected. Hence, lacking re-innervation of the ACL-graft may contribute to increased risk of re-tear due to missing sensory feed-back mechanism such as the acl-hamstring arc. Future studies will have to show, whether this factor may be influenced by either surgery or rehabilitation methods.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament I

Time: 14:00 - 15:30

Room: Club A

Abstract no.: 28584

COMPARISON OF 3 DIFFERENT FEMORAL FIXATION (APERFIX, TRANSFIX, ENDOBUTTON) FOR ACL RECONSTRUCTION. A PROSPECTIVE RANDOMISED CLINICAL TRIAL STUDY

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Purpose: Aim of the present study was to compare three different femoral fixation (Aperfix, transfix, endobutton) in anterior cruciate ligament (ACL) reconstruction. **Methods:** 120 patients randomly divided in 3 groups with different femoral fixation. All patients checked before and 6 months after surgery with KT-1000 & Lyscholm score. **Results:** there was no clear difference between the three fixation groups in term of time of surgery. In the endobutton group lyscholm score rose from 63.21 ± 18.59 to 90.22 ± 9.47 in the Aperfix group from 65.72 ± 18.74 to 96.22 ± 5.35 and in transfix group from 69.21 ± 17.45 to 90.64 ± 9.47 in the endobutton group 6 failures and in the transfix group 4 cases and in the Aperfix group only one failure occurred. Anterior tibial translation in the endobutton group was 3.96 ± 1.58 , for the transfix group 4.28 ± 1.48 and in the Aperfix group 4.03 ± 1.79 . **Conclusion:** lyscholm score analysis proved a better result for the Aperfix group compared with the transfix group and both prove better than the endobutton. From the other aspects there were no exact differences.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament II

Time: 16:30 - 18:00

Room: Club A

Abstract no.: 28870

UNTREATED DEEP CARTILAGE LESIONS ASSOCIATED WITH ACL INJURY: RESULTS AT 10 AND 15 YEARS FOLLOW-UP

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Introduction: Chondral lesions are often documented at the time of ACL reconstruction. They are usually asymptomatic. Little is known if current treatment methods change the natural history of such lesions if left untreated. Our study was aimed to determine what effect, deep cartilage lesions found during ACL reconstruction would have on clinical outcome if left untreated. Materials and Methods: From 1991 to 1995, 586 ACL reconstructions were performed, and 51 of them in patients with a concomitant single focal chondral lesion of Outerbridge grade 3 and 4. The mean defect size was 2.5 cm² (range, 0.5 to 4.0 cm²). The control group (ACL injury only) was matched for sex, age, operation time with the study group. Outcomes were reported at 10 and 15 years follow-up using IKDC criteria, Lysholm Score and Tegner activity scale. Results: 42 were evaluated at 10 years follow-up and 36 at 15 years follow-up. At 10 years follow-up according to Lysholm, Tegner and IKDC objective scores no statistical differences were noted between the groups. The mean total IKDC subjective score was significantly lower in the defect group comparing to the control group (mean, 79.6 points versus 83.7; $p = 0.031$). At 15 years follow-up there were no statistical differences according to Lysholm, Tegner and either objective or subjective IKDC scores. Conclusions: Deep cartilage lesions found during ACL reconstruction, left with no treatment, do not appear to affect clinical outcome at 10 and 15 years follow-up.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament II

Time: 16:30 - 18:00

Room: Club A

Abstract no.: 29854

MAGNETIC RESONANCE IMAGING DOCUMENTS INCREASED INCIDENCE OF MENISCAL TEARS IN THE ANTERIOR CRUCIATE LIGAMENT DEFICIENT KNEE

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BACKGROUND: Previous studies had shown increased incidence of meniscal tears in the anterior cruciate ligament (ACL) deficient knee. Meniscal tear could occur during the primary knee injury when the ACL was ruptured or secondary to the instability of the ACL deficient knee. Sensitivity of MRI findings is 95% for the medial meniscus MM and 90% for the lateral meniscus LM. **HYPOTHESIS:** Normal menisci in the ACL deficient knee are in increasing risk for tear as the ACL reconstruction is delayed. **METHODS:** We retrospectively reviewed 177 ACL deficient knees that underwent MRI evaluation in the preoperative period. According to MRI, only knees with normal MM or LM were included in our study. Both menisci were arthroscopically evaluated during the surgery for ACL reconstruction. **RESULTS:** Respectively, from 128 and 97 knees with normal LM and MM in MRI, 51 and 12 had tears in arthroscopy. The period between MRI and ACL reconstruction was significantly longer in the knees with meniscal tear comparing to knees with normal ones in arthroscopy, LM group ($p=0.021$, $t = -2.368$) and MM group ($p=0.012$, $t = -2.562$). When ACL reconstruction was performed within 90, 90 to 180 or more than 180 days after MRI evaluation, respectively 29%, 44% and 59% had lateral meniscal tear, and 7%, 11% and 25% had medial meniscal tear. **CONCLUSION:** Normal medial or lateral meniscus in ACL deficient knee is in increased risk for tear when the surgery for ACL reconstruction is delayed.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament II

Time: 16:30 - 18:00

Room: Club A

Abstract no.: 28513

ANATOMIC SINGLE BUNDLE ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION USING TWO CROSS PINS: CADAVERIC STUDY

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Background: Anatomic single bundle Anterior Cruciate Ligament (ACL) reconstruction performed through the medial portal has been widely accepted by arthroscopic surgeons. The research question: can cross pins (Rigid-Fix MITEK, J&J) be used safely for graft fixation on the femoral side through the medial portal? Methods: Ten cadaveric femora were tested in this study. The natural footprints of the anteromedial and posterolateral ACL bundles were identified. Eight mm wide and thirty mm long sockets were reamed in the center of the anatomic ACL footprints. Rigid-Fix guide for soft tissue graft was used to prepare pin sites through the femoral tunnels and two sleeves were left in position. Two inclinations for the guide and sleeves were tested using the posterior femoral condyles as reference line. The first inclination (A) creates an angle of 15° closed laterally and the second (B) creates an angle of 15° closed medially. The sleeves' positions were correlated to the lateral epicondyle and the femoral articular cartilage. Results: The inclination (A) placed the pins through the femoral tunnels and their full lengths were located within the lateral femoral condyle. Pins inserted with inclination (B) were found to penetrate the back of the distal femur behind posterior joint capsule attachment. Conclusion: Cross-pins (Rigid-Fix) that is originally designed for trans-tibial ACL reconstruction can only be used for anatomic single bundle ACL reconstruction through the medial portal when surgeons are informed about its correct inclination. Wrong orientation of the guide can put the neurovascular structures posterior knee at risk.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament II

Time: 16:30 - 18:00

Room: Club A

Abstract no.: 26920

MEDIAL PATELLO-FEMORAL LIGAMENT RECONSTRUCTION: IS A CLINICAL METHOD OF IDENTIFYING THE ISOMETRIC FEMORAL ATTACHMENT RELIABLE? A CLINICAL AND RADIOLOGICAL STUDY

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Introduction: As intra-operative fluoroscopic identification of isometric MPFL attachment to femur can be imprecise and laborious in surgical setting, we used clinical criteria to identify the isometric point and then studied post-operative radiographs to find out whether it was achieved and compared it with functional outcome. Materials and Methods: Sixteen patients underwent 17 MPFL reconstructions using autologous semi-tendinosis tendon graft. Clinical judgement was used to identify optimal point for femoral attachment of the MPFL without fluoroscopy control. Post-operative radiographs at 2 weeks were analysed to confirm whether an isometric point for reconstructed MPFL was achieved by dividing the distal femur into 4 quadrants by 2 lines on the lateral radiograph. Telephonic interview was conducted to assess functional scores using the Kujala score at a mean follow-up of 13 months. Results: In only 4 of 17 cases, femoral point of attachment lay in radiographically isometric (antero-proximal) quadrant. In 8 of 17 knees, point of MPFL attachment lay in antero-distal quadrant. However, there was improvement in functional score in 14 of 16 patients, with none reporting recurrence of patellar instability. The position of reconstructed MPFL did not correlate with functional score. Conclusion: Over-reliance on clinical method alone for identification of optimal point for MPFL attachment without an intra-operative radiograph leads to radiographically non-isometric positioning in majority of cases. In clinical setting, however, this does not correlate with adverse functional outcome, although intra-operative fluoroscopy may improve the anatomical isometry, and we therefore suggest use of qualitative clinical method to achieve optimal positioning.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament II

Time: 16:30 - 18:00

Room: Club A

Abstract no.: 29714

ARTHROSCOPIC NEEDLE-KNIFE SURGICAL DEVICE (ANKSD)

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Background: It is common, safer and precise arthroscopic technique to use a needle before a cutting knife help targeting the correct entry point. It avoids damaging healthy structures. Painfully arthroscopic entry points is an undesired complication, difficult to avoid and treatment, although it is a minor complication, it is a bad result, affecting the patient's quality of life. It is time for a development of a surgical instrument. Objective: Is the Arthroscopic Needle-Knife Surgical Device Ecofriendly safe and effective? Method: 50 knees were arthroscopically operated by using the ANKSD. On the lateral portal the ANKSD's technique were used and for the medial portal, standard knife was used. All the portals healed well. There were no cases of painful scars in both portals so far. Discussion: With the ANKSD method it is possible to precise more the entry portals, avoid soft tissue damage and avoid cutaneous nerve damage. As it is two instruments in one, time and cost are saving by this method. Conclusion: ANKSD's method is safe, cost effective and efficient.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament II

Time: 16:30 - 18:00

Room: Club A

Abstract no.: 28705

THE IMPORTANCE OF INDEPENDENT MEASUREMENT OF WIDTH AND LENGTH OF LATERAL MENISCUS DURING PREOPERATIVE SIZING FOR MENISCAL ALLOGRAFT TRANSPLANTATION

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Purpose: Although accurate sizing of the meniscal allograft is crucial during meniscal transplantation, the accuracy of meniscal measurement methods is still in debate. This study evaluated relationship between the width and length of lateral meniscus. These anatomic dimensions were also evaluated in the context of the patient's height, weight, gender and body mass index (BMI). **Methods:** Ninety one samples of fresh lateral meniscus were obtained during total knee arthroplasty. The sample was obtained carefully without injuring the meniscus itself and the bony attachment sites. For each lateral meniscus, the anatomic dimensions (width; LMW and length; LML) were recorded. The height, weight, gender and BMI were also recorded. The Pearson correlation, multivariate and linear regression analysis were applied for each variable. The accuracy was defined as those measures that fell within 10% of the original size. A p value ≤ 0.05 was considered significant. **Results:** The mean LMW was 30.7mm (SD=3.5) and 27.0mm (SD=2.6) for males and females, respectively. The mean LML was 33.7mm (SD=4.3) and 30.8mm (SD=2.6) for males and females, respectively. Thirty nine samples (42.5%) showed LMW measurements within a 10% difference of LML, whereas 50 samples (55%) showed an LMW greater than a 10% difference of LML. Although there were correlations between LML with LMW in males and correlations between weight, LMW with LML in females, the accuracy for the derived linear regression formulas was 3, 9 and 12% respectively. **Conclusion:** The length cannot be predicted accurately from the width of the lateral meniscus. The height, weight, gender and BMI failed to estimate the dimensions of the lateral meniscus. Therefore, it is essential to measure the width and length separately and match it with the allograft with other size measuring methods.

Date: 2011-09-08

Session: Sports Traumatology - Anterior Cruciate Ligament II

Time: 16:30 - 18:00

Room: Club A

Abstract no.: 28588

**SURGICAL SYNOVECTOMY COMBINED 90Y SYNOVECTOMY
RECURRENT KNEE SYNOVITIS**

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Radiosynoviorthesis is one of many therapeutic methods for recurrent joint effusions. Retrospectively evaluated surgical synovectomy combined 90Y synovectomy recurrent knee synovitis. Surgical combined RS procedure was used 31 (34 knees) patients. All cases were associated knee joint. One patient (both of knee) had schizophrenia was excluded the study. Remain 30 patients (32 knees, 23 men F and 7 women) were join the study with a mean age of 32 years (range 14–70). After six weeks for the surgical procedures (open or arthroscopic synovectomy) Y90 intraarticular injection was applied. All cases the diagnosis was confirmed arthroscopic biopsy. The most common pathologies were chronic non specific synovitis (15 patients), pigmented villonodular synovitis (7 patients), villonodular synovitis (5 patients), and lipoma arborescens (5 patients). The mean follow up period 4,15 (1,5-10, 5 years) years. The assessment of the outcome of treatment was based on self-reporting of with a knee effusion, Visual Analogue Scale (VAS). Resting and nocturnal pain also were considered, together and results also were recorded as good, very good, excellent, or nil, as a satisfactory outcome. Average knee effusion, VAS resting, VAS nocturnal, VAS during activity before and after RS combined surgery were 6.65/1.56, 6.18/0.96, 8.0,/2.59, 2.78/0.375 respectively. Satisfactory outcome was excellent 13 (40.6 %), very good 10 (31.2%), good 5 (15.6%) and nil 4 (12.5%). This study shows that radiation synovectomy is a safe and effective therapeutic option in knee recurrent synovitis.

Date: 2011-09-08

Session: Research - Miscellaneous I

Time: 10:30 - 12:00

Room: Club C

Abstract no.: 29747

GLUCOSAMINE-SULFATE ON FRACTURE HEALING

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Background: We hypothesized that glucosamine could be used as a therapeutic agent for the treatment of intraarticular fractures to favour cartilage healing. But the affect of glucosamine on fracture healing has not been investigated yet. The aim of this study is to determine whether glucosamine-sulfate has any effects on bone-healing. Methods: A unilateral fracture was created in the tibia of sixty-one female rats. Rats were given no drug or 230mg/kg glucosamine-sulfate daily. Fractures were analyzed at first, second and fourth weeks after creation of fracture. Quantitative measurement for new bone formation and osteoblast lining were determined histologically. Semiquantitative score for fracture healing was used for histomorphometric analyses. Bridging bone formation was assessed radiographically. Results: New bone formation and osteoblast lining were significantly higher in glucosamine-treated group at week 1. Surrounding connective tissue was more cellular, vascular, and the newly formed bone trabecules were in bigger amount in glucosamine-treated group, comparing to control group at week 1 and 4. But radiologically, the control group had better scores than that of the glucosamine-treated group at week 4. Conclusion: These data demonstrate that daily glucosamine sulfate administration accelerate early phase of fracture repair in the mouse tibia, with increased new bone formation and osteoblast lining histologically, but radiologic bone union is not favoured on radiographs.

Date: 2011-09-08

Session: Research - Miscellaneous I

Time: 10:30 - 12:00

Room: Club C

Abstract no.: 28827

CARTILAGE REGENERATION: THE PHENOTYPE OF CHONDROCYTES IN TGF- β 1 MODIFIED BOVINE ACHILLES TENDON COLLAGEN SPONGE

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INTRODUCTION: A new source of collagen from bovine Achilles tendon was utilized as scaffold material for hyaline-like cartilage tissue regeneration. We hypothesized that recombinant human transforming growth factor- β 1 (TGF- β 1) bonded collagen type I scaffold could keep phenotypes of chondrocytes for longer culture time. **MATERIALS AND METHODS:** The bovine Achilles tendon collagen was dissolved and replaced into a diameter 12 mm mold, and then bovine Achilles tendon collagen sponge (BATCS) was harvested. BATCS was put into 250 ng/ml of TGF- β 1 solution. The chondrocytes were isolated from the articular cartilage of New Zealand White Rabbit. Chondrocytes were cultured and seeded into every BATCS and BATCS-TGF sponge. The cell sponges were cultured for 1, 7 and 14 days in vitro. Then the morphology, proliferation, total collagen, histology and gene expression of chondrocytes in two collagen sponges were determined to demonstrate the cell phenotypes. **RESULTS AND DISCUSSION:** According to the results of DNA content, the similar proliferation of BATCS and BATCS-TGF with time was observed. The higher total collagen in BATCS-TGF than BATC at 14 day was found ($P < 0.05$). The higher gene expression of collagen type II, aggrecan and Sox9 in BATCS-TGF than those in BATCS were determined at 7 day. More proteoglycan deposited in BATCS-TGF than BATCS at 14 day was observed. We demonstrated that BATCS modified by TGF- β 1 can maintain phenotype of chondrocytes in vitro. It can feasibly offer new a biomaterial for cartilage regeneration.

Date: 2011-09-08

Session: Research - Miscellaneous I

Time: 10:30 - 12:00

Room: Club C

Abstract no.: 29209

INTERLEUKIN-1 BETA GENE POLYMORPHISM ASSOCIATED WITH RADIOGRAPHIC KNEE OSTEOARTHRITIS IN CHINESE

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Recently, the involvement of genetic factors for severe osteoarthritis (OA) has been widely reported. However, a lack of biomarkers that identify patients at risk complicates development of disease-modifying OA drugs. The purpose of this study was to identify polymorphisms at particular risk of osteoarthritis of the knee Chinese people. 481 participants were recruited. All control subjects were over 60 years. Severity of knee OA was evaluated by radiography. Cases (n = 300) were defined if Kellgren & Lawrence grade was 3-4, and controls (n = 181) were those in grade 0-1. Genotyping of these individuals were carried out by Sequenom. Interleukin-1 beta (IL1B) polymorphism was found to be associated with radiographic OA (ROA). Two SNPs (rs1143627 and rs16944) in high linkage disequilibrium (LD) upstream of the IL1B gene were found to be associated with ROA (Chi-square P-values = 0.009294 and 0.01012 respectively). Odds ratio (OR) for A allele of rs1143627 was 1.866, 95% confidence interval (95%CI) 0.2411 - 2.994. OR for G allele of rs16944 was 1.841, 95% CI 1.153 - 2.939. P-values for haplotype test for the SNPs were similar to single SNP test (0.009221), reflecting the high LD between the SNPs. Our results confirm the association of two SNPs in IL1B with ROA. An allele of rs1143627 and G allele of rs16944 were found to have significantly higher allele frequency in ROA cases than controls. The results indicate there is a possible role for IL1B played in the etiology of ROA.

Date: 2011-09-08

Session: Research - Miscellaneous I

Time: 10:30 - 12:00

Room: Club C

Abstract no.: 29442

PROSPECTS OF USE OF PREPARATIONS ON THE BASIS OF BLOOD SERUM AS SYNOVIAL MEDIUM FOR MEDICAL CORRECTION TRIBOLOGY JOINTS

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Study of the friction processes in joints of living organisms is of great scientific and practical interest. The most essential experimental results in the domain of arthrology have been obtained with the use of pendulum tribometers. The application of natural articular members as a bearing unit of the pendulum is the best prerequisite for simulation and investigation of the mechanisms of friction and wear of joints. Materials and methods: Natural synovial fluid is injected into an animal joint partitioned beforehand; the pendulum is set in motion and the area of deflection of the pendulum on each side of equilibrium is determined; two adjacent areas are compared and the difference between them is used to determine the friction coefficient in the joint. Then the synovial fluid is removed and replaced with the studied lubricant and measurement procedure is repeated. The difference between results allows comparison of the lubricity of each fluid. Natural synovial fluid and blood serum and its combination with medicinal preparations containing chondroitin sulfate were used for lubrication. Results and discussion: It has been established that medicinal preparations with chondroitin sulfate possess a high lubricating capability in comparison with pure blood serum. When these preparations are administered into blood serum, tribological articular properties improve. The novel experimental complex has shown that the preparations containing chondroitin sulfate produce a powerful biological effect, as well as a high lubricity when used on natural friction surfaces. From tribological viewpoint, the preparations are most useful when used in combination with blood serum.

Date: 2011-09-08

Session: Research - Miscellaneous I

Time: 10:30 - 12:00

Room: Club C

Abstract no.: 28867

ALKAPTONURIC OCHRONOSIS – A REVIEW OF 8 CASES

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Alkaptonuria and its sequelae ochronosis is a rare disease having incidence of 1 in 125000 to 1 in 1 million worldwide. 8 cases (age range 34 yrs to 49 yrs) came with gradually worsening low back ache as initial presentation. One patient had associated severe arthropathy of bilateral hip joints and subcutaneous nodules over both knees and tendoachilles. He had bilateral hip replacement. The second patient had intramedullary calcification of femur. Another patient had associated caries spine at third and fourth lumbar vertebrae and had resolution of symptoms after ATT intake for 18 months. Fourth patient had associated features of hyperthyroidism which was an incidental finding. All the remaining patients had typical features of low back ache and arthritis of large joints. The parents of all patients were non consanguineous and siblings were found to be affected in two patients. Diagnosis was established by typical clinical, radiological findings and biochemical analysis. Initial screening was done by simple biochemical tests on urine; black discoloration with the addition of sodium hydroxide or transient green discoloration with ferric chloride. The diagnosis was confirmed by thin layer chromatography in all patients. MRI was used to establish diagnosis of caries spine. A high likelihood exists of this disease being left unnoticed. Therefore a high index of suspicion and awareness is needed as early management will significantly lessen the morbidity. Our study is unique for presentation with intramedullary calcification in one case, subcutaneous nodules in the other and one patient with associated caries spine.

Date: 2011-09-08

Session: Research - Miscellaneous I

Time: 10:30 - 12:00

Room: Club C

Abstract no.: 29641

TNF- α INHIBITS MINERALIZATION BUT NOT OSTEOGENIC DIFFERENTIATION INDUCED BY BMP-2

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Background: The effect of inflammation and cytokines on bone formation has been increasingly evidenced. TNF- α has been reported with conflicting effects on osteogenesis. Dose-dependence hypothesis is likely to be the explanation of the confliction. However, the effect of TNF- α on different phases of osteogenesis has hardly been investigated. Objective: To explore the effect of TNF- α on different phases of osteogenesis. Methods Primary BMSCs and C2C12 cells were used to represent the early stage of osteogenesis while MC3T3-24 osteoblasts were used to represent the late stage of osteogenesis. BMP-2 (100-300 ng/ml) was used to induce osteogenesis. TNF- α (5 ng/ml) was applied simultaneously with BMP-2 in experimental group, compared with non-treatment group. Cell morphology change was observed under microscope. Runx2, Osterix, ALP and osteocalcin mRNA level was detected by RT-PCR. Bone nodule formation was determined by Alizarin Red staining. Results: BMP-2 induced both up-regulation of Runx2, Osterix, ALP and osteocalcin mRNA level, and nodule formation in all three types of cultures. TNF- α significantly reduced osteocalcin mRNA level and nodule formation in BMSCs and C2C12 cells. Also, TNF- α dramatically inhibited nodule formation in MC3T3-24 cells. However, TNF- α only partially inhibited ALP, Osterix and barely inhibited Runx2 expression. Additionally, TNF- α had no effect on BMSCs and C2C12 cells morphological differentiation towards osteoblastic lineage. Conclusion: TNF- α inhibits BMP-2-induced mineralization but not osteogenic differentiation. The molecular mechanism is still under investigation.

Date: 2011-09-08
Session: Research - Miscellaneous I
Time: 10:30 - 12:00
Room: Club C

Abstract no.: 29005

TRACTION REGENERATION OF PERIPHERAL NERVES TO TREAT SEGMENTAL DEFECTS

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Introduction: The repair of large segmental defect in peripheral nerve injuries is very challenging. In this experimental study, the behavior of peripheral nerves was investigated in teddy goats; and the role of mobilization and repair technique was compared with traction regeneration technique to cover the segmental nerve defect. The technique was then used in human beings. Material and Methods: Ten teddy goats were divided in two equal groups A & B. In all goats, 50 mm of peroneal nerve was excised. The microscopic findings of excised segments were taken as Normal Control. In Group A the proximal nerve was mobilized around the ankle and end to end repair performed. In Group B the traction was applied to proximal end with the help of a traction device. Traction was given at 0.25 mm twice a day and desired length was achieved and end to end repair was performed. Three months after repair three specimens of nerves were obtained in both groups (1) 1 cm proximal to suture line (2) through suture line and (3) 1 cm distal to suture line for histological examination under light and electron microscopy for (1) number of nerve fibres (2) diameter of nerve fibres and (3) percentage of neural and fibrous tissue. The Data of Group A & B was compared with control group and each other. Results: There was fall in number and size of nerve fibres and percentage of fibrous tissue in both groups A&B as compared with control. The Comparison of number and size of myelinated and non-myelinated nerve fibres and percentage of nerve to fibrous tissue was slightly better in group A. (Traction Regeneration Group). Conclusion: The Possibility of using Traction Regeneration and Repair technique have been scientifically proven and now is being used in clinical cases by the author.

Date: 2011-09-08

Session: Research - Miscellaneous I

Time: 10:30 - 12:00

Room: Club C

Abstract no.: 29670

A NOVEL BIODEGRADABLE INJECTABLE POLYCAPROLACTONE-MAGNESIUM HYBRID FOR ORTHOPAEDIC IMPLANTATION

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Currently developed injectable materials such as calcium-based bone cements have tried to replace the conventional PMMA. However, their brittleness affects their stability and may cause another fracture. Hence, our group has recently fabricated an injectable biodegradable polycaprolactone (PCL) - magnesium (Mg) hybrids to solve the problems. A wide range of mechanical properties was obtained by altering the PCL and Mg composition. And the rapid degradation of Mg was suppressed by the silane coupling agent surface treatment. This study aims to investigate the mechanical and in-vitro properties of the newly developed hybrid. Four types of PCL-Mg hybrids were prepared by incorporating 0.1g and 0.6g Mg beads with and without silane treatment into 1g PCL, respectively. Compression test was conducted to evaluate the mechanical properties of the hybrids. Green fluorescent protein osteoblasts (GFPOB) were cultured on the hybrids for 1 and 3 day(s) to evaluate their cell attachment and proliferation. 1-fold and 3-fold higher compressive moduli were found on the 0.1g and 0.6g Mg-PCL hybrids with and without silane treatment than pure PCL, respectively, indicating that the mechanical property of pure PCL was enhanced by incorporating Mg beads. GFPOBs grew well on the hybrids except the untreated 0.6g Mg-PCL. This was probably due to the large release of Mg which may cause toxic effect. Hence, the results suggested that the silane treatment was able to slow down the degradation of Mg. Further osteogenic properties and in-vivo studies are required for validating this material for clinical use.

Date: 2011-09-08

Session: Research - Miscellaneous I

Time: 10:30 - 12:00

Room: Club C

Abstract no.: 29931

MORPHOLOGICAL ANALYSIS OF SYNOVIAL FLUID IN DIAGNOSIS OF OSTEOARTHRITIS

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Aim: to define the possibility of diagnostics of degenerative-dystrophic joint diseases by synovial fluid morphology in normal and pathological conditions. **Materials and methods:** 0.01 ml Synovial fluid was collected during arthroscopic surgeries from 31 patients (age varies from 18-73 yrs) with different orthopaedic pathology of knee joint. All the patients are divided in to 2 groups. In the first group (14 patients), who have no macroscopic changes in cartilage is considered as an absence of osteoarthritis. In the 2nd group (17 patients), who have clear degenerative changes of hyaline cartilage is noted. Synovial fluid is studied under stereomicroscope as a dry drop. Also determined the composition and chemical elements of synovial fluid with different locus (Na, Mg, Si, P, S, Cl, Ca, Zn) by radiospectral microanalysis. **Results:** In the control group, synovial fluid morphologically characterized by the ferny shaped salt structure in the central zone, multiple small rounded formation in the intermediate and marginal zones and network of thin fissures in the peripheral zone. Morphologically, the markers of arthrosis are characterized by spindle-shaped structures in the intermediate zone, presence of marginal amorphous zone and the absence of small rounded formations. According radiospectral microanalysis, multiple increases in calcium and phosphor level is observed in the synovial fluid of patients with degenerative hyaline cartilage disease.

Date: 2011-09-08

Session: Regenerative Orthopaedics

Time: 14:00 - 15:30

Room: Club C

Abstract no.: 30138

LAMA 4 EXPRESSION IN HUMAN CHONDROCYTES AND REGULATION BY EPIGENETIC MECHANISMS

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Enhancement of matrix degrading enzymes leads to hypertrophic chondrocytes and loss of extracellular matrix compounds. Interactions of cells, like adhesion or motility can be modulated by integrins like LAMA4. In the last decade researchers are focusing on methylation as a main player in the aging process. We tried to substantiate LAMA4 in degenerating chondrocytes and suspected its expression to be enhanced by demethylation. Methods: We collected 15 probes of human cartilage before undergoing total knee joint replacement. Immunohistochemistry for LAMA4 was performed after immunohistological classification for OA. Four probes were prepared for tissue culture. After digestion, the cells were spread out and half of them were treated with 10 uM of demethylation agent 5-AZA-deoxy-cytidine. After harvesting the cells, RNA was extracted and cDNA was transcribed. Gene expression was performed with the Taqman Realtime PCR Assay. Results: 15 probes with Grade III and IV OA displayed positive staining for LAMA4 especially in hypertrophic clusters of chondrocytes. Lower grades of OA had no intracellular staining for LAMA4. In the 5-AZA-deoxycytidine treated group of grade 0-II OA chondrocytes showed an increase of LAMA4 expression, whereas the group of grade III and IV chondrocytes did not, compared with the untreated cells. Conclusion: Our results lead to the thought that LAMA4 plays a role in hypertrophic chondrocytes and that maybe demethylation is the activating process. Further investigations are needed to detect the function of LAMA4 in cartilage degeneration and to proof, if an epigenetic mechanism is the key for its activation.

Date: 2011-09-08

Session: Regenerative Orthopaedics

Time: 14:00 - 15:30

Room: Club C

Abstract no.: 29051

TREATMENT OF BIG BONE DEFECTS BY FIX AS STRATEGY

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Treatment of bone defects caused by removing of pathological processes (mostly tumors) in orthopedic field or caused by primary trauma in traumathology and finally after radical debriding or complications followed by infections, has always been of interest to surgeons and a challenge for the methods and science in general. Possible applications of ceramic allograft can be done on small bone defects with good contact with the local bone and lack of infection. For this reason, the preference is given to microvascular free graft. However, graft harvesting requires the new incision, which lengthens operative time, increase pain and blood loss, and with larger defects, performing several subsequent operations is necessary, which increases the possibility of complications followed by infections. Getting the new good-quality bone by distraction of pineal body as well as by distraction calus after corticotomy and metaphysiary lengthening, has enabled treatment of larger bone defects without autografted cancellous bone with regenerate which is appropriate with its width and density. This has been, certainly, made easier with technical improvements of fixators and dynamic possibilities of structures with area, flexible and extra focal stability. For the last 25 years we've successfully been using compression-distraction method. First 6 years we used Prof G.A. Ilizarov's apparatus, and during the last 19 years, our own external fixator FixAS (Acording Sabic). In this paper we are presenting case of lengthening of lower leg for 28cm by Fix AS, after radical resection of osteosarcoma and extirpation 2/3 of the bone.

Date: 2011-09-08
Session: Regenerative Orthopaedics
Time: 14:00 - 15:30
Room: Club C

Abstract no.: 29198

INTRAOPERATIVE CELL SALVAGE IN PRIMARY HIP ARTHROPLASTY

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Purpose: To determine if intraoperative cell salvage reduces the need for postoperative allogenic blood transfusion, assess any adverse events and its effect on postoperative stay in primary hip arthroplasty. **Method:** Between February 2009 and August 2010 77 patients underwent primary total hip arthroplasty. Intraoperative cell salvage was used in 38 patients and not used in 39 patients. We prospectively collected data on patient demographics, ASA grade, preoperative and postoperative haematologic features, number of units of packed red cells transfused and the volume of intraoperative reinfused cell salvaged blood was recorded. Total inpatient stay and any post-operative adverse events were recorded. **Results:** No patients in the cell salvage group required postoperative allogenic blood transfusion compared to three patients (7.7%) in the conventional group. Postoperative haemoglobin drop was lower in the cell salvage group (2.57 vs. 3.3 g/dL). The mean length of postoperative inpatient stay was shorter in the cell salvage group and (5.1 vs. 6.41 days). Three patients in the cell salvage group had postoperative adverse events (1 UTI, 1 hyponatraemia, 1 pseudo-obstruction). Three patients in the conventional group experienced adverse events (2 superficial wound infections, 1 DVT). An average of 361mls of cell salvaged blood was reinfused (110 – 900mls). **Conclusions:** We have found that the use of intraoperative cell salvage in patients undergoing primary total hip arthroplasty reduces the need for post operative allogenic blood transfusion with no increase in adverse events when compared to conventional measures of blood preserving techniques.

Date: 2011-09-08

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Room: Club C

Abstract no.: 29752

USE OF AUTOLOGOUS DECAL BONE GRAFT IN THE TREATMENT OF NON-UNIONS AND DELAYED-UNIONS OF LONG BONES

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Though there are many papers describing use of autologous decal bone in the cystic lesions of bone and bone gaps, hardly few reports are available in the literature which describes the use of decal bone for non-union and delayed-union after fractures of long bones. While treating 31 cases of long bone fractures that had non-union or delayed-union, we used autologous decal bone as graft along with plating or nailing. Out of 31 cases 20 had fractures of both radius and ulna, 4 had fracture of radius alone, 2 had fracture of Humerus and 5 had fracture of tibia and fibula. The bone was harvested under aseptic precautions. Most of the time we used the head of femur removed during prosthetic replacement for fracture neck of femur. The donor is tested for all possible diseases including HIV to rule out any chance of disease transmission. It is decalcified using 0.6N HCL for 48 hours and then stored in absolute alcohol in an ordinary refrigerator. Before use the graft was washed with normal saline, and cut into thin matchstick like pieces. Complications included serous discharge in 8 cases for few weeks, infection in 2 cases which required re-operation. Rest 18 cases had good results and their fractures healed in 12 to 16 weeks time. By using this method the complications at the donor site are avoided. Blood loss is lesser. Operation time is also less, as one team prepares the graft while other team opens the fracture site.

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ARTHRODIATASIS FOR MANAGEMENT OF KNEE OSTEOARTHRITIS

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Introduction: Osteoarthritic disease is the result of mechanical and biological events that destabilize the normal processes of degradation and synthesis of articular cartilage. Because of the progressive nature of the disease, many patients with osteoarthritis of the knee eventually benefit from operative treatment. Purpose: the aim of this study was to evaluate the clinical results of distraction arthroplasty combined with arthroscopic lavage and drilling of cartilage defects for treatment of osteoarthritis of the knee. Patients and methods: nineteen patients (15 females and 4 males, age range, 39 to 65 years) were operated upon. We compared preoperative and postoperative findings. Control group composed of 42 patients treated with arthroscopic procedures only were evaluated for comparison. The follow-up period ranged from 3 to 5 years. Results: clinically, pain and walking capacity improved in most of the patients. Radiologically, joint space widening was noted in nearly all patients. Conclusion: We conclude that treatment using arthrodiatasis device showed improvement in management of osteoarthritic knees in mid-term study.

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Room: Club C

Abstract no.: 27449

PLATELET-RICH PLASMA IS MORE EFFECTIVE THAN CORTISONE FOR CHRONIC PLANTAR FASCIITIS

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Thirty-six patients (16 males 20 females) were prospectively randomized into two study groups. All patients had pre-treatment MRI and ultrasound studies consistent with plantar fasciitis. The first group was treated with a single ultrasound guided injection of 40 mg Depo-Medrol at the injury site and the second group was treated with a single ultrasound guided injection of un-buffered autologous PRP at the injury site. The cortisone group had an average age of 59 (24-74) and had failed 4 months (3-24) of standard non-operative management (rest, heel lifts, PT, NSAIDS, cam walker immobilization, night splinting, local modalities) and had pre-treatment AOFAS scores of 52 (24-60). The PRP group had an average age of 51 (21-67) and had failed 5 months (3-26) of standard non-operative management (rest, heel lifts, PT, NSAIDS, cam walker immobilization, night splinting, local modalities) and had pre-treatment AOFAS scores of 37 (30-56). All patients were then immobilized fully weight bearing in a cam walker for 2 weeks, started on eccentric home exercises and allowed to return to normal activities as tolerated and without brace support. Post-treatment AOFAS scores were PRP 95 (84-100)/cortisone 81(60-90) at 3 months (CI 95% $p < .0001$), PRP 95 (86-100)/cortisone 81 (60-90) at 6 months (CI 95% $p < .0001$), and PRP 94 (86-100)/cortisone 58 (45-77) at 12 months (CI 95% $p < .0001$). This study suggests that platelet rich plasma injection is more effective and durable than cortisone injection for the treatment of severe chronic plantar fasciitis refractory to traditional non-operative management.

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Abstract no.: 29518

CHRONIC LATERAL ELBOW EPICONDYLITIS TREATED WITH EITHER PLATELET RICH PLASMA OR AUTOLOGOUS WHOLE BLOOD. A RANDOMIZED CONTROLLED CLINICAL TRIAL

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Chronic lateral elbow epicondylitis is a tendinosis with angiofibroblastic degeneration of the wrist extensors' origin. Healing of this lesion is reported with the use of autologous blood as well as with platelets rich plasma (PRP). A comparative study of these two treatments was conducted in an effort to investigate the possible advantages of PRP. Twenty eight patients were divided equally in two groups, after blocked randomization. Group A treated with a single injection of 3 ml of autologous blood and group B with 3 ml of PRP under ultrasound guidance. A standardized program of eccentric muscle strengthening was followed by all patients in both groups. Evaluation using pain visual analogue scale (VAS) and Liverpool elbow score was performed at six weeks, three months and six months. VAS score improvement was higher in group B at every follow-up interval but statistically significant only at six weeks, when mean improvement was (95% CI) 3.8 points (3.1 to 4.5) in group B (61.47% improvement) and 2.5 points (1.9 to 3.1) in group A (41.6% improvement), $p < 0.05$. No statistically significant difference was noted between groups regarding Liverpool elbow score although group B had better outcome at every interval. Regarding pain reduction, PRP treatment seems to be an effective treatment for chronic lateral elbow epicondylitis and superior to autologous blood in the short term.

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Room: Club C

Abstract no.: 27119

A NOVEL METHOD TO TREAT THROMBOANGITIS OBLITERANS BY ILIZAROV RING FIXATOR – A STUDY OF 30 CASES

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Thromboangitis obliterans is a non-atherosclerotic, segmental occlusive inflammatory disease of small and medium sized vessels. Diagnostic criteria are – Age group between 25 to 45years, prolonged tobacco smoking, claudication and rest pain, absent pulsations, exclusion of autoimmune diseases, artherosclerosis and the investigations of arteriography showing spider legs, or colour Doppler. Material and methods: We studied 30 cases from May 2005 to May 2009. All were males with age group between 25-45 years with prolonged smoking history of on an average 9.5 years. All patients had claudication pain with claudication distance of <30 meters, 8 patients had rest pain, 6 patients had foot ulceration, 4 patients had toe gangrene. Dorsalis pedis and posterior tibial artery were not palpable in any patient. Colour Doppler was done in 10 patients. All patients were encouraged to quit smoking. All patients were operated in the form of longitudinal corticotomy of lateral cortex of tibia and controlled distraction osteogenesis. Distraction is started on 10th post-op day for 20 days with a rate of 1mm/day. Apparatus is removed after 8 to 10 weeks. Results and complications: 25 patients were pain free and satisfied, 1 patient had partial relief of pain. All the ulcers healed. Claudication distance improved dramatically in 25 patients. 4 patients underwent amputation. 2 patients had osteomyelitis of distracted fragment. 6 patients had superficial pin tract infection. Conclusion: Ilizarov ring fixator which causes neoangiogenesis in extremities is a boon to orthopaedic surgeons for treating this difficult and enigmatic disease.

Date: 2011-09-08

Session: Research - Miscellaneous II

Time: 16:30 - 18:00

Room: Club C

Abstract no.: 28327

**ANALYSIS OF PERFORMANCE METRICS REPORTING IN PAPERS
COMPARING TREATMENTS OR MATERIALS/DEVICES IN FOUR
IMPORTANT ORTHOPEDIC JOURNALS FOR THE YEAR 2009**

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Background: Evidence base medicine is now the quality standard for medical research. The Cochrane "levels of evidence" stratify the quality of papers published based on the adequacy of their methodology. This methodology will influence the accuracy and the repeatability/reproducibility of the results and define the value of one technique versus another. However, is this evidence reproducible by the general orthopedist? How can the reader weigh the quality of the surgery performed if no index for surgical quality were used and reported? We propose to look at the quality of performance metrics reporting in papers comparing two or more treatments. Method: Review of papers (1082 papers with 98 papers meeting the inclusion criteria) from four important orthopedic journals published in 2009 revealed that only 32 papers (33%) reported performance metrics – defined as (1) radiographic evidence; (2) training/experience of surgeon(s); and (3) intra-operative measurements. Results: Analysis did not reveal any significant differences in the rate of performance metrics reporting amongst the journals included or amongst the different orthopedic subspecialties topics, however, papers from South Korea and China reported both performance metrics in general and radiographic measurements specifically at a notably higher rate than papers from the western world. Conclusion: The rate of performance metrics reporting in four important American orthopedic journals was poor in 2009 (33%). This might have an impact on the reader's ability to determine the reproducibility of the results published. We propose a new section on performance metrics reporting for editors to include in their instructions for authors.

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Session: Research - Miscellaneous II

Time: 16:30 - 18:00

Room: Club C

Abstract no.: 28242

ALBUMIN COATING FOR PREVENTING BACTERIAL BIOFILM FORMATION ON TITANIUM SURFACES

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Biomaterial surfaces provide an ideal substrate for bacterial colonization and biofilm formation, resulting in notorious infections following implantation surgery. With no effective treatment once colonization and subsequent biofilm formation has occurred, attention has been paid to decreasing the infection rate by preventing bacterial adhesion and subsequent biofilm formation. We have previously demonstrated that albumin coating dramatically inhibited the adhesion of *Staphylococcus aureus* and *epidermidis* to titanium surfaces (An et al 1996). In this study we evaluated the effect of albumin coating on bacterial biofilm formation to the surface of titanium alloy. An in vitro biofilm formation chamber reported by An et al (2001) was used for the study. Titanium alloy disks with or without albumin coating (bovine albumin cross-linked with carbodiimide by McDowell et al 1995) were incubated in the biofilm chamber for up to 10 days. Samples were taken out of the chamber at day 1, 3 and 10 and evaluated morphologically using confocal microscopy. Adherent bacteria were dislodged and counted using a plate count method. At day 1, 3, and 10, confocal fluorescent microscopy showed samples coated with cross-linked albumin had only small number of adherent bacteria up to day 10, whereas, extensive biofilms were seen on sample surfaces without cross-linked albumin coating. This result was confirmed with quantitative measurements of viable bacteria adhered to the sample surfaces (plate count method) demonstrating a dramatic reduction of adherent bacteria on albumin coated surfaces by 98.97%. This result indicates the feasibility of using albumin coating for prevention of implant infection.

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Session: Research - Miscellaneous II

Time: 16:30 - 18:00

Room: Club C

Abstract no.: 28131

VALUE OF USING CEMENT SPACERS AND ALLOGRAFTS WITH ANTIBIOTIC FOR THE RECONSTRUCTION OF INFECTED BONE DEFECTS

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Introduction: The purpose of this experimental study is to evaluate different types of treatment in open fractures with bone loss, and infected fractures in rabbits. Materials and Methods: Twenty five adult rabbits were included. A mid diaphyseal open fracture of the femur was reproduced in all of them, and was contaminated with Staphylococo Aureus. Group I did not receive treatment (control group). Group II had polymethylmethacrylate with gentamicin and vancomycin intercalated in the fracture area, associated to systemic antibiotics. Group III had polymethylmethacrylate without antibiotic intercalated in the fracture area associated to systemic antibiotics. Group IV had fresh frozen morcialized bone allograft with vancomycin placed in the fracture area associated to systemic antibiotics. Group V had only systemic antibiotic. Histological evaluation of the pseudomembrane formed surrounding the cement was performed. Results: In group I, five positive cultures were found for Staphylococo Aureus. In groups II and IV, all cultures were negative. In group III, there were four negative and one positive culture. In group V two negative and three positive cultures were found. The results obtained at histological evaluation were similar in both groups in which cement was used; showing that the adition of antibiotics to the cement does not alter the histological characteristics of the pseudomembrane. Discussion: When primary open fracture reconstruction is decided, the association of antibiotics to the bone graft help preventing infection; and if staged reconstruction is prioritized, placing a polymethylmethacrylate spacer with antibiotics in the defect during the first stage should be considered.

Date: 2011-09-08

Session: Research - Miscellaneous II

Time: 16:30 - 18:00

Room: Club C

Abstract no.: 29132

RELATIONSHIP BETWEEN SAGITTAL BALANCE OF PELVIS AND OSTEOARTHRITIS: PROPOSAL OF A METHOD OF ANALYSIS AND PRELIMINARY RESULTS

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The approach of the sagittal hip is made popular since the discovery of the syndrome of Ganz. We conducted a study of the pelvis in patients with hip osteoarthritis to determine whether or not there is relationship between the type of hip, frontal and sagittal pelvic parameters. 68 patients, aged 47-88 years followed for osteoarthritis of the hip at the Massues Hospital (Lyon, France) by two senior surgeons were included in the study. All patients included in this study were at an advanced stage of disease progression, and were offered a total hip replacement. The radiographic work-up included an anteroposterior and lateral views of the pelvis. These images were analyzed with software Optispine and Metros. For each patient we measured the angles in frontal and sagittal images: lateral cover (VCE), acetabular roof horizontality (THE), sharp angle, the pelvic incidence, the sacral slope and the pelvic version, and determined the type of osteoarthritis. The mean pelvic incidence of the series is higher than the general population. We find a significant difference in the type of osteoarthritis for: VCE (29.4° for central medial osteoarthritis versus 29.4° for superior superior pole osteoarthritis) and pelvic incidence (53.3° for central medial osteoarthritis versus 61.9° for superior pole osteoarthritis). This preliminary study shows the frontal parameter already involved in osteoarthritis, but also displays that the pelvic incidence, appears to be involved in the development of osteoarthritis, and in the determination of a type of osteoarthritis.

Date: 2011-09-08

Session: Research - Miscellaneous II

Time: 16:30 - 18:00

Room: Club C

Abstract no.: 29334

PERI OPERATIVE HIGH VOLUME LOCAL INFILTRATION OF LOCAL ANAESTHETICS, ADRENALINE AND KETOROLAC DOES NOT INCREASE THE INTRA AND IMMEDIATE POST OPERATIVE BLOOD LOSS AFTER TOTAL HIP REPLACEMENT: A RANDOMISED CONTROLLED STUDY

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Pain after total hip replacement (THR) surgery has been a well-recognised limiting factor affecting post-operative mobilisation and length of hospital stay (LOS). Multi modal high volume local wound infiltration with ropivacaine, adrenaline and Ketorolac, a non steroidal anti inflammatory drug (NSAID) has been introduced in an attempt to reduce opioid requirements postoperatively, but it is unknown if local infiltration with NSAID cause any excess blood loss in the intra operative or immediate post operative period. We evaluated the intra operative and immediate post operative blood loss associated with the use of peri-articular multimodal drug infiltration in THR. We hypothesised that there will be no difference in blood loss amongst patients infiltrated with ketorolac to those who were not. We randomised 86 patients undergoing primary THR to receive either peri-articular intra operative multimodal drug injection with ketorolac (with or without ropivacaine and adrenaline; n=43) or infiltration with ropivacaine (with or without adrenaline; n=43). Blood loss was measured directly per-operatively and indirectly post-operatively after 48 hours of surgery. There were no significant differences in the intra operative and the post operative total blood loss measured at 48 hours between the groups infiltrated with ketorolac (P=0.63 and P=0.72 respectively). We did not find any major difference in the pre and 48 hours post operative haemoglobin levels as well (P=0.56). Our study is the first to report that high volume multi modal wound infiltration including NSAID does not lead to increased blood loss after primary THR.

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Time: 16:30 - 18:00

Room: Club C

Abstract no.: 29465

METASTATIC BONE DISEASE STUDY OF 250 CASES

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In the last two to three centuries the number of cancer cases is on the rise, due to increase in life expectancy & other factors like genetic, racial etc world wide. Due to longer survival of cancer patients due to advances in chemotherapy, radiotherapy & surgical treatment the no. of patients presenting with metastasis are also on the rise though authenticated data are not available. Bony metastasis does not lead to death but they definitely increase the morbidity of a terminally ill patient this is a study of 250 cases of carcinoma breast the average life after metastasis was 18 months. Patient without visceral metastasis survived longer than with visceral metastasis along with bony metastasis. treatment of metastasis is both by chemo, radiotherapy, hormones, herceptin, surgery along with other medicines. These are bisphosphonates, calcitonin, steroids, nsaid, opiates & vit d. this regime of steroids, bisphosphonates calcitonin & vit. d definitely helps in making the patient comfortable & decreases the osteolytic process & helps in strengthening the bone. Out of 250 cases 30 cases needed surgery for spinal & extraspinal metastasis. 5 patients were for prophylactic fixation for impending fracture, rest for pathological fractures supplemented by bone cement along with chemotherapy & radiotherapy. These are complimentary to each other. patient nursing care improved, self confidence increased. 2 patients died in post operative period. Longest survival is three years the survival varied from 5 weeks to three years. It can be seen that the overall quality of life & survival has definitely improved with these modalities as compared to previous years.

Date: 2011-09-08

Session: Research - Miscellaneous II

Time: 16:30 - 18:00

Room: Club C

Abstract no.: 30038

INTERPRETING A HIGH METAL ION RESULTS FOR THE MOM PATIENT

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Introduction: We examined the relationship between wear of explanted components, blood/serum CrCo levels and the risk of early failure of hip resurfacing. Methods: We included all resurfaced patients who were three years from the initial blood test for CrCo level. Patients with increased Co (>4µg/L) or pain were examined with ultrasound scans. The presence of a moderate or large effusion was an indication for revision. Results: There were 78 ASR and 71 BHR patients. ROC analysis of the total volumetric wear rates of retrieved MoM hip resurfacings at our centre since 2008 (n=30) and blood/serum Cr/Co analysis showed serum Co to be the most reliable surrogate measure of wear. Therefore patients were arbitrarily split into sub groups according to serum Co (Group 1: <2µg/L (n=62), Group 2: 2 – 5µg/L (45), Group 3: 5 – 10µg/L(17), Group 4: >10µg/L(25)). At three years, one Group 1 patient developed ARMD (ASR). In Group 2, 24% of ASR patients developed ARMD compared to 0 of 24 BHR patients in this group. In Group 3, 45% of ASR patients compared to 20% of BHR patients developed ARMD. In Group 4, 80% of ASR patients and 60% of BHR patients developed ARMD. Conclusions: Metal ion testing is a useful tool to assess the in vivo performance of MoM prosthesis. Patients with increased ion levels are at higher risk of early joint failure however it appears that there is variability in an individual's tolerance to metal debris.

Date: 2011-09-08

Session: Research - Miscellaneous II

Time: 16:30 - 18:00

Room: Club C

Abstract no.: 26945

BONE FORMATION INDUCED BY GROWTH FACTORS EMBEDDED INTO THE NANOSTRUCTURED PARTICLES

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(FRANCE)

Tissue engineering has merged with stem cell biotechnology with development of new sources of transplantable biomaterials for the treatment of bone tissue diseases. Bone defects are expected to benefit from this new biotechnology because of the low self-regenerating capacity of bone matrix secreting cells. The differentiation of stem cells to bone cells using bi-functionalized multilayered particles is presented. The functionalized nanoparticles are composed of poly-glutamic acid (PGA) and poly-L-lysine (PLL) with two bone growth factors (BMP-2 and TGF β 1) embedded into the multilayered film. The induction of bone from these bioactive particles incubated with embryonic stem cells was demonstrated in vitro. Herein, we report the unique demonstration of a multilayered particle-based delivery system for inducing bone formation in vivo. This strategy is an alternative approach for in vitro and in vivo bone formation. Strategies using simple chemistry to control complex biological processes would be particularly powerful, as they make production of therapeutic materials simpler and more easily controlled.

Date: 2011-09-08

Session: ICFC/SICOT: Clubfoot - Basic Science & Clinical Research

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 29676

THE ROLE OF LEG MUSCLE ATROPHY IN THE PATHOGENESIS OF IDIOPATHIC CONGENITAL CLUBFOOT

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Pathologic and clinical studies on idiopathic congenital clubfoot have shown atrophy and shortening of the leg muscles, with both triceps surae and tibialis posterior being mostly affected. In the present study, we investigate whether the atrophy of the leg muscles is primitive or secondary to the treatment of the deformity. We studied the histologic cross sections of the legs of two fetuses with unilateral congenital clubfoot spontaneously aborted at 13 and 19 weeks of gestation respectively and the transverse MRI scans of both legs in 24 patients with unilateral congenital clubfoot (8 babies, 8 children and 8 adults), using a computer program (AutoCAD 2002 LT). Marked atrophy of the leg muscles on the clubfoot side was found in both fetuses and untreated newborns with a percentage ratio of muscular tissue volume between the normal and affected leg of 1.3 and 1.5, respectively. Leg muscle atrophy increased with growth, and the percentage ratio of muscular tissue volume between the normal and affected leg was 1.8 and 2 in treated children and adults, respectively. Fatty tissue tended to increase relatively from birth to adulthood. We demonstrate that the leg muscular atrophy in congenital clubfoot is primitive and increases with the patient's age; we believe that an impairment of the mechanism of muscle growth could be one of the possible pathogenic factors of congenital clubfoot.

Date: 2011-09-08

Session: ICFC/SICOT: Clubfoot - Basic Science & Clinical Research

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 28517

EVIDENCE THAT PITX1 HAPLOINSUFFICIENCY CAUSES CLUBFOOT IN HUMANS AND MICE

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Purpose: Clubfoot is a common musculoskeletal disorder affecting 1 in 1000 individuals. We recently identified a mutation in the bicoid homeodomain transcription factor PITX1 in a family with a range of lower extremity abnormalities, including clubfoot. Because the E130K mutation abolished the ability of PITX1 to transactivate a luciferase reporter, we hypothesized that additional cases of clubfoot could result from PITX1 haploinsufficiency. Methods: (1) Genome-wide copy number analysis was performed on 40 isolated clubfoot patients using the Affymetrix 6.0 array. (2) Segregation analysis of identified copy number variants was performed in families with multiple affected members. (3) Chromatin-immunoprecipitation-sequencing (ChIP-seq) of E12.5 mouse limb buds was performed to identify downstream targets of PITX1. Results: We identified a 241 kb microdeletion of chromosome 5 involving 124 markers and 4 genes, including PITX1, in one patient. The patient's mother and grandmother also had isolated clubfoot, and were found to have the chromosome 5 microdeletion, demonstrating segregation over three generations. In breeding the Pitx1 knockout mice in our laboratory, we noticed that some of the Pitx1 $-/+$ mice had clubfoot. The Pitx1 $-/+$ mice were previously reported to be normal and Pitx1 $-/-$ mice shown to have severe limb shortening but no clubfoot. Clubfoot was present in 20 of 232 Pitx1 $-/+$ mice. To understand the mechanism by which PITX1 haploinsufficiency causes clubfoot, we performed ChIP-seq on E12.5 embryo hindlimb buds using an antibody to PITX1 and a control IgG antibody. We identified more than 300 potential direct transcriptional targets of PITX1 in the developing hindlimb that suggest a possible mechanism by which alterations of this gene cause clubfoot. Conclusion: Haploinsufficiency of the bicoid homeodomain transcription factor PITX1 causes isolated idiopathic clubfoot in humans and mice. Significance: The Pitx1 haploinsufficient mouse represents the first genetic mouse model for clubfoot.

Date: 2011-09-08

Session: ICFC/SICOT: Clubfoot - Basic Science & Clinical Research

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 29614

TREATMENT OF IDIOPATHIC CONGENITAL CLUBFOOT: THE EXPERIENCE OF THE ITALIAN GROUP FOR PROMOTION AND PROTECTION OF PONSETI METHOD (IGPPPM)

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Ponseti method for treatment of idiopathic congenital clubfoot has proven to be worldwide successful. In September 2009 was founded in Palermo the Italian Group for Promotion and Protection of Ponseti Method (IGPPPM). The aim of the present study is to report the experience of IGPPPM in a multicenter group of patients treated for idiopathic congenital clubfoot. Two-thousand-two-hundred-seven patients affected by idiopathic congenital clubfoot (3479 feet) were treated according to the Ponseti method, in 7 Paediatric Orthopaedics departments (University-Hospital of Catania, Giovanni XXIII Hospital - Bari, University-Hospital of Rome Tor Vergata, Pediatric Orthopaedic Unit of Padua, V. Buzzi Hospital - Milan, Bambino Gesù Hospital – Rome, San Bortolo Hospital – Vicenza), between 2001 and 2009. Age at treatment, gender, side, severity of initial deformity evaluated according to Manes classification, age at tenotomy, compliance with brace, and number of recurrence were recorded. The mean follow up was 49 months (range 7 to 108 months). The age at the beginning of treatment ranged from 4 days to 5 weeks; 1427 patients were males and 780 females (M:F = 1,82); 1272 cases were bilateral. According to Manes Classification, 16.7% of the patients were type I, 47.0% type II, and 36.3% type III. Subcutaneous tenotomy was performed in 1582 patients (86.0%). Recurrence was observed in 239 children (12.6%). Poor compliance with the Denis Browne splint seems to be the main cause of failure. The experience of IGPPPM confirmed the effectiveness of the Ponseti method for treatment of idiopathic congenital clubfoot.

Date: 2011-09-08

Session: ICFC/SICOT: Clubfoot - Basic Science & Clinical Research

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 28502

FAMILIAL ISOLATED CLUBFOOT IS ASSOCIATED WITH RECURRENT CHROMOSOME 17Q23.1Q23.2 MIRCRODUPLICATIONS CONTAINING TBX4

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Purpose: Clubfoot is a common musculoskeletal birth defect for which few causative genes have been identified. The purpose of this study was to identify the genes responsible for isolated familial clubfoot. **Methods:** In the present study, we identified 66 isolated idiopathic clubfoot probands with at least one affected first-degree relative. Individuals were considered to have isolated idiopathic clubfoot only in the absence of additional congenital anomalies (i.e. heart defect, hypospadias) or known underlying etiology (i.e. arthrogyrosis, myelomeningocele, and myopathy). Probands were screened for genomic copy number variants (CNVs) with the Affymetrix Genome-wide Human SNP Array 6.0. **Results:** A recurrent chromosome 17q23.1q23.2 microduplication was identified in 3 of 66 probands with familial isolated clubfoot (Fig. 1). The chromosome 17q23.1q23.2 microduplication segregated with autosomal dominant clubfoot in all three families but with reduced penetrance. Mild short stature was common and one female had developmental hip dysplasia. Subtle skeletal abnormalities consisted of broad and shortened metatarsals and calcanei, small distal tibial epiphyses, and thickened ischia (Fig. 2). Several skeletal features were opposite to those described in the reciprocal chromosome 17q23.1q23.2 microdeletion syndrome associated with developmental delay, cardiac and limb abnormalities. **Conclusion:** In this study, we provide evidence supporting a role for a recurrent chromosome 17q23.1q23.2 microduplication in the etiology of isolated clubfoot. Since few genes have previously been implicated in clubfoot pathogenesis, this discovery represents the most common cause of isolated clubfoot identified to date. **Significance:** The chromosome 17q23.1q23.2 region contains the T-box transcription factor TBX4, a likely target of the bicoid-related transcription factor PITX1 previously implicated in clubfoot etiology. Our result suggests that this chromosome 17q23.1q23.2 microduplication is a relatively common cause of familial isolated clubfoot, and provides strong evidence linking clubfoot etiology to abnormal early limb development.

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Session: ICFC/SICOT: Clubfoot - Basic Science & Clinical Research

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 28498

EXOME SEQUENCING IDENTIFIES MYH3 MUTATION IN FAMILY WITH DISTAL ARTHROGRYPOSIS TYPE I

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Background: Few genes responsible for distal arthrogryposis type 1 are known although sarcomeric genes have been implicated in many types of distal arthrogryposis. Cost-effective sequencing methods are now available to interrogate all genes in the human genome for the purpose of establishing the genetic basis of musculoskeletal disorders such as distal arthrogryposis. Methods: A multi-generational family with distal arthrogryposis type 1 characterized by clubfoot and mild hand contractures was identified and exome sequencing was performed on DNA from the proband. Linkage analysis was used to confirm segregation of genetic variants. Results: Exome sequencing identified 573 novel variants that were not present in control databases. A missense mutation in MYH3 (myosin heavy chain) causing a F437I amino acid substitution was identified that segregated with disease in this family. Linkage analysis confirmed that this MYH3 mutation was the only exome variant common to all 6 affected individuals. Conclusions: MYH3 gene mutations cause a variety of human diseases associated with distal contractures, including distal arthrogryposis type 1 as shown here. Because distinction between some types of distal arthrogryposis and isolated clubfoot may be difficult clinically, genetic testing may be supportive. Clinical relevance: Exome sequencing is a useful and cost-effective method to discover causative genetic mutations, though extended family data may be needed to confirm the importance of the hundreds of identified variants.

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Session: ICFC/SICOT: Clubfoot - Basic Science & Clinical Research

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Room: Club D

Abstract no.: 29155

KINETIC ANALYSIS OF THE HIP JOINT IN CHILDREN WITH IDIOPATHIC CLUBFOOT

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This study evaluates the differences of kinetic parameters of the hip during walking in children with operated unilateral clubfeet compared to the contralateral side and to normal children. Ten children (6-9y) with operated mild or moderate idiopathic clubfeet with 5-8y average follow-up were compared to 20 matching normal children. 3-D Gait analysis was carried out and the data collected by the "Opto-electronic motion analysis system with a force plate unit". Qualisys Motion Capture System was used to measure the excursions of the ankle, knee and hip joints & with a force plate unit to measure the Ground reaction force in them during gait. Results: 1-There was a significant reduction of the extension moment of the affected side when compared to the non-affected side and to the normal group. 2-There was a significant increase of the internal rotation moment of the affected side when compared with both the non-affected side and the normal children. There was also a significant increase in that moment in the non-affected side of the clubfoot group when compared to the normal group. We concluded that there are compensatory mechanisms occurring in the hip joint, of the operated side, especially in extension and internal rotation moments. The evaluation of the kinetic parameters of these hips may help to define the functional deficits and prescribe novel rehabilitation techniques to improve their outcome. We may add that the recent shift to conservative methods may also prove to be logical since surgery might have long term detrimental effects on other joints.

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Session: ICFC/SICOT: Clubfoot - Basic Science & Clinical Research

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 28389

PREDICTION OF THE CLUBFOOT PROGNOSIS BY THE RADIOGRAPH AT NEONATE

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The purpose of this study is to verify that the relationship between the 1st metatarsus and the ossification center of talus on the radiograph at neonate influenced the prognosis of idiopathic clubfoot. Forty patients with unilateral idiopathic clubfoot treated by Ponseti method were retrospectively examined. Anteroposterior radiographs of the foot were taken at the average age of 15 days (range; 1-79 days) after birth. The length of the 1st metatarsus (LM1) and the ossification center of talus (LOT) of both affected and unaffected feet were measured on the radiographs. The proportion of LOT to LM1 (POTM1) was calculated in each foot. All patients, whose average age at final follow-up were 51 months (range; 9-94 months), were classified into two groups; six patients who were operated for residual deformity or relapse by the time of final follow-up (the operated group), the other 34 patients without any operations (the conservative group). We compared POTM1 between two groups. As results, there were no differences between the average of the LM1 in the affected and that in the unaffected feet (12.7 and 12.9mm respectively). The average of the LOT in the affected feet was significantly shorter than that in the unaffected feet (7.1 and 9.6mm respectively). The average of the POTM1 in the operated group was significantly smaller than that in the conservative group (0.47 and 0.57 respectively). We concluded that the POTM1 could prognose the future needs of the corrective surgery for both unilateral and bilateral idiopathic clubfoot.

Date: 2011-09-08

Session: ICFC/SICOT: Clubfoot - Basic Science & Clinical Research

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 28621

RELIABILITY OF THE DIMEGLIO CLASSIFICATION FOR CLUBFOOT

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Purpose: To report the reliability of the Dimeglio system for congenital clubfoot in terms of intraclass correlation coefficients (ICCs) considering three raters during the process. **Introduction:** Dimeglio's classification for clubfoot has become the most widely used system for grading this deformity. We sought to report the reliability of the Dimeglio system for congenital clubfoot in terms of intraclass correlation coefficients (ICCs) considering three raters during the process and the homogeneity of the scale in terms of Cronbach's alpha. **Methods:** Prolective observational study, with randomly selected patients and three fixed raters (observers) to assess the reliability and homogeneity of Dimeglio's classification for clubfoot. From March 31 2009 to June 31 2010 144 feet (subjects) were evaluated. Sample size was calculated using Bonnet's formula; based upon obtained reliabilities, the number of raters (3), the desired width of the confidence interval ($w = 0.08$) and statistical significance ($Z\text{-alpha} = 1.96$) for a two-tailed alpha level of 0.05 a sample of 130 subjects was obtained. Sampling was achieved with stratified randomization to obtain a platykurtic distribution of scores ($k = -0.38$). **Statistical Analysis:** We used a two-way random effects Analysis of Variance (ANOVA) mixed effects model; mean squares were used to calculate the ICCs: ICC2 (C,1) for consistency and ICC2 (A,1) for agreement. We calculated all the possible split-half reliabilities of the scale (internal consistency and homogeneity) in terms of Cronbach's alpha, for all the observations and for each observer. **Results:** The ICCs (95% CI) for consistency ICC2 (C,1) was 0.8554 (0.8087-0.9022, $p=0.013$) corresponding to the intra-rater reliability. The ICC (A,1) was 0.8521 (0.8049-0.8993, $p=0.098$). Cronbach's alpha resulted in 0.8149, which denoted homogeneity of Dimeglio's classification. **Discussion:** Dimeglio's classification is reliable.

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Session: ICFC/SICOT: Clubfoot - Basic Science & Clinical Research

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 29736

EVALUATION OF THE ACCURACY OF THE I-BUTTON FOR MEASURING PATIENT COMPLIANCE WITH BRACE WEAR IN IDIOPATHIC CLUBFOOT

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Clubfoot or Congenital Talipes Equino Varus deformity affects one in every 1,000 live births. Ponsetti technique involves repeated manipulations and serial casting followed by bracing for a 2 year period and is still the widely accepted and successful management technique. The most important cause for failure after the Ponsetti technique is failure of compliance with brace wear. It is extremely difficult to monitor the duration of brace wear in the patient's home environment. The aim of the study was to evaluate the accuracy of using the Thermocon I -Button as a method for objective assessment of compliance with brace use. The study was a prospective method comparison study. The I -Button was used for collecting the data of time and temperature recessed within the insole. The time the brace was applied and removed was also manually recorded by one observer. The data was assessed for the limits of agreement using the Bland Altman Plot. There were 34 patients. The difference between the two sets of data is likely to differ by less than 8 minutes and this deviation could be in either direction. The 95% confidence intervals are - 6.64 to 8.15. The agreement between the two sets of data was found to be statistically significant. This study proves that the I Button temperature sensor can precisely identify when the brace is in use and when it is taken off and therefore this sensor can be used to accurately evaluate patient compliance with brace wear.

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Session: ICFC/SICOT: Clubfoot - Basic Science & Clinical Research

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 29065

THE ACCESSORY SOLEUS MUSCLE AS A CAUSE OF PERSISTENT EQUINUS IN CLUBFEET TREATED BY THE PONSETI METHOD: A REPORT OF 16 CASES

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Encountering an accessory soleus muscle in children undergoing surgical release for clubfeet is not a frequent occurrence and only a few reports could be traced in literature. The purpose of this study is to report a series of 20 observations in 16 patients with idiopathic clubfeet treated by the Ponseti technique where the accessory soleus muscle was responsible in preventing full ankle dorsiflexion after Achilles tendon tenotomy. Following its division, adequate dorsiflexion could be achieved. To our knowledge this is the largest series published to date on this topic. In addition, we discuss the frequency and epidemiology, as well as the anatomy of the accessory soleus muscle, its innervation and embryology. The mean age at presentation was 40.7 days (range: 6 to 210 days). The accessory soleus tendon was observed in 6 right and 6 left feet, 4 feet had bilateral involvement. The average ankle dorsiflexion after complete tendo Achilles tenotomy was 2.5° (SD: 6.38), and after sectioning of the accessory soleus tendon, it was 19.5° (SD: 5.59) ($p < 0.001$). Correction was obtained in all patients, after 3 to 10 casts. In conclusion, the recognition of an accessory soleus muscle, in patients with clubfeet, is important, and its release is necessary to fully correct the deformity. Failure to recognize this muscle may lead to persistent hindfoot deformity.

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Session: ICFC/SICOT: Clubfoot - Basic Science & Clinical Research

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Room: Club D

Abstract no.: 30052

ASSESSMENT OF THE TALO-NAVICULAR JOINT BY ULTRASOUND DURING PONSETI MANAGEMENT OF CLUBFEET

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BACKGROUND: It is well known that proper correction of the displacement in the talo-navicular joint and maintenance of the corrected position is crucial in the treatment of clubfeet. **MATERIAL:** In an ongoing study we follow more than 30 children with clubfeet by repeated ultrasound examinations from the neonatal period to the end of bracing treatment at the age of four years. **METHODS:** Our original protocol includes the medial malleolus-navicular distance and a semi quantitative grading of the navicular luxation. To improve the assessment of the navicular displacement we have added to our measurement protocol the perpendicular distance from the most medial edge of the navicular to the tangent of the medial side of the talus. Negative values means that the navicular edge is medial to the tangent and positive values that it is lateral to the tangent. In the control group the values are close to zero when the feet are in neutral position. **RESULTS:** When the clubfeet were clinically enough corrected to discontinue manipulation and casting and it was time to continue the treatment by foot-abduction-orthosis (modified Dennis Browne) the navicular was still significantly more medially positioned than in normal feet. This displacement gradually decreased during the bracing period. **CONCLUSION:** At the end of the manipulation and casting, there still remains a medial displacement of the navicular bone which gradually decreases during the bracing period. This emphasizes the importance to fulfil the bracing treatment even if the foot looks normal.

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Session: ICFC/SICOT: Clubfoot - Basic Science & Clinical Research

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 29160

CLUBFOOT SEVERITY CHANGES DURING THE FIRST WEEK OF LIFE

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Purpose: To evaluate the clubfoot severity on the first and seventh days of life. **Materials & Method:** This study reviews 28 neonates with 40 moderate and severe clubfeet (initial equinus was 95 degrees or more, initial Pirani score was 2,0 points or more). Patients with arthrogryptic clubfeet and other syndromes were not included. Age at presentation ranged from 10 min to 24 hours. Clubfeet were assessed on the first and seventh days of life using Pirani score. Foot dorsiflexion angle in maximum correction was carefully calculated. All assessments were done by senior author. No treatment was performed in patients of this group until the seventh day of their life. **Results:** Clubfoot assessment on the first day of life was 2,0 – 3,5 points according to the Pirani scale (mean 2,87), foot dorsiflexion angle was 95 – 118 degrees (mean 106,8). Clubfoot assessment on the seventh day of life was 3,0 – 5,0 points according to the Pirani scale (mean 4,07), foot dorsiflexion angle was 101-130 degrees (mean 116,3). Total Pirani score increased in each foot during the first week of life, additional points varied from 0,5 to 1,5 (mean 1,2). Foot dorsiflexion angle increased from 6 to 12 degrees in every foot (mean 9,5). **Conclusions:** Clubfoot severity was progressing in all assessed neonatal feet during the first week of life. It is optimal to start the clubfoot treatment in the first days of life.

Date: 2011-09-08

Session: ICFC/SICOT: Clubfoot - Basic Science & Clinical Research

Time: 08:00 - 09:30

Room: Club D

Abstract no.: 30211

ULTRASOUND ASSESSMENT OF CLUBFOOT IN INFANTS

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Purpose: Clubfoot is a relatively common musculoskeletal disorder. It is characterised by equinus and varus of the hindfoot, adduction of the forefoot, supinatus plus or less cavus. The purpose of this study was to establish the usefulness of US in clinical practice, to determine the value of the different US items analyzed and to compare the talo-calcaneal angle measured by US and plain films. Material and Methods: Using a linear high frequency transducer, the US was performed along medial, dorsal, posterior and lateral borders of the foot. The talo-navicular relationship was established and quantified from medial and dorsal approaches. Measurement of the distance between the navicular and the medial malleolus was evaluated. The talo-calcaneal divergence was assessed in order to correlate with angle obtained on plain films. The tibio-talo-calcaneal axis in dorsiflexion of the foot was evaluated by a posterior approach. The relationship between the cuboid and the calcaneus was established and quantified with examination of the lateral border of the foot. Results: 110 patients with idiopathic clubfoot were assessed by US (73% male; mean age at first exam 11.5 weeks; 66% bilateral involvement). Patients with neuromuscular disorders or other syndromes were excluded. Morphological changes of the talo-navicular joint, the distance between the medial malleolus and the navicular, and the talo-calcaneal relationship are good indicators of the clinical severity. There is good agreement between US and plain films measurement of the talo-calcaneal angle. Conclusion: US is an effective technique to assess and quantify the deformity in clubfoot.

Date: 2011-09-08

Session: ICFC/SICOT: International Clubfoot Treatment Programs & Strategies for Managing Difficult Clubfeet

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 29114

IMPLEMENTING NATIONAL PONSETI CLUBFOOT PROGRAMS IN UNDER-RESOURCED NATIONS: FACTORS FOR SUCCESS

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Purpose: To evaluate the factors resulting in the successful implementation of country-wide training and service delivery programs for early intervention of clubfoot deformity by the Ponseti method in under-resourced developing nations. Methods: 10 developing nations in sub-Saharan Africa, Latin America, and Asia were selected for simultaneous introduction of Ponseti clubfoot training and service delivery in a distributed model following public health principles. The targets over two years were to establish at least 1 referral clubfoot clinic, train 20 personnel and treat 250 babies in each country. Independent quantitative and qualitative review was undertaken after 2 years. Factors resulting in relative degrees of success were analyzed. Results: 112 clubfoot clinics were established, 634 practitioners were trained, and 7705 babies were treated in the two year span of the project. Practitioners, managers and caregivers applauded the program and desired continuing support. Identified factors resulting in more successful programs included: support from the national Ministry of Health and implementation within national health structures, an enthusiastic and committed country leader, a country coordinating administrator, support for clinic database management and support/supervision, clinic social workers, and subsidy support for foot abduction braces. Conclusion: Country-wide programs for the treatment of babies with congenital clubfoot can be successfully implemented if appropriate health systems administration is followed. Overall this project exceeded targets almost threefold and the methodology was found to be applicable across continents and cultures. Significance: The project highlights the value of a public health approach to early intervention and orthopedic care for clubfoot deformity.

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Session: ICFC/SICOT: International Clubfoot Treatment Programs & Strategies for Managing Difficult Clubfeet

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 29809

PONSETI CLUBFOOT TREATMENT BY ORTHOPAEDIC OFFICERS: PROSPECTIVE COHORT STUDY IN UGANDA

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Background: The Uganda Sustainable Clubfoot Care Project's aim is to reduce consequences of disability from neglected clubfoot by institutionalizing the Ponseti clubfoot treatment throughout the Uganda Healthcare System so as to provide universal and effective Ponseti clubfoot treatment. This study reports characteristics of the first 370 infants and children that were identified in seven clinics in Uganda between January 2006 and December 2007 and their outcomes to end of casting. Methods: This is a multicenter prospective cohort study. Orthopaedic paramedical (orthopaedic officers) provided Ponseti treatment under the supervision of an orthopedic or general surgeon. The diagnosis was made clinically. Outcome criteria were Pirani scores noted at each visit. Results: The majority of children seen were under 14 weeks of age. There were 111 girls and 259 boys for an M:F ratio of 2.3:1. Half (51%) of all cases were bilateral congenital idiopathic clubfoot, 14% were left only, 23% right only, 6% were positional, and 6% were syndromic. The average Pirani Score at diagnosis was 5.4 falling to less than 2 by treatment six. The majority of children were corrected by the sixth treatment. There were no serious complications but minor complications occurred at the rate of 19/1000 manipulation and castings, most being associated with plaster burns. The adherence rate to end of casting was 83%. Conclusions: The diagnosis and management of clubfoot deformities by orthopedic officers is a viable management method in Uganda. Level of Evidence: Level1, prognostic study.

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Session: ICFC/SICOT: International Clubfoot Treatment Programs & Strategies for Managing Difficult Clubfeet

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 30029

LESSONS AND RESULTS FROM THE FIRST THREE YEARS OF THE MALAWI NATIONAL CLUBFOOT PROGRAM

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The Malawi National Clubfoot Program was launched in November 2007. It represents a collaborative initiative of several Governmental and non-governmental organisations including CURE Clubfoot Worldwide, Malawi Ministry of Health and CBM (Christian Blind Mission). In the first three years of operation we have held training courses for 178 Clinicians in the Ponseti Method, set up 26 national treatment centers and trained 82 counselors. Over 2000 children with clubfeet have been treated. The demographics of these children differ markedly from those of developed countries with approximately three quarters of cases being bilateral cases and only one quarter unilateral. The ratio of males to females was approximately 3:1. Achilles tenotomy rates nationally were only 45% in the initial months and have subsequently improved to over 80%. So far we have lost 107 children to follow-up and 30 have failed treatment and required surgery. We have learned many valuable lessons on the institution and running of a national program, on improvements in training techniques and the need for effective counseling in delivering quality care to children with clubfeet in this region of Africa. Some of these lessons are discussed in this paper and we believe are also applicable to other regions of the world. We believe working collaboratively with all stake holders and learning from the experience of other projects are important in running a successful national program. Training clinicians alone in the Ponseti method is ineffective in delivering quality Ponseti care to children with clubfeet in a country such as Malawi.

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Session: ICFC/SICOT: International Clubfoot Treatment Programs & Strategies for Managing Difficult Clubfeet

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 29377

UNDERSTANDING THE BARRIERS FOR EFFECTIVE TREATMENT OF CLUBFOOT BY THE PONSETI METHOD: AN INDIAN PERSPECTIVE

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Introduction: The utility of the Ponseti method in the Indian scenario with its unique socio-economic pattern has still not been adequately proved. The purpose of this paper is to shed some light on the barriers for effective Ponseti treatment of clubfoot in India. Materials and methods: The database of two groups of patients with CTEV treated over a 3 year period at two different institutes (one government set-up and the other – a private institute) was analysed using prospectively gathered data of 58 patients (99 clubfeet) and 99 patients (153 clubfeet). All patients were treated by the Ponseti method and were compared on the basis of follow-up rate, compliance with brace wear, rate of recurrence and its relation to socio-economic status and educational status of the parents. Results: Though there were marked differences in the socio-economic and educational levels of parents in both groups, the results were not significantly different, with no drop-outs during the treatment phase in both groups. The number of casts required for completion of therapy as well as the failure rates was not statistically different. The follow-up was very poor (<30%) in the government set-up, the probable reasons being poor educational levels of the caregivers, amount of money and time required to travel for follow-up and more tolerance of people towards minor deformities. Thus, until these social barriers are overcome, the Ponseti method may have a high relapse rate in India and a gradual disillusionment might set in, despite its promise of a very high success rate.

Date: 2011-09-08

Session: ICFC/SICOT: International Clubfoot Treatment Programs & Strategies for Managing Difficult Clubfeet

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 28944

A MANAGEMENT PROTOCOL TO MINIMIZE THE SURGICAL INTERVENTION IN LATE NEGLECTED CLUBFOOT (ABOVE 5 YEARS)

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Late Neglected clubfoot (presenting after the age of 5 years) require extensive surgeries involving both soft tissues and bones. This study is undertaken with the objective that if a protocol of serial manipulations prior to surgery can minimize the surgical Intervention and achieve correction in the late presenting neglected CETV foot. Between 2009-2010, 27 feet were recruited .Each underwent clinical and radiological evaluation; and planning of surgical corrections by an independent orthopaedic consultant. Subsequently, instead of planned surgical correction they were subjected to the protocol of undergoing serial casting based on Ponsetti s principle and sequence. The major difference being the duration, which was shortened to 3 days. The end point being no further correction possible. The residual deformities were than subjected to the necessary surgical correction, by the author. 23 such feet are finally analyzed for the corrections achieved, and surgical procedures avoided. The study depicts the usefulness of such a protocol before embarking on surgical intervention in late presenting neglected CTEV.

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Abstract no.: 29566

THE UGANDA SUSTAINABLE CLUBFOOT CARE PROJECT (USCCP)

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Background/Method: Widespread access to effective Ponseti clubfoot treatment may considerably reduce the incidence of neglected clubfeet. USCCP was established to build capacity, using public health principles, for: 1. Ponseti clubfoot treatment within Ugandan health systems, and 2. Ponseti clubfoot teaching within Ugandan schools of healthcare. Its purpose is to make available a universal, effective, efficient, and safe treatment of the congenital clubfoot deformity in Uganda, in a sustainable fashion. Results: The Ministry of Health approved the Ponseti method to treat the congenital clubfoot deformity in all its hospitals using a model of paramedical care delivery. 2171 children have received treatment at 36 clubfoot clinics across Uganda's four regions. 1081 health care professionals (147 orthopedic officers, 26 orthopedic technicians, 815 nurses and 12 surgeons) have benefited from training in the Ponseti method. Together, the project and the Ministry have run a paper based awareness campaign to spread the message that clubfoot can be treated and that treatment is free. The Project and Uganda's medical/paramedical schools developed a comprehensive Ponseti Method training module for healthcare students, which is now being used in 80% of the Uganda schools of healthcare. 2705 students (638 medical students, 41 residents, 659 student orthopaedic officers, 171 student orthopaedic technicians and 1196 student nurses) have benefited. Conclusion: USCCP has used public health principles to build capacity for Ponseti clubfoot care & for Ponseti clubfoot teaching, thereby improving access to timely and effective care for children born with clubfeet.

Date: 2011-09-08

Session: ICFC/SICOT: International Clubfoot Treatment Programs & Strategies for Managing Difficult Clubfeet

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 28369

TREATMENT OF SEVERE TALIPES EQUINOVARUS IN CHILDREN

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The objective of the study was to assess the effectiveness of combined treatment of the severe talipes equinovarus in children. Material of the study included 32 patients (52 feet) with severe talipes equinovarus. Etiology of the deformity included relapsing clubfeet after primary surgical treatment (8 children), neurogenic forms (6 children with spina bifida, diastatomyelia, peroneal and ischiadicus nerves palsy) arthrogriposis (10 children) and skeletal dysplasias (8 children with diastrophic dwarfism and multiple epiphyseal dyaplasia). The complex protocol of treatment included serial casting with plaster above-knee casts according to the principles of Ponseti method. Achilles tenotomy was performed in 50% of children on the early stage to facilitate correction process. The second part of protocol was posteromedial release which was accomplished by release and realignment of the first cuneiform and tibialis anterior transfer. This maneuver gives the possibility to adopt the axes of tarsal and metatarsal bones and achieve normal relations between hindfoot and forefoot without corrective osteotomies. The results demonstrated, that in 70% of patients this approach gives stable long-lasting correction and these children were not underwent additional surgical procedures. In 30% of children during follow-up period of 4 years additional surgical correction with osteotomies and/or Ilizarov frame was performed. As a conclusion, two-stage approach in treatment of severe talipes equinovarus in children gives better results with minimal rate of surgical complications.

Date: 2011-09-08

Session: ICFC/SICOT: International Clubfoot Treatment Programs & Strategies for Managing Difficult Clubfeet

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 28943

PREDICTIVE FACTORS OF EARLY RECURRENCE DURING CLUBFOOT TREATMENT WITH THE PONSETI METHOD: DOES TEMPERAMENT MATTER?

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Relapse is a well recognized phenomenon of clubfoot treatment. We sought to investigate the effects of clubfoot severity, demographic factors, orthotic compliance and two previously uninvestigated variables, child temperament and parental stress, on early recurrence of an idiopathic clubfoot deformity during the Ponseti method. Nineteen patients (28 clubfeet) received initial casts at a mean age of 17 days and were followed for a mean 32 (22-48) months. At the time of enrollment, clubfoot severity was measured by the Pirani score; child temperament and parental stress were assessed by the Unadaptability domain of the ICQ and the Parental Distress score of the PSI-SF (higher scores indicate a less adaptable temperament and more stress). Parental compliance was gathered 1-3 months after initiating orthoses. Twelve feet demonstrated recurrence requiring re-casting; 4 feet required further operative procedures including 2 hindfoot releases for atypical clubfeet. Univariate analyses demonstrated the recurrence group had a larger number of pre-tenotomy casts (8.0 versus 5.6, $p=.048$), higher Pirani scores (5.3 versus 4.3, $p=.043$), lower compliance (16.4 versus 21.5 hours/day, $p=.020$), lower Unadaptability scores (8.3 vs. 11.4, $p=.042$), lower Parental Distress scores (18.8 versus 22.3, $p=.028$), lower income ($< \$30,000/\text{year}$, $p=.019$) and were more likely to be non-white ($p<.001$). Multivariate analysis demonstrated children with an Unadaptability score >10 were 24 times less likely ($p=.010$) and those with a Pirani score ≥ 5.5 were 11 times more likely ($p=.043$) to recur. A more adaptable temperament and a higher presenting Pirani score had a predictive effect on recurrence. We have introduced parental stress and child temperament as new variables in the evaluation of clubfoot recurrence.

Date: 2011-09-08

Session: ICFC/SICOT: International Clubfoot Treatment Programs & Strategies for Managing Difficult Clubfeet

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 28419

OPTIMAL ASSEMBLY OF SOFTWARE BASED ORTHO-SUV FRAME FOR FOREFOOT COMPLEX DEFORMITY CORRECTION

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Objective: Correction of complicated foot deformity using hexapod frame is recently becoming popular. However there are some difficulties because of the narrow space that resulted in the collision of the struts. We report the assessment of several types of assemblies of software-based Ortho-SUV Frame (<http://www.rniito.org/download/ortho-suv-frame-eng.pdf>) for forefoot correction. Methods: Six variants of Ortho-SUV Frame assemblies were investigated experimentally using plastic bone model. In all types, the basic module consisted of two supports: "wire-pin" support at the level VII of the shin and half-ring support fixed by the wires to the calcaneus. Distal mobile module was fixed by two-four wires to the metatarsal bones. The method of the unified designation of external fixation was used for the description of frame configurations (<http://rniito.org/solomin/download/mudef.zip>). Results: In the optimal assembly, the plane of proximal module, to which the 1st, 3rd and 5th joints are fixed, was placed parallel to the tibial axis, and was placed dorsal site of the ankle. The plane of distal module, to which the 2nd, 4th and 6th joints are fixed, was placed orthogonally to the axis of the metatarsal bones: VI,12,120; VII(8-2)8-2; VII,10-4 _ calc.,10-4, calc.,8-2; calc.,6,90 _ talus,9-3 -SUV- m/tars.,10-4, m/tars.,8-2. This assembly enabled us to correct the biggest range of deformities: 50° of distal foot flexion, 40° of extension, 50° of each abduction/adduction and 45° of each supination/pronation. We applied this assembly to the three patients with complex multicomponent forefoot deformities, and could correct successfully. Conclusion: Optimal assembly of Ortho-SUV Frame enables us to correct wide range of forefoot deformities.

Date: 2011-09-08

Session: ICFC/SICOT: International Clubfoot Treatment Programs & Strategies for Managing Difficult Clubfeet

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 28271

APOS THERAPY FOR MAINTAINING CORRECTION AFTER RECURRENCE OF CLUBFOOT DEFORMITY

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Relapse clubfoot following treatment according to the Ponseti method should first be treated by serial casting. Heel cord lengthening may be required if the equinus deformity persists. In order to prevent further relapses, tibialis anterior tendon transfer should be considered. We present 3 patients ages 5, 6 and 9 years, in whom recurrence of the clubfoot deformity occurred after 4 years of age. Serial casting was applied and good correction of the deformity was achieved. In order to prevent further relapses, tendon transfer was advised however the parents refused. Instead, the patients were treated with a novel device comprised of 4 modular elements, attached to a foot-worn platform. The modules are 2 convex shaped elements attached to each foot, one under the heel and the other beneath the forefoot. The device was calibrated to each patient (APOS therapy). The patients were instructed to walk with this device a few hours every day. They were also encouraged to keep on using the abduction brace during night time as tolerated. One patient was followed for 2 years and two patients for one year. Good correction was maintained in all patients at the last follow-up. We believe that this device improves the proprioception of the lower limbs enables strengthening of the peroneal muscles and stretching of a short heel cord. Therefore APOS therapy should be considered as an option for maintaining correction after recurrence of clubfoot deformity in patients older than 5 years.

Date: 2011-09-08

Session: ICFC/SICOT: International Clubfoot Treatment Programs & Strategies for Managing Difficult Clubfeet

Time: 10:30 - 12:00

Room: Club D

Abstract no.: 28191

ASSESSMENT OF CHILDREN WITH CTEV PRE-TIBIALIS ANTERIOR TENDON TRANSFER: DO THEY DIFFER FROM THOSE WHO DON'T REQUIRE A TATT?

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Introduction: Tibialis anterior tendon transfer (TATT) is commonly used to treat recurrent CTEV and residual dynamic supination. Methods: From August 2009 to October 2010, 17 children (average age 51 months \pm 10 months) with 22 CTEV feet were assessed prior to a TATT. All children had undergone prior treatment according to the Ponseti protocol. Assessment was undertaken using the Dimeglio Scale, Foot Posture Index, hand held dynamometry (HDD) for strength, pedobarography and quality of life with the Clubfoot Specific Index Questionnaire and the Children's Health Questionnaire. These results were compared to 5 controls (average age 47 months \pm 16 months) with 8 CTEV feet that did not require a TATT. Results: Differences were noted in several key areas. The average Dimeglio score in the TATT group was 5 (\pm 2.1) compared to 2.9 (\pm 0.7) in the control group. Resting foot alignment in standing assessed with the Foot posture Index identified a more supinated posture with an average score of -0.2 (\pm 3.5) compared to the control group average of +3.6 (\pm 3.6). The ratio of eversion to inversion strength in the TATT group was 0.7 compared to 1.29 in the control group. Conclusions: Children with CTEV assessed pre-tibialis anterior tendon transfer show differences in objective measurements compared to their CTEV controls of the same age. The authors are undertaking a prospective trial to assess if tibialis anterior tendon transfer correlates with a change in strength, foot posture, gait and quality of life.

Date: 2011-09-08

Session: ICFC/SICOT: Ponseti Method

Time: 14:00 - 15:30

Room: Club D

Abstract no.: 28534

TIBIALIS ANTERIOR TENDON TRANSFER FOR DEFORMITY CORRECTION IN CLUBFOOT PATIENTS TREATED WITH THE PONSETI METHOD

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The purpose of this research was to study the epidemiology of the recurrence of adductus deformity (RAD) that requires a Tibialis Anterior Transfer (TAT) in patients with clubfoot, treated with the Ponseti method. To determine the associated factors for RAD that require a TAT and to evaluate the functional outcomes of TAT. We present a case-control study (1:2) of a cohort of 114 patients with clubfoot, treated with the Ponseti method with a mean follow up of 22 months. 38 cases had RAD., Age at treatment and functional outcome with AOFAS were evaluated. Statistical Analysis included normality tests, descriptive statistics, hypothesis testing were performed with a Man Whitney Test for independent samples and a Wilcoxon sum rank test for related samples. Results: Total 114 patients, divided into two groups one of the cases with 38 and a control group with 76. The group of cases had a median age of 3.75 months at the beginning of treatment, while the control group had a median age of 2 months ($p=0.452$). Patients that required a TAT scored a median of 77.5 (IQR=28), in comparison to 86 (IQR=20) in controls ($p=0.988$). The group treated with a TAT improved in AOFAS score from a median of 60.5 (IQR=16) to 77.5 (IQR=28) ($p<0.001$). Conclusion: Residual adductus deformity treated with TAT to the center of the foot results in good function, comparable to patients that did not required a TAT. TAT improved function in patients with recurrences. Age at the initial treatment was not a factor that determined the need for a TAT.

Date: 2011-09-08
Session: ICFC/SICOT: Ponseti Method
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 29744

THE PONSETI LEARNING CURVE

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The Ponseti Method of treating congenital talipes equinovarus has been shown successful in correcting the deformity, reducing the rate of major surgical corrections. Delivering the treatment protocol is a complex, highly skilled process requiring detailed anatomical knowledge, practical and inter-personal skills, and is therefore likely to be subject to a learning curve. This paper examines the improving performance of the Ponseti Clinic at Chelsea and Westminster Hospital over three distinct time periods. This paper analyses 147 patients, 237 feet, which were divided into three groups based on date of first presentation. It demonstrates that there is no significant difference between the groups in terms of age at presentation, sex distribution, laterality, previous treatment and initial Pirani score. It goes on to show that Group 1, the earliest presenting feet, had significantly poorer results in terms of recurrence rate (25/79) when compared to Group 2 (9/79 $p=0.003$), which is similar to Group 3 (13/79, $p=0.49$). Group 1 also demonstrated higher rates of tibialis anterior tendon transfer (16/79 vs 4/79 $p=0.007$) and extensive soft tissue release (7/79 vs 0/79 $p=0.014$) than group 2. There was no significant difference between group 2 and group 3 for any of these outcome measures. This is one of the largest series of feet treated by the Ponseti method ever published and is the first paper to demonstrate the effect of the learning curve in administering the Ponseti method of treating clubfeet.

Date: 2011-09-08
Session: ICFC/SICOT: Ponseti Method
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 28664

FURTHER ADVANCES OF THE DYNAMIC FUNCTIONAL TREATMENT

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Introduction: The Dynamic functional treatment is based on the pathoanatomy of the newborn, and not on the weight-bearing clubfoot. Its aim is the repositioning of the Talus, Calcaneus and Naviculare in relation to each other. The gentle movements of this treatment were modified in order to reduce the previously necessary daily physiotherapy sessions. Method: Any reduction in a joint has to be performed directly on the bone requiring repositioning. Starting on the first days after birth a supple pressure applied on the lateral, prominent side of the clubfoot, on the Talus, initiates the key movement. The Talus is repositioned between the two malleoli, allowing the heel (Calcaneus) to move freely. This single movement is pivotal for properly aligning the foot and for dorsiflexion. Results: Thirteen children with 18 severe and very severe clubfeet (11 – 20 pts in the Dimeglio-/Bensahel score) were treated in the last two years focusing on this direct reduction of the joints. All feet were supple, in perfect form and had excellent active movements at the conclusion of our treatment sessions. Fourteen feet (78 %) did not require intervention after our treatments, and only four feet required surgery on the Achilles-tendon, with none of the surgeries including total release. Conclusion: The results of the study yielded feet that were excellent in both passive and active movements, despite the fact that physiotherapy was only performed intensively for the first two to three weeks of life. Therapy thereafter occurred on a weekly basis and became less and less frequent with time.

Date: 2011-09-08
Session: ICFC/SICOT: Ponseti Method
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 29136

**PREDICTING THE NEED FOR ANTERIOR TIBIALIS TENDON TRANSFER
IN CLUBFEET TREATED WITH THE PONSETI METHOD**

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Purpose: To determine factors associated with need for anterior tibialis tendon transfers (ATTT) in patients with idiopathic clubfoot treated with Ponseti method. Methods: From 2000-2010, 186 patients with idiopathic clubfeet were treated and were of an age when they could be considered candidate for ATTT (if needed). Age at presentation, number of casts, need for percutaneous Achilles tenotomy, age of foot abduction orthosis (FAO) initiation, FAO compliance, need for additional casts, and need for ATTT were noted. Dimeglio/Bensahel and Catterall/Pirani scores were recorded at initial presentation and FAO initiation. Results: Sixty-one (89 clubfeet) of the 186 patients (33%) had complete records. Thirty-eight of 89 feet (43%) had undergone ATTT. Feet that required ATTT compared to feet that did not have ATTT had significantly higher Dimeglio/Bensahel scores (15.00 vs 12.77, $p < 0.0001$) and Catterall/Pirani scores (4.80 vs 3.80, $p = 0.007$) at presentation as well as significantly higher Dimeglio/Bensahel scores at FAO initiation (3.42 vs 2.17, $p = 0.002$). ATTT group needed more casts for correction (5.84 vs 5.14, $p = 0.017$), was less compliant with FAO ($p = 0.003$), and was more likely to need additional casting after FAO initiation ($p = 0.04$) than group that did not have ATTT. Conclusion: In idiopathic clubfeet treated with Ponseti technique, those requiring ATTT tended to present with worse Dimeglio/Bensahel and Catterall/Pirani scores, require more casts to achieve correction, and were less frequently compliant with FAO use.

Date: 2011-09-08

Session: ICFC/SICOT: Ponseti Method

Time: 14:00 - 15:30

Room: Club D

Abstract no.: 28897

A PHYSIOTHERAPIST-LED PONSETI SERVICE FOR THE MANAGEMENT OF IDIOPATHIC AND COMPLEX CLUBFOOT DEFORMITY

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Introduction: A physiotherapist-led Ponseti service gives good early results in managing idiopathic clubfoot and in a comparison study such a service was equivalent to a surgeon-led service. Care of the complex syndromic foot is considered more difficult. This study assesses a physiotherapy-led service for management of both complex and idiopathic clubfeet. Materials and Methods: In 2005, a physiotherapy-led Ponseti service was established at our tertiary referral centre. Treatment was performed by specialist physiotherapists supervised by an orthopaedic surgeon. Patient data was collected prospectively. The complex feet included neuromuscular (21) and arthrogryptic (4) conditions. All tenotomies were performed by an orthopaedic surgeon in clinic. Results: Between 2005-2010, 131 clubfeet in 85 children were treated: 89 idiopathic feet (60 patients) and 42 non-idiopathic feet (25 patients). The mean Pirani scores were 4.6 and 5.2, mean casts number 5.3 and 8.1 respectively. 54% of idiopathic and 100% of non-idiopathic feet required Achilles tenotomy. Brace compliance was 90 %. At mean follow-up of 35 months, recurrence rates were 5% in idiopathic and 36% in non-idiopathic feet. No idiopathic foot required surgery but a soft tissue release was required in 36% of non-idiopathic feet. The overall loss to follow up was 11%. Conclusion: A physiotherapist directed service is highly effective in clubfoot management. Complex feet require significantly more input. Results for idiopathic and complex clubfeet are comparable to those published. Significance Families benefit from continuity of care and access to consistent advice and review with minimal input from medical staff. Other contractures can be treated concurrently.

Date: 2011-09-08
Session: ICFC/SICOT: Ponseti Method
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 28730

VULPIUS PROCEDURE FOR CORRECTION OF EQUINUS DEFORMITY IN PATIENTS WITH RESIDUAL OR RELAPSED CLUBFOOT

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Background: Regardless of the mode of treatment, the clubfoot has a strong tendency to relapse especially in hindfoot equinus. Contracture or shortening of Achilles tendon causes an equinus deformity of the ankle. Its release is therefore required in the correction of equinus deformity in patients with residual or relapsed clubfoot. Purposes: To determine if Vulpius technique can be effective in correcting equinus deformity in residual or relapsed clubfoot. Patients and Methods: Eighty idiopathic clubfeet were treated with conservative method using Ponseti protocol from March 200 to July 2008. Among the 32 feet which were identified to have had residual or relapsed equinus deformity, 22 feet had Vulpius procedure for correction of equinus deformity. The mean patient age at the time of surgery was 27 months and the mean follow-up period was 46 months. We reviewed the dorsiflexion angle of ankle joint for clinical evaluation and talocalcaneal and tibiocalcaneal angle on dorsiflexion lateral views of the feet for radiographic evaluation. Results: The mean ankle dorsiflexion angle improved from -0.7 degree (-10 to 5) preoperatively to 14.5 degree (10 to 25) at the last follow-up ($P<0.05$). The mean tibiocalcaneal angle improved from 86.8 degrees (65 to 119) preoperatively to 67.0 degrees (48 to 81) at the last follow-up ($P<0.05$). The mean lateral talocalcaneal angle improved from 17.6 degrees (1 to 36) preoperatively to 27.6 degrees (11 to 49) at the last follow-up ($P<0.05$). Conclusions: Vulpius procedure is thought to be an effective surgical procedure in correcting equinus deformity in residual or relapsed clubfoot.

Date: 2011-09-08

Session: ICFC/SICOT: Ponseti Method

Time: 14:00 - 15:30

Room: Club D

Abstract no.: 28378

CAN SOFT CAST BE AN ALTERNATIVE MATERIAL IN PONSETI CLUBFOOT TREATMENT?

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Purpose: The purpose of this study is compared the use of soft cast (SC) with Plaster of Paris (POP) in efficacy of clubfoot treatment by Ponseti method. **Methods:** During one year period, there were consecutive 22 patients (33 clubfeet) treated at our hospital using Ponseti method. Patients were randomized into two groups, POP and SC, based on medical recorder number. We used Dimeglio and Bensahel classification for pretreatment severity. Achilles tenotomy was performed in those with sagittal plane score of more than 2 points. At the completion of Ponseti treatment, the severity was recorded again. Questionnaires were provided to monitor the prognosis and parent satisfaction. We used independent t-test for statistical analysis with $p < 0.05$ as significant. **Results:** 8 patients (12 feet) were received POP, and 14 patients (21 feet) received SC. The mean baseline and final severity of the 2 groups were not significantly different. The incidence of Achilles tenotomy was significantly lower in SC than POP (50% vs 83%). There was a higher scores for tolerance, durability, and parent satisfaction in the SC (4.05 vs 3.16, 1 = unsatisfactory). **Conclusion:** This study supports the use serial casting with SC for clubfoot. There was a higher parent satisfaction in the SC. Incidence of Achilles tenotomy was lower in SC. With less padding and skin tight soft casting, we may have better feeling of the position of the foot in the cast. Hence, a better correction may ensure. However, this difference on long-term outcomes remains to be studied.

Date: 2011-09-08
Session: ICFC/SICOT: Ponseti Method
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 28332

RESULTS OF AN EFFECTIVE HUB AND SPOKE MODEL FOR TREATMENT OF CLUBFOOT

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Introduction: Peripheral hospitals in Birmingham with no paediatric orthopaedic service have physiotherapists providing a Ponseti casting service for surgeons based at a central children's hospital. The Ponseti-trained physiotherapist provides initial assessment and casting without any orthopaedic input. The timing of the Achilles tenotomy is determined by the physiotherapist but performed by the surgeon under general anaesthesia. Follow-up care with foot abduction orthoses is also done by physiotherapists. Materials and Methods: We performed a retrospective review of 49 consecutive patients, with 71 clubfeet, referred to a single surgeon with a median follow-up of 40 months. All clubfeet, including those with associated syndromes, were included in this regimen. Results: No patients developed serious complications of casting requiring cessation of treatment. Eight feet required repeat tenotomies within the first year, usually due to poor compliance with the boots and bar. The two patients with arthrogryposis and a patient with a non-compliant family required a third tenotomy for persistent equinus deformity. Two cases with complex idiopathic clubfeet failed to correct fully requiring transfer to another centre. No feet required open release for persistent deformity. Discussion: We conclude that our hub and spoke model is safe and effective for use where paediatric orthopaedic services are geographically scarce.

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Session: ICFC/SICOT: Ponseti Method

Time: 14:00 - 15:30

Room: Club D

Abstract no.: 27393

**MANAGEMENT OF IDIOPATHIC CLUBFOOT BY PONSETI TECHNIQUE:
OUR EXPERIENCE AT A TERTIARY REFERRAL CENTRE**

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Background: Clubfoot or congenital talipes equinovarus is a common congenital abnormality of uncertain etiology. The purpose of this study is to assess the results of Ponseti method in India and to look for the demography of the relapse and resistant cases. **Methods:** A total of eighty six children (total of 146 feet) below one year of age who had presented to the paediatric orthopedic outpatient department of our institution between June 2003 and January 2007 with unilateral or bilateral idiopathic clubfoot deformity were included in our study and treated conservatively by the Ponseti technique. **Results:** 128 feet responded to Ponseti casting technique initially and 18 feet were resistant to the conservative treatment. Out of the responsive feet, in 20 feet there was a relapse of the deformity. Evaluation of the results showed that poor compliance to splintage was the most common cause for relapse, while delayed presentation and atypical clubfeet had high resistance to this technique. The correction rate at our centre was 82.18%. This correction rate was less when compared to many recent studies and could be attributed to increased incidence of delayed presentation, poorer compliance and atypical feet in our population. **Conclusion:** We conclude that Ponseti technique is recommended for management of clubfoot and strict compliance to splintage is essential to prevent relapses. The people of lower socioeconomic status are at high risk for relapse and they have to be targeted to create awareness among them about the importance of compliance to splintage.

Date: 2011-09-08

Session: ICFC/SICOT: Ponseti Method

Time: 14:00 - 15:30

Room: Club D

Abstract no.: 30114

**THE ROLE OF ULTRASOUND IN CLUBFOOT TREATMENT.
CORRELATION WITH THE PIRANI SCORE AND ASSESSMENT OF THE
PONSETI METHOD**

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Hesham Taha KOTB

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Background: To evaluate neonates and infants with clubfoot, clinical and imaging modalities are required. Conventional radiography is of limited value because the studied bones are not fully ossified. **Purposes:** We attempted to (1) evaluate clinically and sonographically the reliability of the Ponseti method in correcting clubfeet; and (2) determine whether various ultrasound variables correlated with each other and with the Pirani score before and after treatment. **Methods:** We prospectively followed 17 infants (25 clubfeet) assessed using the Pirani score and Ultrasound variables (medial malleolus-navicular distance, navicular alignment in relation to the talar head, medial soft tissue thickness, talar length, and calcaneocuboid distance) and treated with the Ponseti method. The mean age of the patients at first casting was 30 days, and repeat assessment after treatment was performed at a mean age of 6.3 months. Patients were followed for a mean of 14.1 months (range, 0.75–38 months). **Results:** The Ponseti method corrected all feet. We found three clinical/Ultrasound correlations. Before treatment, we observed a negative correlation between the clinical midfoot score and the sonographic medial malleolus-navicular distance. After treatment we observed two negative correlations: one between the midfoot score and the sonographic talar length and the other between the hindfoot score and medial malleolus-navicular distance. Four feet had recurrence of varus, two of which had an increased calcaneocuboid distance despite full restoration of navicular alignment in one foot. **Conclusions:** US can play a role in clubfoot assessment and may alert the surgeon to feet that may be prone to recurrence.

Date: 2011-09-08
Session: ICFC/SICOT: Ponseti Method
Time: 14:00 - 15:30
Room: Club D

Abstract no.: 29997

USE OF DYNAMIC VS STATIC ABDUCTION BARS WITH MITCHELL SHOES

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Talipes equinovarus (TEV) or clubfoot remains a common congenital musculoskeletal condition affecting 1 in 1000 live births. The Ponseti method of serial manipulation and casting followed by abduction bracing has become the preferred treatment in much of the world. The bracing phase of the treatment remains challenging due to poor brace tolerance and compliance. Failure of bracing is associated with a high rate of recurrence. The most critical time for brace compliance is initial acceptance and most recurrences occur in the first year. We have undertaken a prospective randomized clinical trial comparing two styles of foot abduction orthoses with respect to efficacy and patient satisfaction. The orthoses incorporate Mitchell style shoes with either a static or a hinged bar. We present preliminary results with respect to recurrence, compliance, and caregiver satisfaction. 21 patients were enrolled. Average follow-up is 12 months. Five patients required additional intervention after initiation of bracing. Four of these patients had difficult courses with casting and likely represent incomplete correction rather than true recurrence. Two families were non-compliant with bracing, one in each group. Of the 11 families who completed satisfaction surveys, one reported dissatisfaction and brace intolerance, in the static bar group. All other families report that they were very or extremely satisfied with the brace. Overall initial compliance and satisfaction is high with abduction orthoses using Mitchell shoes. At present, we have insufficient data to statistically compare the two groups or to evaluate long-term compliance and recurrence.

Date: 2011-09-08

Session: ICFC/SICOT: Long-term Follow-Up Studies & Surgical Intervention

Time: 16:30 - 18:00

Room: Club D

Abstract no.: 29123

REVISION CLUBFOOT SURGERY WITH CALCANEOCUBOID FUSION: RESULTS AT LONG-TERM FOLLOW-UP

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Purpose: Calcaneocuboid fusion has been used to supplement soft tissue revision clubfoot surgery to tether growth of the outer column of the foot. The purpose of the present study was to reevaluate the clinical and radiographic long-term outcomes of 20 patients (27 clubfeet), treated with this procedure, who were previously examined at mean follow-up of 5.5 years. Methods: Ten patients (13 clubfeet) who underwent this procedure from 1991-1994 returned for radiographs and reevaluation by the original surgeon. Results: Patients had a mean age of 24 years (range 23-26) and an average of 18 years follow-up (range 16-19). The procedure was performed at an average age of 7 years (range 5-8). Eleven of thirteen feet (85%) demonstrated radiographic fusion. The two failed fusions occurred unilaterally in bilaterally treated patients. No patient required major additional procedures. Comparison of Hospital for Joint Diseases Functional Rating System results from earlier to current follow-up for all 13 feet demonstrated: (1) significant decline in mean score, 77.8 vs 65.9 (p=.03), and (2) number of good/excellent ratings went from 85% to 38%. At long-term follow-up: (1) average Foot Ankle Outcomes Questionnaire standardized shoe comfort and core scores were 84.5 (range 25-100) and 85.6 (range 44-100), respectively, and (2) average foot pain was 1.38 (range 0-8) on a scale of 1 to 10. Conclusion: At long-term follow-up, revision clubfoot surgery with calcaneocuboid fusion in patients 5 to 8 years of age produces relatively painless, plantigrade feet with moderate functional outcomes.

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PROGRESSIVE SOFT TISSUE RELEASE PROCEDURE FOR IDIOPATHIC CLUBFOOT: 10-YEAR FOLLOW-UP

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Surgery for idiopathic clubfoot (ICF) remains a subject of debate as the extensive soft tissue release leads to foot stiffness. The progressive soft tissue release (PR), a stepwise correction of the posterior, medial and plantar structures of the ICF was proposed. To assess the long-term outcomes of PR, 24 patients with 36 ICF who underwent PR were evaluated at the average 10-year follow up by the Ponseti score along with anteroposterior (AP) and lateral (LAT) weight bearing radiography. The talocalcaneal (TC), talus-tibia (T-Ti), talo-1st metatarsal (T-1st), calcaneal-5th metatarsal (C-5th), calcaneal-1st metatarsal (Cal-1st), 1st-5th metatarsal (1st-5th) and calcaneal pitch angles were measured. Normal feet from unilateral ICF were used as the controls. The age at PR was 11 months. The Ponseti score was rated as 19 excellent, 13 good, 2 fair and 2 poor outcomes with the average score of 89. On AP, average measurements of ICF versus (vs.) controls revealed TC 20 vs.24, T-1st -2 vs. -11, C-5th -8 vs. -10 degrees. On LAT, measurements in ICF vs. controls revealed TC 28 vs.40, T-1st 5 vs.-16, Cal-1st 148 vs.154, 1st-5th 11 vs.12 and calcaneal pitch 10 vs.11degrees. The difference between dorsiflexion and plantar flexion of TC and T-Ti on LAT was 4 and 27 degrees, respectively ($P<0.05$). Deformity recurred in 2 feet. PR corrects deformities in ICF and maintains subtalar and ankle joint motion. Corrective procedures for ICF should be performed in a progressive fashion with minimum dissection of the subtalar joint.

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PATIENT REPORTED OUTCOME AT 16 YEARS OF AGE IN CONGENITAL CLUBFOOT; A SWEDISH MULTICENTER STUDY

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Background: Congenital clubfoot, one of the most common congenital orthopedic deformities, has a possible impact on adolescents' subjective well-being, function and self esteem. There are still few reports addressing these aspects. Patient reported outcome measures (PROMs) are thereby reported to be useful, both as quality indicator and for quality of life assessment. Patients and methods: In Sweden a total of 156 children, born 1995 with congenital clubfoot, were evaluated at 16 years of age with the use of Oxford Foot Ankle Questionnaire. This survey form comprises 15 items, divided into three subscales (Physical, School and Play and Emotional), and was sent to both patients and parents during first part of 2011. There were 111 (71%) boys and 45 (29%) girls, with 90 (58%) unilateral and 66 (42%) bilateral clubfoot. Initial treatment was manipulation and plaster in 129 (83%) and taping in 22 (14%) patients. At three years of age surgery had been performed in 120 (77%) and non-surgical treatment in 36 (23%) of the patients. Primary surgery was percutaneous Achilles tendon lengthening (ATL) in 26,7% , open ATL in 5,8%, posterior release (PR) in 48,3% and posteromedial release (PMR) in 15%. Results and conclusions: Preliminary results are presented, with special reference to gender differences, differences between children and their parents, and correlation between subjective outcome and given treatment.

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Room: Club D

Abstract no.: 28334

LONG-TERM OUTCOMES OF COMPREHENSIVE SURGICAL INTERVENTION VS PONSETI CASTING IN THE TREATMENT OF IDIOPATHIC CLUBFOOT

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Introduction: The purpose of this study is to compare the long term results of comprehensive surgery and Ponseti casting for idiopathic clubfoot. Methods: Twenty-four young adults (21.8 +/- 2.3 years) who had a comprehensive surgical release performed by the same surgeon and 18 subjects (29.2 +/- 5.5 years) who had Ponseti treatment at a different institution participated. We evaluated 48 healthy adults as a Control Group. Strength, gait temporal spatial parameters and segmental foot motion during gait were analyzed. Standardized outcome tools were used to measure pain, satisfaction, function, activity restriction and disability. Results: All subjects demonstrated a plantigrade foot. The Surgical Group had an average of 1.62 surgeries (33% releases, 18% transfers and 38% bony procedures), and the Ponseti Group had an average of 1.55 surgeries (54% releases, 29% tendon transfers and 10% bony procedures) at a later date than the original corrective procedure. Both treatment groups had diminished foot motion on foot and ankle motion analysis, compared to the Controls. In addition, the Ponseti Group exhibited more coronal range of motion of the hindfoot than the Surgical Group. The Surgical Group demonstrated deficits in temporal-spatial measures compared to the Controls. Both groups showed diminished plantarflexion strength, and the Surgical Group had less strength in foot motion than the Ponseti Group. Both groups demonstrated higher pain and disability compared to Controls, but the Surgical Group had significantly more pain and disability than Ponseti. Discussion: These findings indicate that compared to surgery, treatment of clubfoot via the Ponseti casting method results in better measurable long term outcomes and ambulatory function when these individuals reach the age when they enter the workforce.

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Session: ICFC/SICOT: Long-term Follow-Up Studies & Surgical Intervention

Time: 16:30 - 18:00

Room: Club D

Abstract no.: 30321

**RESULTS OF TREATMENT OF CLUBFOOT BY THE PONSETI METHOD:
10 YEARS FOLLOW-UP**

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Objective: Evaluate the results of the treatment of 229 clubfeet by the Ponseti Method. In the period between 2001 and 2011 and compare them according to the follow-up time. **Materials and methods:** We treated 155 pacientes (229 clubfeet) by the Ponseti Method divided in two groups: Group I- 72 patients (109 clubfeet- 47,6%) with follow-up time from 62 to 128 months (average of 85). 50 of these were males and 22 females. The average age at the beginning of the treatment was 5.4 months. We rated the clubfeet before the treatment, according to Dimeglio: type I- 9 feet, type II- 1, type III- 72 and type IV- 26 feet. Group II- 83 patients (120 clubfeet- 52,4 %) with follow-up time from four to 57 months (average of 33,5). 69 of these were males and 14 females. The average age at the beginning of the treatment was 3.2 months. Dimeglio type I- 15 feet, type II- 4, type III- 62 and type IV- 39 feet. We considered the results satisfactory for the clubfeet that showed correction of all the components of the deformity and unsatisfactory for the ones that kept the deformity and needed surgical correction. **Results:** The number of cast changes used in the correction of the deformities was: Group I- average of 9.3 casts. Group II- average of 6,9 casts. The calcaneus percutaneous tenotomy was done in: Group I- 73 feet (67%). Group II- 78 feet (65%). In group I, we obtained satisfactory results in 83 clubfeet (85,4%) and unsatisfactory in 16 (14,6%), while in Group II 117 PTCs were satisfactory (97,5%). The recurrence of the deformities, during the use of abduction braces, happened in 41 (37,6%) feet of group I; 25 of these clubfeet were corrected with new

Date: 2011-09-08

Session: ICFC/SICOT: Long-term Follow-Up Studies & Surgical Intervention

Time: 16:30 - 18:00

Room: Club D

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SHORT-TERM CLINICAL RESULTS AFTER THE TREATMENT OF IDIOPATHIC CLUBFOOT – COMPARISON OF PONSETI METHOD AND COMPLETE SUBTALAR RELEASE

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Purpose: To evaluate physical and radiographic outcome of clubfoot correction by Ponseti Method compared with complete subtalar release (Simons). **Methods** We reviewed the medical records of 12 clubfoot patients (17 feet) corrected with Ponseti Method followed by percutaneous Achilles tenotomies (Group P) and 15 patients (24 feet) with complete subtalar release (Group CSR) at Japanese RedCross Sendai hospital. The contralateral feet of unilateral clubfoot were served as a control group (Group N). **Results:** Mean follow-up period of Group P, CSR, and N were 4.9, 5.1, and 5.1 years, respectively. Clinically, Dorsiflexion of the ankle joint was significantly better in Group P than CSR ($p < 0.05$). In ankle planterflexion, thigh-foot angle, and transmalleolar axis, no statistical significance was found between Group P and CSR ($p > 0.05$). On x-ray analysis, AP talo-calcaneal angle, lateral talo-calcaneal angle, lateral tibio-calcaneal angle, height of talus body, length of talus, and length of calcaneus, width of distal tibial metaphysis, no statistical significance was found between Group P and CSR ($p > 0.05$). The Height-Length ratio of talus, defined as height of talus body/length of talus $\times 100$, and the calcaneus/ tibia ratio, defined as the anteroposterior length of calcaneus to the width of distal tibial metaphysis, was significantly larger in Group P than CSR ($p < 0.05$). **Conclusion:** The physical outcome of clubfoot correction by Ponseti method was comparable with the complete subtalar release. Developmental disturbance of the talus and calcaneus after Ponseti method was less prominent than complete subtalar release.

Date: 2011-09-08

Session: ICFC/SICOT: Long-term Follow-Up Studies & Surgical Intervention

Time: 16:30 - 18:00

Room: Club D

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IS MEASURING THE LENGTH OF THE FOOT A USEFUL TOOL IN THE CLUBFOOT FOLLOW-UP?

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Background: Static measures of foot length (FL) have been used for follow up of clubfoot but there is a lack of studies analyzing its clinical importance. Aim: To evaluate if the FL measurement is a useful tool for clubfoot follow up. Patients and Methods: We measured the FL of 48 children with congenital clubfoot (28 unilateral, 20 bilateral. approximately every six months, from 2-2,5 years until 7 years of age. The children were initially treated according the Ponseti casting technique (26 cases, 38 feet) or the Copenhagen method (22 cases, 30 feet). Orthoses were used until four years of ages. Both feet were measured in a standardized way in all cases. Repeat surgery or serial casting after the initial treatment was registered. The development of FL was compared with the Clubfoot Assessment Protocol (CAP). Results: The clubfeet showed a slower increase in FL development than the normal feet. Clubfeet not requiring repeat treatment showed a steadily increase in FL. Most feet showing a temporary stop in increase of FL also showed a decrease in range of motion and motion quality. Secondary treatment effected the FL growth positively. There was no significant difference in the FL development between the two treatment groups Conclusions: After analyzing the growth of foot length of 68 clubfeet from 2 to 7 years of age we conclude that measurement of FL seems to be a useful tool for the clubfoot follow up.

Date: 2011-09-08

Session: ICFC/SICOT: Long-term Follow-Up Studies & Surgical Intervention

Time: 16:30 - 18:00

Room: Club D

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IS JESS EXTERNAL FIXATION USEFUL IN TREATING CLUBFOOT?

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Introduction: The conservative treatment, anywhat is its technique, doesn't allow to reduce all the idiopathic clubfeet. Hence, it is usual to perform a surgical stage to achieve the reduction. But, surgery may generate fibrosis. In such cases we propose the use of JESS a mini-external fixator according to the principle of a differential distraction. Material & Methods: 178 idiopathic clubfeet in 200 children, aged from 9 months to 12 years old were reviewed for this study. All of them were severe/rigid clubfeet. This device allowed us to perform an asymmetrical distraction for correction of all the components of deformities. The average duration for correction was 6 weeks followed by a plaster cast for stabilization. The functional and cosmetic aspect as well as the tolerance and X rays have been evaluated. Results At follow up (average 7 years), the results are excellent in 70% cases, good in 25% cases and fair in 5% cases according to International ClubFoot Study Group Outcome Evaluation. Minor complications were observed (local infection around K wires, swelling). Local care, then removal of the pins led to healing these complications. At the follow up, there has been no recurrence of any deformity. Conclusion: The JESS Mini-External Fixator using differential distraction seems to be a useful tool for all kinds of residual deformities being resistant to conservative treatment. It is helpful to prevent surgical fibrosis; more, it may be used in the young children.

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Session: ICFC/SICOT: Long-term Follow-Up Studies & Surgical Intervention

Time: 16:30 - 18:00

Room: Club D

Abstract no.: 29849

FROM CONVENTIONAL ILIZAROV TREATMENT TO PONSI TAYLOR EXPERIENCES IN CLUBFOOT TREATMENT USING EXTERNAL FIXATION

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The Ponseti method for clubfoot treatment is widely accepted. Today in most patients extensive surgical procedures can be avoided. There are still cases of neglected or relapsed clubfoot, clubfeet after previous extensive open release surgeries. Repeated soft tissue procedure may result in extensive postoperative scarring with a high rate of complications like skin necrosis, infection or neurovascular damage. The disadvantage of bony procedures with closed wedge osteotomies and arthrodesis is stiffness and shortening of the foot. To use external fixation for correction is an alternative. Correction can occur through gradual distraction as soft tissues and bones still have remodelling potential. In our experience gradual correction is not limited by extensive scar tissue from previous surgeries. In children older than 8 years the soft tissue correction can be combined with osteotomies: The U osteotomy and the V osteotomy. During the last decade two new concepts have been introduced into the "Ilizarov treatment" of clubfoot: 1. The Ponseti method 2. The Taylor Spatial Frame allowing 6 axis correction including rotational correction without the need of complex frame adjustments and modifications. For this type of treatment the term "Ponsi Taylor" is used. The keypoint of this technique is to insert an olive wire at the neck of the talus from the lateral side. In our experience external fixation with soft tissue distraction without extensive open surgery is an effective treatment option for relapsed or neglected clubfoot to obtain and maintain a plantigrade and functional foot, even after repeated surgeries.

Date: 2011-09-08

Session: Spine - Deformities I

Time: 14:00 - 15:30

Room: Club E

Abstract no.: 28121

PREVENTION OF PROGRESSION OF ADOLESCENT IDIOPATHIC SCOLIOSIS WITH THE NIGHT TIME BENDING BRACE IN A DEVELOPING COUNTRY

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Effective bracing techniques have been expensive and unattainable by majority of our local population. Patients may lack the financial resources to purchase custom made braces, while Orthopods may lack the necessary technical fabrication equipment. Curve progression may best be prevented if not corrected while patients are still skeletally immature. Based on the principles of the Charleston night time bending brace, as designed by Hooper and Reed, the proponents of the study are replicating the side bending brace by correcting or overcorrecting the curvature of the spine with a nocturnal brace. Not a secret in general, the bending brace design has a dose dependent correlation with success rates of prevention or even correction of curvatures. The advantage of wearing a nocturnal or "wear at home" brace is preferable to the active life style of today's youth who would rather not wear a brace in public. Despite the advantages, the braces are expensive and not easily attainable especially in developing countries like the Philippines. By using locally available materials the proponents have been able to adopt the principle for the local setting. With the help of fiberglass cast rolls, a cast cutter, some comfortable lining and straps, a night time bending brace can be fabricated at a tenth of the price of the commercial braces. Preliminary results are still being obtained, but the results are promising. Not only for the patients, but also for the orthopod who chooses to serve his patients with the best of his abilities with out the hefty price tag.

Date: 2011-09-08
Session: Spine - Deformities I
Time: 14:00 - 15:30
Room: Club E

Abstract no.: 29318

SURGERY FOR SEVERE CAMPTOCORMIA IN PARKINSON'S DISEASE

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Camptocormia i.e. functional kyphoscoliosis which aggravates during standing and walking and disappears while lying down is common in Parkinson's disease. Such a functional deformity may deteriorate into a severe degenerative kyphoscoliosis with complete loss of sagittal and coronal truncal balance and pain. The available literature on surgery in this condition is limited to few case reports. We report our complete experience with surgical correction of severe camptocormia. Six patients (4M, 2F, mean age 63.7 (range 58-70) years were operated on 2000-2010. This is the largest series reported so far. All were optimally treated medically and had progressive deformity for > 3 years. The procedures were posterior correction and stabilization with pedicle screws/rods, Smith Petersen osteotomies, and PSO in 4 cases. The mean (range) operation time was 7.4 (4-10) hr, blood loss 4.0 (1.2-7.7) lit., days in intensive care unit 2.7 (0-5), days until first mobilization 4 (3-6), and hospitalization days 17 (8-32). All obtained good correction and pain relief initially. However, a total of 9 re-operations have been performed in this series, mostly due to distal screw loosening/pull-out and/or rod breakage where instrumentation ended short of the ileum. Treatment of these patients has been a taxing learning experience. Corrective surgery is possible, but it has a very high complication rate. We suggest the use of the strongest available implant, long constructs with segmental screws, obligatory sacroiliac fixation and complete balance restoration.

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Session: Spine - Deformities I

Time: 14:00 - 15:30

Room: Club E

Abstract no.: 29158

BENEFIT OF PERIOPERATIVE CELL SALVAGE SYSTEM FOR POSTERIOR SPINAL FUSION IN ADOLESCENT IDIOPATHIC SCOLIOSIS

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This study investigates efficacy and safety of routine cell salvage system use in adolescent idiopathic scoliosis patients undergoing primary posterior spinal fusion surgery with segmental spinal instrumentation. Forty two consecutive adolescent idiopathic scoliosis patients undergoing posterior spinal fusion by two surgeons at a single hospital were studied. Intraoperative cell salvage system was used in 20 patients and the control group was of 22 patients who underwent surgery without cell salvage system. Average patient age was $15,06 \pm 1,3$ in cell saver group and $13,86 \pm 2,0$ in control group. In cell saver group average intraoperative autotransfusion was 411 mL (250-950 mL). Average perioperative allogeneic blood transfusion need was $1,17 \pm 0,63$ unit in cell saver group and $2,59 \pm 1,14$ unit in control group. No transfusion reactions occurred in either group. Postoperative first day average hemoglobin level was $10,7 \pm 1,00$ (hematocrite $33 \pm 3,4$) in cell saver group and $10,7 \pm 1,02$ (hematocrite $32,4 \pm 3$) in control group. Average hemoglobin level of saver group was $10,7 \pm 0,84$ and average hemoglobin level of control group was $10,6 \pm 0,82$ in the day of discharge. During surgery the blood transfusion need is multifactorial and more studies with larger groups are needed to determine the effect of these factors. Cell salvage systems can reduce perioperative transfusion rate for posterior spinal fusion in adolescent idiopathic scoliosis, but they can not reduce transfusion rate to zero.

Date: 2011-09-08
Session: Spine - Deformities I
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Room: Club E

Abstract no.: 28640

THE USE OF SOMATOSENSORY EVOKED POTENTIAL (SSEP) MONITORING IN THE PREVENTION OF NEUROLOGICAL INJURY IN SPINAL SURGERY: A 5-YEAR REVIEW OF TIMING AND RESPONSE TO AN ABNORMAL TRACE

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Objective: This study aims to examine the role of intra-operative somatosensory evoked potential (SSEP) monitoring in the prevention of neurological injury. Focusing on timing of trace abnormality, monitoring sensitivity and sensitivity, and whether the abnormalities were reversible by the operating team. **Design** Case note review of prospectively collected data **Subjects** 2953 consecutive complex spine operations (male 36% female 64%, median age 25yrs) prospectively performed using spinal cord monitoring at a single institution (2005-2009). **Methods:** All traces and neurophysiological events were prospectively recorded by the neurophysiology technician. All patients with a significant neurophysiology event were examined clinically by a neurologist, separate from the spinal surgery team. Significant trace abnormality was defined as a decrease in signal amplitude of 50% or a 10% increase in latency. Timing of trace abnormality, surgeon's response and prospective neurological outcome were recorded. Sensitivity, specificity, positive / negative predictive value were calculated. A Chi-squared test was performed to assess the impact of intervention on neurological outcome ($p < 0.05$). **Results:** 2953 operations involving SCM were performed and 106 recorded a significant trace abnormality. This most often occurred during instrumentation and the most common reaction was adjustment of metalwork. SSEP monitoring had a sensitivity of 100%, specificity 97.3%, positive predictive value 24%, negative predictive value 100%. There were 79 false positives and no false negatives in this series. Chi-squared test was not significant ($p=0.18$) possibly suggesting intervention did not affect neurological outcome. **Conclusions:** Triggering events are uncommon and the development of a persistent neurological deficit is rare. We found an incidence of 0.85% in this series of 2953 operations. In the majority of cases detection of a monitoring abnormality prompts a corrective reaction by the surgeon. Of those with an abnormal trace 76% were neurologically normal at outpatient follow up.

Date: 2011-09-08

Session: Spine - Deformities I

Time: 14:00 - 15:30

Room: Club E

Abstract no.: 27455

BIOMECHANICAL GROUNDING FOR MINI-INVASIVE TECHNOLOGY OF SPINAL OSTEOSYNTHESIS FOR MANAGEMENT OF PATIENTS WITH SCOLIOSIS

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Biomechanical disorders of the spine in scoliosis manifest by change of the vertebra shape at the deformity apex and, as a result, formation of the major and compensatory curvature arches and inter-vertebral discs disorders. Scoliotic deformities are multicomponent: disorders in frontal and sagittal planes, rotation, secondary pelvic and shoulder asymmetry. Correction of scoliosis by an external transpedicular fixator is a mini-invasive controlled technology, because spinal osteosynthesis is done through skin micro-cuts; the construction is assembled externally; and it allows gradual correction of all deformity components. Radiographic, neurologic and orthopedic control of correction process allows avoiding vascular and neurologic disorders associated with traction of the spine and contents of the spinal canal and enables prevention and correction of such negative moments of spinal deformity correction as pelvic and shoulder tilt. Selection of type and scheme of osteosynthesis is differentiated and depends on the degree and type of deformity. Transpedicular screws are interconnected into support blocks, which are located at the base of deformity apexes, and if necessary – at the apex of deformity. Fixation of pelvic bones as a separate block is a support point for all corrective manipulations and allows correction of its tilt. Deformity correction is accomplished by compression-distraction between blocks of the fixator. Acute correction of spinal deformity up to 25% of the initial value is done on the operating table. Correction of sagittal deformity (kyphosis) is done by compression between blocks of the fixator located at the curvature arch base. Thoracoplasty and fixation fusion constitute treatment stages.

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Session: Spine - Deformities I

Time: 14:00 - 15:30

Room: Club E

Abstract no.: 28182

THE APPLICATION OF SELECTIVE SCREW INSERTION AND CORRECTION ON THE CONVEX SIDE IN THE TREATMENT OF SCOLIOSIS

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Aim: Summarize the clinical outcome of 106 cases of spinal scoliosis that underwent selective screw insertion and correction on the convex side. **Method:** In this study, total 106 cases with spinal scoliosis was defined including 45 males and 61 females. The average age was 16.8 years old. In this group, 41 cases were congenital scoliosis (including 33 cases of completely segmented lateral hemivertebrae and 8 cases completely segmented posterior hemivertebrae), 62 cases were adolescent idiopathic scoliosis and 3 cases were scoliosis with neuroinomatosis. The preoperative coronal Cobb's angle and sagittal Cobb's angle of primary curve were 74.0 ± 15.20 and 31.3 ± 11.10 respectively. Within the correction segments, the screws were selectively inserted with an interval of one or two vertebrae. One to three more screws were selectively inserted into the convex side of the primary curve when the vertebral osteotomy or hemivertebral resection was not necessary. One to four more screws were selectively inserted into the one to two segments proximal and distal to the resection site on the convex side. **Results:** The average follow-up period was 4.5 years, ranged from 1 to 8 years. In the final follow-up, the coronal Cobb's angle was 21 ± 6.90 and the correction rate was 74.6%. The sagittal Cobb's angle was 20.2 ± 4.20 and the correction rate was 35.6%. The average height increment was 2.5 ± 1.1 cm. During the follow-up period, the correction loss on the coronal plane and sagittal plane were 3.1 ± 0.30 and 1.1 ± 0.20 respectively.

Date: 2011-09-08

Session: Spine - Deformities I

Time: 14:00 - 15:30

Room: Club E

Abstract no.: 30048

HIGHER DEGREES OF CURVE CORRECTION CORRELATE WITH WORSENERD SAGITTAL BALANCE

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Introduction: Current treatment methods for AIS can have unintended negative effects on sagittal balance. The purpose is to investigate the correlation between coronal correction and sagittal balance at 2 years postop. Methods: Review of prospective multicenter dataset was performed to identify patients with AIS following PSFI. For 1053 patients with 2 year follow up demographic, clinical and radiographic measures were reviewed. Patients were grouped in two cohorts according to coronal correction >50% and ≤50%. Results: Sagittal balance averaged -14.3 mm preoperatively and -23.4mm postoperatively. 490 (46.5%) patients demonstrated worsening sagittal balance at 2 years. The two groups had equal sagittal balance score at baseline (14.5 vs 13.6 mm; p=0.74). Patients with >50% major curve correction had significantly worse negative sagittal balance at 2 years when compared to those who had <50% curve correction (-24.5 vs -19.9mm; p=0.04). Only Lenke 1 curves showed a trend toward significant difference (p=0.066). When looking at lumbar modifiers only Lenke 1A curve's sagittal balance remained significantly affected after >50% correction was performed (p=0.03). Patients with sagittal modifier "N" with >50% correction had worsened sagittal balance at 2 years (p=0.03), and those with "+" (>40) curves showed a trend (p=0.08). Conclusion: 46% of patients treated for AIS experience significant worsening of sagittal balance at 2 years postoperatively, an effect that seems to be correlated with >50% of coronal correction. This association should be considered especially in Lenke 1 curves and in curves that have neutral or positive sagittal balance preoperatively.

Date: 2011-09-08
Session: Spine - Deformities I
Time: 14:00 - 15:30
Room: Club E

Abstract no.: 29827

THE INFLUENCE OF BRACE TREATMENT ON THE PULMONARY FUNCTION TEST IN ADOLESCENT IDIOPATHIC SCOLIOSIS

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Objectives: To analyze the influence of brace treatment on the FVC and FEV1 parameters of pulmonary function tests (PFTs) in AIS. Methods: 349 patients were classified into two groups: group A-with preoperative brace treatment, 90 cases; group B-no preoperative brace treatment, 259 cases. Compare the differences of the PFTs between 2 groups. Results: The percentage of actual value and predicted value of FVC and FEV1 in group A and B were 80.4% and 86.9%, 85.5% and 92.7%, respectively. The patients with preoperative brace treatment had significant lower values (all $P < 0.05$). This difference was significant in the patients with a primary thoracic curve ($P < 0.05$), while not in the patients without a primary thoracic curve ($P > 0.05$). In the 61 patients with a primary thoracic curve and preoperative brace treatment, there were negative correlation between the total length of brace treatment and the percentage of actual value and predicted value of FVC and FEV1 ($P = 0.017$; $P = 0.032$) and positive correlation between the sagittal Cobb angle of the thoracic curve and the percentage of actual value and predicted value of FVC and FEV1 ($P = 0.000$; $P = 0.000$). Conclusions: Preoperative brace treatment can reduce the actual values and the percentage of actual value and predicted value of FVC and FEV1 in thoracic AIS. The total length of brace treatment and sagittal Cobb angle of the thoracic curve may be the influential factors of the FVC and FEV1.

Date: 2011-09-08
Session: Spine - Deformities I
Time: 14:00 - 15:30
Room: Club E

Abstract no.: 29603

SPONTANEOUS DEROTATION OF THE LUMBAR CURVES DURING THORACIC CURVE CORRECTION AND COMPLEX GEOMETRIC SPINAL TORSION IN AIS

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Introduction: Spontaneous lumbar curves correction is regular phenomenon during correction of thoracic main idiopathic scoliotic curve. We focused to prospective monitoring of spontaneous lumbar derotation and its relation to the complex geometric scoliotic spinal torsion. Material and Method: A total number of 31 patients with diagnosis of AIS Lenke 3 type, treated with thoracic curve correction from posterior approach, were prospectively evaluated with spiral CT and x-ray examinations. We measured apical vertebral rotation in both curves (spiral CT preop. and 4 month postop.) and coronal correction with Cobb angle measurement (X-ray preop., 3 days, 4 month and 3 years postop.). Finally we compare preop. with postop. sum of thoracic and lumbar apical vertebra rotation to come nearer to geometrical complex spinal rotation. In this way we established Rotational Index (RI). Results: Spontaneous derotation of lumbar curve was in average 5,9° (43.7%). An average spontaneous coronal correction of lumbar curve was 23° (67%). First group (23 pts. with an average value RI=1,15) demonstrated 3 y. postop. final loosening of correction in thoracic (primary surgically managed) curve of about only 2° (4%). On opposite site in second group (8 pts with an average value RI=0,89) there were the same loosening of about 12° (38%). Conclusion: Complex geometric spinal derotation (RI>1,0) allows long-term keeping of coronal correction and give good conditions for posterior bony fusion maturing. Better and more exact derotative methods allow more accurate correction and functional spinal status in future.

Date: 2011-09-08

Session: Spine - Complications in Spine Surgery

Time: 16:30 - 18:00

Room: Club E

Abstract no.: 27141

**REDUCTION OF THE DOSE OF IONISING RADIATION IN NAVIGATED
TRANSPEDICULAR SCREW PLACEMENT**

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Introduction: The purpose of this study was to compare a computer-assisted navigation to a conventional procedure in order to assess if it is possible to reduce radiation exposure while preserving accuracy of pedicular screw placement. **Methods** The first “conventional” group consisted of 30 patients. 1,9 segments of thoracolumbal spine were stabilized on average. Screws were inserted transpedicularly under fluoroscopic guidance. In the second “navigated” group of 30 patients, stabilization of 1,8 segments was performed on average. A CT-free 2D spinal navigation system was used intraoperatively. For each surgery (navigated or not), the irradiation duration, the surgery duration, and the screw positioning accuracy were recorded. **Results** The irradiation duration calculated to one vertebra (two screws) was significantly shorter in the second group ($3,97 \pm 1,7$ seconds) than in the first group ($14,41 \pm 6,7$ seconds). The surgery duration was meanly 7,5 minutes shorter in the first group (range, 4 to 12 minutes). All screws in both groups were placed accurately because of routinely very meticulous pedicle palpation before screw insertion. **Conclusion** During the conventional surgical procedure many X-ray images are made to control the accuracy of the screw insertion. Navigation allows in our hands to keep the same accuracy of pedicle screw placement reducing radiation exposure of the surgeons and operating room staff by close to $\frac{1}{4}$. In multiple level vertebral instrumentations this reduction is more pronounced. In centers where multiple cases of spine instrumentation are done the “saving” of exposure time can mount to hours.

Date: 2011-09-08

Session: Spine - Complications in Spine Surgery

Time: 16:30 - 18:00

Room: Club E

Abstract no.: 29585

**CAUSES OF MALPOSITION OF CERVICAL PEDICLE SCREWS
INSERTED WITH INTRAOPERATIVE 3D-IMAGE BASED NAVIGATION**

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Objective: The purpose of this study was to evaluate causes of malpositioning of cervical pedicle screws (CPSs) inserted using navigation. Methods: With the intraoperative-3D-image based navigation, 182 CPSs were placed in 46 patients. Retrospective investigation was performed using postoperative-CT scans for evaluation of causes of malpositioning of CPSs in those patients. In addition the relationship between the perforation rate and the distance from the vertebra attached on navigation reference frame (NRF) was evaluated. Results: Of the 182 CPSs, 21 (11.5%) were classified as Grade 1 (>50% of the screw's diameter located within the pedicle) and 10 (5.5%) were classified as Grade 2 (>50% of the screw's diameter located outside the pedicle). These malpositioned CPSs have occurred for following reasons: 14 were malpositioned because of the limitation to appropriate directing of the instruments by posterior cervical muscles, 5 due to hard medial cortical bone of pedicle, 5 due to navigational error, and 7 due to other errors. The perforation rate was 15.4% for the vertebra with NRF, 14.1% for the vertebrae above and below the vertebra with NRF, and 26.9% for the two vertebrae above and below the vertebra with NRF. Conclusion: Even with the current technologies, CPS malposition can occur due to various factors such as NE, the use of incompatible devices, and distance from NRF. Sufficient attention and awareness of the risk factors related to CPS malpositioning should be considered during every step.

Date: 2011-09-08

Session: Spine - Complications in Spine Surgery

Time: 16:30 - 18:00

Room: Club E

Abstract no.: 28976

HOW TO INCREASE THE ACCURACY OF CERVICAL PEDICLE SCREW PLACEMENT – ANALYSIS OF CONSECUTIVE 100 CERVICAL TRAUMA CASES TREATED BY A SAME SURGEON

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INTRODUCTION: Cervical pedicle screw (CPS) system is a strong tool that provides rigid stabilization for unstable disease; however, misplacement of CPS may cause severe neurovascular complications. Increasing accuracy of CPS placement is an essential requirement in order to avoid the complications. The purpose of this study is to investigate the accuracy of CPS placement with our original “half-tapping technique”.
METHODS: A total of 100 consecutive patients of cervical trauma treated with CPS by a same surgeon (first author) were evaluated. First screw hole around 15mm deep from the insertion point is made by a tap-drill which just reaches the transverse foramen or spinal canal even as a misdirection. After confirming the absence of breach using a fine feeler, full length hole is made. With breach, a correct screw hole is remade in a same procedure. Screw misplacement was classified as either grade-1 (under 50% of screw diameter outside of pedicle) or grade-2 (over 50% of screw diameter).
RESULTS: A total of 365 screws were used in this consecutive study. Only one screw (0.27%) demonstrated grade-2 perforation, and 9 screws (2.46%) grade-1. There is no neurovascular complication.
CONCLUSIONS: In order to elevate CPS to a common tool, establishment of safety measures is most important. Above all increasing accuracy of screw placement has the key to solve the problem. Our original half-tapping assessment technique is one of solutions for safety use of CPS.

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Session: Spine - Complications in Spine Surgery

Time: 16:30 - 18:00

Room: Club E

Abstract no.: 28494

PEDICLE SCREW PLACEMENT WITH O-ARM AND STEALTH NAVIGATION

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Introduction: Various navigation systems are available to aid pedicle screw placement. The O-Arm replaces the need for fluoroscopy and generates 3-D, real-time transverse, coronal, and sagittal images of the spine, similar to CT scanning, that are downloaded to the Stealth Station. The objectives of this study were to evaluate (1) accuracy of pedicle screw placement using O-Arm/Stealth, (2) time for draping, positioning of O-Arm, and screw placement, (3) whether tapping improves screw trajectory accuracy, and (4) accuracy of intraoperative neuromonitoring. Methods: We evaluated pedicle screw placement using O-Arm/Stealth between February and August 2010. The times for draping, positioning the O-Arm, and screw placement were recorded. "Snap-shot" navigation images of the awl and O-Arm-CT scan confirmation images were analyzed for accuracy. Results: Of 188 screws (25 patients), 116 had adequate images for analysis. The average time for O-Arm draping was 3.5 minutes, initial O-Arm positioning was 6.1 minutes, and final positioning was 4.9 minutes. The mean time between array attachment and screw placement was 8.1 minutes/screw. The mean time for screw placement alone was 5.9 minutes/screw. Screw placements on final CTs were on average 3.14 mm deeper than on the O-Arm snap-shot navigation images. Three screws (2.5%) breached the medial cortex and three screws were misaligned. Neuromonitoring was normal in all cases, resulting in a 1.59% false negative rate. Conclusions: The use of O-Arm/Stealth was associated with a low rate of pedicle screw misalignment. The time to place screws was less than previously reported with CT navigation, but longer than conventional techniques. It is important to be aware of the potential discrepancy between snap-shot images and actual screw placement on CT-O-Arm. Our findings suggest that final screw positions may be deeper than awl positions appear on navigation.

Date: 2011-09-08

Session: Spine - Complications in Spine Surgery

Time: 16:30 - 18:00

Room: Club E

Abstract no.: 29848

EVALUATION OF THE PULMONARY COMPLICATIONS OF CONCAVE RIB OSTEOTOMIES IN SCOLIOTIC PATIENTS WITH RIGID CURVES IN SINA HOSPITAL 2001-2003

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Background and object: To decrease the magnitude of the spinal curves, operations such as anterior or posterior releases can be use. Concave rib osteotomy is an example of posterior release. The main complication of this operation is pulmonary complications and related morbidities. In this study, the frequency of the pulmonary complications has been evaluated. Material and methods: the pulmonary complications of concave rib osteotomies were studied in a series of 14 patients in sina hospital in a 2 years period of time (2001-2003). After this operation each patients was observed. Results: 8 patients were females and 6 were males. During the operation 3 pleural tear were detected and chest tube was inserted. We had no pneumothorax and only one asymptomatic pleural effusion postoperatively. Conclusion: this operation is a simple one. If do valsalva maneuver and detect pleural tears intraoperatively pulmonary morbidities will not increase significantly. KEY WORDS: Scoliosis, Osteotomies, Pulmonary, Morbidity.

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Session: Spine - Complications in Spine Surgery

Time: 16:30 - 18:00

Room: Club E

Abstract no.: 30063

DO WE NEED TO KNOW SACRAL HIATUS ANATOMY FOR SUCCESSFUL CAUDAL EPIDURAL BLOCK?

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Knowledge of sacral hiatus anatomy is imperative in clinical situations requiring caudal epidural block for various diagnostic and therapeutic procedures of the lumbosacral spine to avoid failure and dural injury. Aim was to evaluate various morphometric parameters of sacral hiatus for a successful epidural block. A detailed anatomic study of the sacral region was carried out on 56 male adult Indian cadavers. Dorsal surface of sacral region was dissected to study sacral cornua, sacral hiatus and the dimensions of triangle formed by the right and left posterosuperior iliac spines with apex of the hiatus. Midsagittal sections were subjected for various anatomical measurements. The angle of needle insertion and the depth of caudal space were noted. Cornu was not palpable bilaterally in 8 (14.3%) and palpable unilaterally in 13 (23.2%) specimens. Mean (standard deviation) distance between apex of hiatus and coccyx tip was 58.3 (8.3) mm and length of sacrococcygeal ligament was 34.4 (7.4) mm. The dimensions of the triangle were found to be interchangeable in 25 cadavers. The level of maximum curvature of sacrum was S3 in 38 (67.9%) of cases. The dural sac was found to terminate at S2 in 46 (82.1%). The mean (SD) angle of depression of the needle was 65.2 degrees (5.3) (range 57-79 degrees). The measurements described for the identification of the sacral hiatus, optimal angle of depression and depth of the needle may improve the safety and reliability of a caudal epidural block.

Date: 2011-09-08

Session: Spine - Complications in Spine Surgery

Time: 16:30 - 18:00

Room: Club E

Abstract no.: 30209

TREND OVER TIME AND FACTORS INFLUENCING BLOOD LOSS DURING POSTERIOR SPINAL FUSION IN AIS

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The objectives of this study were to review the evolution of blood loss and the factors associated with increased blood loss over the last 18 years in a major university hospital center. Materials and Methods: This retrospective and prospective study was conducted on all patients with AIS who underwent a posterior spinal fusion. Preoperative Cobb angles, age, sex, menarche, type of instrumentation, upper and lower levels of instrumentation, number of instrumented vertebrae, surgeon, cell saver use, hemodilution, number and type of implants and anaesthesia and surgery durations were analysed. Linear regression analyses were performed. Results: A total of 470 patients with AIS were treated surgically over the period: age=15.0±2.0, 420 girls. Blood loss decreased significantly from year to year (p=0.001). Blood loss was shown to be significantly decreased by sex (girls -379 cc's, p=0.043), menarche (-376 cc's, p=0.004) and pre-op hemoglobin (-7cc's/dg of Hg, p=0.045). Factors increasing blood loss were the total number of vertebrae included in the fusion (+114 cc's/level instrumented, p≤0.001), use of cell saver (+369cc's, p≤0.001), use of hemodilution (+192cc's, p=0.034) and surgery duration (6cc's/min, p≤0.001). The total number of implants, even if increasing from year to year (p≤0.001) decreases overall blood loss (-23cc's, p=0.046). Conclusion: Overall, blood loss during AIS surgery decreased significantly over the analyzed period. Post-menarchal females with higher pre-op hemoglobin seem to have less blood loss. The number of vertebrae included in the fusion significantly increased blood loss while more complex instrumentation (screws vs. hooks) and total number of implants did not.

Date: 2011-09-08

Session: Spine - Complications in Spine Surgery

Time: 16:30 - 18:00

Room: Club E

Abstract no.: 27411

EFFECT OF INTRAMUSCULAR INJECTION OF BOTULINUM

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Background: Low back pain is a challenge in daily clinical activity. The prognosis for single episodes of acute pain is good, but many patients have persistent/recurrent illness, often characterized by a complex pattern of somatic, psychological and social factors. Several methods have been used to treat chronic low back. Here we examined the effect of intramuscular injection of botulinum neurotoxin type a (BTX- A) in chronic low back pain. Method: Study design a randomized, double-blind, Patients were assigned to one of 2 groups. One group received local injections containing normalsaline only; the other group, local injection of BTX-A. 20 women and 17 man, aged 24 to 62 years (mean 45.6 years) with low back pain of 6 months included. Pain were assessed with Oswestry scale at baseline (before injection), 3 weeks, and 8 weeks after injection of normal saline and BTX-A into varies part of para-spinal muscles (between L1 and S1) bilaterally,The dose per site 500 units. Result: Significant improvement in back pain occurred at 8 weeks after treatment with BTX-A. Conclusion: Botulinum toxin A improves refractory chronic low back pain with a low incidence of side effects.

Date: 2011-09-08

Session: Knee - Blood Loss Control

Time: 14:00 - 15:30

Room: Club H

Abstract no.: 28833

BLOOD SAVING TECHNIQUES DURING PRIMARY TOTAL KNEE REPLACEMENT

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Background: The traditional use of pneumatic tourniquets and reinfusion drains in Total Knee Replacement (TKR) has recently been challenged and many studies have reported considerable doubt with respect to the benefits of their usage. Aim of our study was to compare the outcomes of three different blood management techniques in primary TKR. Materials and Methods: We prospectively examined 87 patients who underwent a primary TKR, using the same implant. Patients were randomised into three groups; Group A: 29 patients without the use of tourniquet and reinfusion drain; Group B: 27 patients without the use of tourniquet and reinfusion drain but application of intraoperative cell salvage system; Group C: 31 patients with the use of tourniquet and reinfusion drain. All groups were matched for age, sex, pre-operative haemoglobin levels, range of knee movements and pre-operative anticoagulant usage. All patients were assessed at the second post-operative day. Results: There was no significant difference between the post-operative haemoglobin drop, allogenic blood transfusion rate, degree of swelling, skin bruising and knee range of movement. Only 2 patients in Group C had post-operative thromboembolic events (DVT, TIA). Readmission rate due to knee stiffness and superficial wound problems did not reveal any significant difference within each group. The average operative time and hospital stay were the same in all groups. We did not record any complications such as wound haematoma and deep infection. Conclusions: All techniques are safe and it is the surgeon's choice as to which one they use routinely in their clinical practice.

Date: 2011-09-08

Session: Knee - Blood Loss Control

Time: 14:00 - 15:30

Room: Club H

Abstract no.: 28225

**A COMPARATIVE STUDY OF USE OF TOPICAL VERSUS INTRAVENOUS
TRANEXAMIC ACID FOR MINIMISING BLOOD LOSS IN CARDIAC
PATIENTS UNDERGOING TOTAL KNEE ARTHROPLASTY**

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Total Knee Arthroplasty is a surgery which is being performed in increasing numbers the world over, due to increased life expectancy of the patients, and due to their demands for a more productive, active and pain-free life. It is also true that the age-group that undergo this surgery belong in majority to the geriatric group. Many of these patients have associated cardiac problems, and are under cardiac care. Also, since TKA leads to bleeding post-operatively and the geriatric patients may already be anemic, control of blood-loss also becomes a very important issue. The use of traditional methods of minimizing blood loss by using Tranexamic Acid intravenously is contraindicated in the patients having associated cardiac problems. This led us to use Tranexamic Acid topically for such patients. The use of Tranexamic Acid topically gives comparable results to its intravenous use in terms of minimizing blood loss. The use of Tranexamic Acid topically minimizes the systemic absorption of Tranexamic Acid and its associated side-effects on the cardiac condition of these potentially high-risk patients, while affording comparable benefits in terms of minimizing blood loss. The use of topical versus intravenous Tranexamic Acid for minimizing blood loss after TKA in cardiac patients is discussed in this paper.

Date: 2011-09-08

Session: Knee - Blood Loss Control

Time: 14:00 - 15:30

Room: Club H

Abstract no.: 29922

THE COMPARISON OF AMOUNT OF BLOOD FROM WOUND DRAINAGE AFTER TKA BETWEEN POSTOPERATIVE CAST IMMOBILIZATION AND NON IMMOBILIZATION: A RANDOMIZED CONTROLLED TRIAL

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This study compared the blood from suction drainage after TKA between postoperative cast immobilization and non immobilization. A consecutive series of 142 knees in 142 osteoarthritis patients who required TKA were randomly divided in long leg cast group and non-cast group (webril and elastic bandage wrapped). Both groups were removed their restrained at 3 days postoperation. The volumes of blood from suction drainage were recorded for 24 hour after operation. Maximum knee flexion at 8 weeks postoperative and wound complications were also evaluated. There were 69 knees in cast group and 73 knees in non-cast group. The mean \pm SD of blood loss in cast group was 324.7 ± 129.3 ml and non-cast group was 546.8 ± 122.2 ml. The mean difference in drainage blood lost between cast and non-cast group were 222.1 ml ($p < 0.05$). More maximum knee flexion at postoperative 8 weeks was gained in cast group ($p < 0.05$). Wound complications were more in non cast group but not statistically significant ($p = 0.497$). The immobilized knee with long leg cast after total knee arthroplasty can significantly decrease blood loss from suction drainage when compared with patients who do not use. It is the method that safely reduces blood loss without compromise to postoperative range of motion. However, the disadvantage of cast application such as patient discomfort and additional cost may compromise the patient satisfaction.

Date: 2011-09-08

Session: Knee - Blood Loss Control

Time: 14:00 - 15:30

Room: Club H

Abstract no.: 29115

THE EFFECTS OF PRE- AND POST-OPERATIVE HAEMOGLOBIN ON TRANSFUSION REQUIREMENTS AND LENGTH OF STAY IN PATIENTS UNDERGOING A TOTAL KNEE REPLACEMENT

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Aim: The aim of this study was to determine the effects of pre and post-operative haemoglobin (Hb) on blood transfusion requirements in patients undergoing total knee replacement (TKR) and to investigate whether the need for blood transfusion affects length of stay (LOS). **Patients and Methods:** This is a retrospective analysis. All patients who underwent primary TKR at our institution between January 2008 and August 2009 were included (n=431). The medical records were reviewed and pre-operative and first post-operative Hb, Hb drop and LOS recorded. Spearman's rank correlation coefficient was used to compare Hb with LOS. **Results:** A lower pre-operative and post-op Hb were shown to increase LOS ($p < 0.001$). Hb drop did not significantly affect LOS. A one-way ANOVA was used to compare mean Hb in those receiving and not receiving transfusions. Results showed that mean pre-op Hb (g/dl) in those who received a transfusion was 12.23 and 13.58 in those who did not ($p < 0.001$). Mean post-op Hb was 9.55 and 10.95, respectively ($p < 0.001$). Patients with pre-op Hb of 12-15 were shown to have a 5% chance of requiring a transfusion, while those with Hb < 12 had a 30% chance. Requirement for a transfusion was associated with a LOS increase of 3.6 days ($p < 0.001$). **Conclusion:** Requirement for a transfusion and lower pre and post-operative Hb are significantly associated with prolonged LOS. In addition, pre-operative Hb < 12 significantly increases the risk of needing a transfusion following TKR.

Date: 2011-09-08

Session: Knee - Blood Loss Control

Time: 14:00 - 15:30

Room: Club H

Abstract no.: 28533

POSTOPERATIVE BLOOD LOSS REDUCTION IN COMPUTER-ASSISTED SURGERY TOTAL KNEE REPLACEMENT BY INTRA-ARTICULAR TRANEXAMIC ACID INJECTION TOGETHER WITH 2-HOUR CLAMP DRAIN: A PROSPECTIVE TRIPLE-BLINDED RANDOMIZED CONTROLLED TRIAL

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A prospective triple-blinded randomized study was conducted to evaluate the effect of intra-articular tranexamic acid injection compared with intra-articular saline injection in 48 patients who underwent computer-assisted surgery total knee replacement (CAS-TKR). Patients were assigned, by computer-generated blocked randomization, to receive either of a mixed intra-articular solution of tranexamic acid 250 mg and physiologic saline (TXA group), or physiologic saline (control group). The mean postoperative drainage volume, total hemoglobin loss and calculated total blood loss in TXA group were 308.8 ml, 2.1 g/dl and 206.3 ml compared to 529.0 ml, 3.0 g/dl and 385.1 ml in the control group ($p = 0.0003$, 0.0005 and < 0.0001 respectively). Allogenic blood transfusion was needed in one patient (4.2%) in TXA group and for eight patients (33.3%) in the control group. Postoperative knee scores were not significantly different between groups. No complication such as deep vein thrombosis, infection or wound complication was detected. Intra-articular tranexamic acid injection with clamping drain was effective for reducing blood loss and blood transfusion in CAS-TKR.

Date: 2011-09-08

Session: Knee - Blood Loss Control

Time: 14:00 - 15:30

Room: Club H

Abstract no.: 29372

THE PERCENTAGE OF POLYMORPHONUCLEAR CELLS (PPMNC) IN SYNOVIAL FLUID SUSPICIOUS FOR PROSTHETIC JOINT INFECTION(PJI) CAN PREDICT REVISION SURGERY AFTER TOTAL KNEE REPLACEMENT(TKR) IN EARLY POSTOPERATIVE STAGE

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After TKR surgery, PJI is one of the most common causes of revision TKR and it is reported in 0.4 to 2 % of patients who underwent TKR. Because there can be postoperative inflammation and edema normally, it is difficult to diagnose a PJI in the early postoperative stage. It is reported that in spite of early PJI, revision TKR was not needed in approximately two thirds of patients after debridement surgery. Any parameter which predicts PJI within 4 weeks after TKR has not been reported, as far as we know. So we evaluated whether synovial fluid suspicious for PJI in the early postoperative period could predict revision TKR. Method: We reviewed 24,766 patients who underwent TKR and identified 333 cases that had a knee aspiration within 4 weeks of surgery for being suspected as PJI. Revision surgery was recommended in 19 cases and performed in 15 cases. Mean FU duration was 3.4 years. Results : In univariate test, serum white blood cell(WBC) count, PPMNC, synovial WBC count and PPMNC were statistically significant variables that affected revision surgery.(P<0.05) In multivariate test, the only statistically significant variable was synovial PPMNC.(P=0.30) In receiver operating characteristic curve analysis, optimal synovial PPMNC cutoff was 92.5%(sensitivity 79%, specificity 77%) for predicting revision surgery. Conclusion: With a cutoff of 92.5%, synovial PPMNC predicted revision surgery after TKR with sensitivity 79% and specificity 77%. This variable was also statistically significant in multivariate logistic regression test.

Date: 2011-09-08

Session: Knee - Blood Loss Control

Time: 14:00 - 15:30

Room: Club H

Abstract no.: 29169

BIOTRANX: A BIOMECHANICAL STUDY OF THE EFFECT OF TOPICAL TRANEXAMIC ACID ON ARTIFICIAL JOINTS

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Tranexamic acid (TXA) has been shown to be an effective way in reducing blood loss and blood transfusion when used intravenously, orally or topically. Historically, there have been unfortunate consequences associated with artificial joint interventions when unexpected and unwanted chemical or physical reaction developed leading to massive wear and joint failure. Methodology: Testing specimens made of Cobalt- Chromium and UHMWPE were soaked with saline and TXA for 48 hours. The following biomechanical properties were compared between the two groups: 1. Tensile properties: a. Ultimate strength. b. Stiffness. c. Young Modulus. 2. Wear rate using a multi-directional pin-on-plate machine. 3. Surface topography: a. Surface roughness (Ra) b. Peak-Valley Value (PV). Results The test showed that the stiffness, elastic Young's modulus, load to break value and stress at break were not affected by the fact the specimens were soaked with TXA or saline; $P=0.740$, 0.740 , $P=0.523$, $P=0.526$ respectively. The wear test involved two multidirectional pin-on-plate machines with 8 stations. After 4 millions cycles, there was no statistically significant difference between the means wear factor between the plates and pins that were soaked in saline or the ones that soaked in TXA $P=0.768$ and $P=0.677$ respectively. There was no significant difference in the peak valley distance (PV) and surface roughness (Ra) between the two groups.

Date: 2011-09-08

Session: Knee - Blood Loss Control

Time: 14:00 - 15:30

Room: Club H

Abstract no.: 29164

A RANDOMISED CONTROLLED TRIAL OF THE TOPICAL TRANEXAMIC ACID IN TOTAL HIP REPLACEMENT

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The aim of this study was to investigate the effect of topical TXA on blood loss and blood transfusion in THR. Design: A double blind randomised controlled trial of 159 patients who underwent unilateral primary THR. OUTCOME MEASURES: Primary outcome: • Blood transfusion required (number of patients needed blood transfusion and number of units of blood transfused until patient is discharged). Secondary outcomes: •drain blood loss (First 48 hour). •Haemoglobin and Haematocrit drops. •General quality of life measure (EUROQOL) preoperative and at 3 months postoperative. •Oxford hip score preoperative and at 3 months postoperative. •Length of stay. •Cost effectiveness analysis. •Complications. Results: There was a significant difference in the amount of blood loss and blood transfusion rate in favour of TXA. Twenty four patients out of 87 who received a placebo needed blood transfusion versus 7 out of 72 who received TXA (Chi Square $P=0.005$). The mean blood loss in the placebo group was 380 ml versus 265 (95% CI: 35.7 to 195.8 ml; $P=0.005$). Length of stay was not statistically different between the two groups. There was no significant difference other outcomes. In conclusion, TXA reduced the blood loss and transfusion rate in THR. However it is not as effective as in TKR. This is probably because the TKR is performed in a bloodless field using a tourniquet.

Date: 2011-09-08

Session: Knee - Blood Loss Control

Time: 14:00 - 15:30

Room: Club H

Abstract no.: 28835

IS ROUTINE USE OF ANTICOAGULANT CHEMOPROPHYLAXIS IN JOINT REPLACEMENT ARTHROPLASTY JUSTIFIED: A CLINICAL STUDY

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Background: To evaluate the routine prophylactic use of low molecular weight heparin (LMH) in patients undergoing joint replacements. Material & Methods: A prospective cohort of 200 patients undergoing hip or knee replacements who did not receive any prophylactic LMH and a retrospective cohort of 200 patients who received routine prophylactic LMH were included in two groups A & B respectively. Colour Doppler was done 100 patients from group A in the preoperative period and on 4th postoperative day. Results: No symptomatic DVT was found in any patient. Doppler ultrasound showed DVT in two of 100 cases from group A however these two patients had no signs or symptoms of thromboembolism. Out of 200 cases of group B, post operative excessive bleed loss in wound drain was seen in 24(12%) cases, wound hematoma and surrounding tissue staining were seen in 52 cases (26%), postoperative infection was seen in 10 cases (5%), epidural bleeding was seen in 4 cases (2%) and nonfatal intracranial bleeding was seen in one patient (0.5%). From group A only two patients had post operative infection (2 %) and no other significant complications were seen in this group. Conclusion: Routine prophylactic use of LMH in patients with joint replacements is associated with transfusion of more units of blood, drainage of persistent wound hematoma, delayed wound healing and wound infection. Therapy is expensive; it increases hospital stay and does not change the incidence rate of fatal pulmonary embolism.

Date: 2011-09-08

Session: Knee - Blood Loss Control

Time: 14:00 - 15:30

Room: Club H

Abstract no.: 28843

CLINICAL EFFICACY AND SAFETY OF CONTINUOUS INTRA-ARTICULAR LEVOBUPIVACAINE INFUSION FOLLOWING KNEE ARTHROPLASTY

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Introduction: Our aim was to assess the safety and efficacy of continuous intra-articular Levobupivacaine infusion following Knee Arthroplasty (KA), and the need for post-operative patient controlled analgesia (PCA) and nerve blocks (NB). **Materials and Methods:** Fifty consecutive patients undergoing cemented KA who received a continuous postoperative infusion of 0.25% Levobupivacaine at a rate of 5ml/hr for 48h (Infusion Group = IG) were compared to 47 patients who underwent KA (following similar rehabilitation regimes) and had received other modalities of post-operative analgesia (Control Group = CG). Data regarding pain scores, satisfaction scores, mobilisation pain, length of hospital stay (LOS), complications and the use of opioids, PCA or NB, was collected prospectively by an independent observer. **Results:** There was significant reduction in post-operative mobilisation pain in the first 48h in the IG compared to the CG ($p < 0.05$). No patient in the IG received PCA compared to all patients in CG. Patients in the IG received a lower total post-operative dose of opioids. Patients in the IG did not have increased complication rates. LOS was shorter in the IG but that did not reach statistical significance. In the IG, patients who did not receive NB ($n=7$) had higher pain scores than those who did ($p < 0.05$). All patients in the CG received NB. **Conclusions:** We believe that the use of a continuous intra-articular infusion of 0.25% Levobupivacaine (rate of 5ml/hr) for 48h post KA significantly reduces pain on mobilisation and need for concomitant use of opioid analgesia.

Date: 2011-09-08
Session: Osteoporosis
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 28094

EFFECTS OF STRONTIUM RANELATE OR BISPHOSPHONATE TREATMENT ON FRACTURE RISK IN WOMEN AGED 80 AND OLDER: META-ANALYSIS

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Aims: Women over 80 years of age constitute 10% of the population but contribute 60% of all non-vertebral fractures. The aim of this meta-analysis is to address the anti-fracture efficacy of bisphosphonates in women over 80 using pooled data from the key regulatory trials. **Methods:** A systematic search was undertaken up to December 2010 to identify regulatory trials comparing strontium ranelate, risedronate, or zoledronate versus placebo, and providing data for both incident vertebral and non-vertebral fractures at 3 years in women aged 80 and older. Meta-analyses were conducted with random-effect models. **Results:** We identified 3 regulatory trials providing data in 1940 women. For vertebral fractures, the pooled risk differences were -7.4% (-11.6 to -3.1%) for strontium ranelate versus placebo and -8.2% (95%CI, -11.7 to -4.7%) for bisphosphonates versus placebo, with a number needed to treat of 14 (9 to 32) and 13 (9 to 21), respectively. For non-vertebral fractures the difference was -5.6% (-9.4 to -1.7%) for strontium ranelate versus placebo, with a number needed to treat of 18 (11 to 57). By contrast, the pooled difference for bisphosphonates versus placebo of -1.4% (-4.1 to +1.3%) was not consistent with an effect of bisphosphonates on fracture risk at 3 years. **Conclusion:** While strontium ranelate has documented anti-fracture efficacy against vertebral and non-vertebral fractures in women over 80 years of age with postmenopausal osteoporosis, similar evidence is lacking with bisphosphonates, even when pooling data from different trials. These findings are potentially consistent with recently reported differential effects on cortical bone.

Date: 2011-09-08
Session: Osteoporosis
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 29303

X-RAY ABSORPTIOMETRY INDEXES FOR WOMEN IN POST-MENOPAUSAL PERIOD WITH OSTEOPOROTICAL FRACTURES

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Aim: To estimate structural and functional condition of bone in women in postmenopausal period with osteoporotic fractures, compare the results to referent data for Ukrainian population and to compare the results of X-ray absorptiometry to the fracture risk rate, assessed by FRAX for women in postmenopausal period with osteoporotic fractures. **Object.** 39 women in postmenopausal period aged 50-89 years with forearm (18) and proximal hip (21) fractures, who were on treatment the Traumatology Department #1 of Lviv City Clinical Hospital of Ambulance. They were divided into 4 categories by age (50-59[13];60-69[12];70-79[9];80-89[5]). **Methods:** Nordin Index was measured with the "Osteolog" workstation, developed in the Institute of Gerontology AMS Ukraine under the direction of Professor Povoroznyuk V.V. Fracture risks were estimated using FRAX. **Results:** We found lower cortical indexes for women in postmenopausal period with osteoporotic fractures for 50-59 (Common IN=0,41), 60-69(Common IN=0,40), 70-79 (Common IN=0,36), 80-89(Common IN=0,33) age groups in comparison to referent data for Ukrainian population. Also we found lower cortical indexes for women in postmenopausal period with higher risk of osteoporotic fracture, assessed by FRAX, independent of age. **Conclusion:** Thus, low cortical indexes, measured with the "Osteolog" workstation are reliable predictors of high fracture risk. There is a significant correlation between low cortical indexes and high fracture risk, assessed by FRAX.

Date: 2011-09-08
Session: Osteoporosis
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 27888

**TIMING FOR ADMINISTRATION OF BISPHOSPHONATE (RISEDRONATE)
AFTER THE OPERATION ON PATIENTS WITH HIP FRACTURE AND
OSTEOPOROSIS**

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For the patient of osteoporotic hip fracture, early treatment of osteoporosis is mandatory to prevent the secondary hip fracture. However, this could lead to unexpected clinical results because the bisphosphonates might inhibit the fracture-healing. The aim of this study was to investigate whether the timing of administration of these agents after surgery might influence the fracture healing and complication rates. Materials and methods: We included 71 osteoporotic patients with intertrochanteric fractures who underwent osteosynthesis in a prospective study for one year. Three groups were randomized according to the timing of administration of bisphosphonates (Risedronate) after surgery: group 1 (one week), group 2 (one month) and group 3 (three months). The outcome of fracture healing was assessed by clinical and radiological bone union and the visual analog scale (VAS) scores (6 months after surgery). Complications regarding the failure of fixation and the mortality rates were compared among three groups. Results: The timing for clinical and radiologic union among 3 groups showed no significant differences ($p>0.05$). The VAS score at 6 months after surgery were not significant differences among 3 groups ($p>0.05$). Complication regarding the fixation loss and mortality rates were not significant differences among three groups ($p>0.05$). Conclusion: The timing of administration of bisphosphonates after surgery had clinically no influence to the fracture healing and the incidence of complication in the hip fracture with osteoporosis. Therefore, early treatment of osteoporosis after surgery should be performed to prevent the secondary osteoporotic hip fractures in those patients.

Date: 2011-09-08
Session: Osteoporosis
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 28553

COMPARISON BETWEEN SINGH'S INDEX AND PHALANGEAL BMD IN PATIENTS OF FRACTURE PROXIMAL FEMUR WITH REFERENCE TO OSTEOPOROSIS

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Introduction: Osteoporotic fractures are common and associated with significant morbidity and mortality. Diagnosis and treatment of osteoporosis prior to osteoporotic fracture has significant impact on osteoporosis management. Current recommendations of diagnosis and treatments for osteoporosis are based on costly DEXA technology. Grading of X-rays as per Singh's Index is also an affordable and accessible tool for diagnosis of Osteoporosis. This study aims to evaluate usefulness of Singh's index to diagnose osteoporosis in patients of fracture proximal femur compared to phalangeal BMD. Material and Methods: This comparative study was carried out on 150 patients of fracture proximal femur. Preoperative radiographs of Pelvis with both hips AP view with 15 degrees internal rotation, neutral flexion; neutral abduction and standard focus were taken. Five observers were blinded to apply Singh's index on non fractured side. All X-rays were subjected to revaluation by same observers twice at interval of 2 weeks keeping placards of Singh's Index in front of them for ready reference. Phalangeal BMD measured by "accuDEXA" (Schick technologies). Results: Mean inter-observer and intra-observer agreement with use of placards for ready reference was 0.94 (kappa) and 0.99 (kappa). Positive predictive value, negative predictive value, sensitivity and specificity were found to be 99.6%, 96.9%, 98.7%, 99.1% respectively. We found significant correlation between Singh's index and BMD. ($r = > 0.9$). Conclusion: Singh's Index is accessible diagnostic test for osteoporosis and has similar efficacy as compared to bone mineral density measurement by DEXA technology especially if Placards are used for ready reference while grading. Key words: Osteoporosis, BMD, Singh's Index.

Date: 2011-09-08
Session: Osteoporosis
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 27266

DISTRIBUTION OF ATYPICAL FRACTURES AND CORTICAL STRESS LESIONS ASSOCIATED WITH BISPHOSPHONATE THERAPY

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Background: This study defines the distribution of atypical fractures and cortical stress lesions associated with prolonged bisphosphonate therapy, with a view toward recommendations for radiological screening and surgical stabilization techniques. **Patients and Methods:** A retrospective radiological review of 44 patients, aged 69 years (47-92 yrs, SD 10.6 yrs) with atypical femoral fractures in association with prolonged bisphosphonate therapy presenting from May 2004 to March 2010 was performed. **Main outcome measures:** • Absolute distance and ratio (of entire femur length) of each lesion from the greater trochanter • Occurrence of stress risers in follow-up radiographs of surgically stabilized lesions. **Results:** There were 34 right femoral lesions, with 29 in the metaphyseal-disphyseal region. These averaged 106.4 mm (67.0-270.4, SD 52.2 mm) from the greater trochanter at 23.8% (15.7 to 58.6, SD 11.2%) of the whole femur length. The left femur exhibited a symmetrical distribution with 34 lesions, with 23 being in the metaphyseal-disphyseal region. These averaged 109.9 mm (73.6-291.2, SD 50.8 mm) from the greater trochanter at 24.4% (16.3 to 66.3%, SD 11.1%) of the whole femur length. All lesions were located in the lateral cortex. Five stress risers requiring revision plating were encountered with extra-medullary fixations. **Conclusion:** Atypical femoral fractures and stress lesions are clustered in the upper two-thirds of the femur shaft. Screening radiographs should include the entire femur. The use of long, antegrade intramedullary devices for surgical stabilization appears a better option.

Date: 2011-09-08
Session: Osteoporosis
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 29298

VITAMIN D-DEFICIENCY AND INSUFFICIENCY IN UKRAINIAN POPULATION

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To determine the frequency of vitamin D-deficiency and insufficiency in people not previously treated with vitamin D. There were examined 450 patients from different regions of Ukraine (mean age $57,0 \pm 13,7$ yrs.). 25(OH) vitamin D3 and PTH level evaluated by Elecsys 2010. BMD was examined by ultrasound densitometry (HOLOGIC, Sahara). The study showed that 85.4% examined people had deficiency of vitamin D, 13.9 %-insufficiency and 0.7 % normal level of 25(OH) vitamin D3. The mean level of 25 (OH) vitamin D3 was ($42,66 \pm 16,68$) mmol/l in people of western part, ($27,08 \pm 14,96$) - in central and ($29,64 \pm 14,58$) -- in eastern part of Ukraine. The difference between the groups wasn't significant. 9.9 % people had higher than normal level of PHT. It was found significant correlation between PHT and 25(OH) vitamin D3 ($r=-0.11$, $p=0.049$). No significant correlation between 25(OH) vitamin D3 level and BMD ($r=-0,06$, $p=0,27$) or Stiffness ($r=0,17$, $p=0,71$). 85.4 % examined people had deficiency of vitamin D, 13.9 % - insufficiency and 0.7 % normal level of 25(OH) vitamin D3. No significant difference in mean levels of 25(OH) vitamin D in patients from different regions of Ukraine. 9.9 % people had higher level of PHT. It was determined significant correlation between 25(OH) vitamin D3 and PTH. No correlations between 25(OH) vitaminD3 level and ultrasound densitometry data.

Date: 2011-09-08
Session: Osteoporosis
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 30084

COMBINED PUBIC RAMI AND SACRAL OSTEOPOROTIC FRACTURES

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Pelvic osteoporotic fractures (POFs) are associated with considerable morbidity and mortality, in addition to prolonged rehabilitation and high costs. The most common sites of POFs include the pubic rami and the sacrum. Combined pubic rami and sacral osteoporotic fractures (SOFs) have been reported previously with varying comments on the mechanism of injury and incidence. Aim of the study: To evaluate the mobility, discharge destination, presence of back pain and length of stay of patients who sustained combined pubic rami and SOFs and to identify the significance of this association. Methods: We prospectively studied 67 patients with low-impact pubic rami and/or SOFs over 12 months. The patients were over 60 years of age and were assessed by the fracture liaison service. MR imaging or bone scan were done when there was back pain or lumbo-sacral tenderness. Results: There were 54 (80.4%) female and 13 (19.6%) male patients and the average age was 87.5 years (Range 65-96). The mean length of stay was 45 (\pm 35) days. Mortality rate was 10.4%. There was a significant relationship between low back pain and the presence of sacral fracture. Patients with combined pubic rami and SOFs showed significantly longer length of stay than those with isolated pubic rami fractures. Conclusion: We recommend considering the high association between SOFs and pubic rami fractures and the presence of back pain in planning the management of patients with POFs and their rehabilitation, which would potentially exhaust resources, due to their significantly increased length of stay and reduced mobility.

Date: 2011-09-08
Session: Osteoporosis
Time: 16:30 - 18:00
Room: Club H

Abstract no.: 28417

EFFECT OF “BIVALOS” THERAPY ON LOWER LEG LENGTHENING IN RABBITS AT PRESENCE OF BONE OSTEOPOROSIS

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Aim: Determine the effect of Bivalos therapy on formation and restructuring of distraction regenerate during lower leg lengthening in rabbits. Methods: Lower leg in all groups of rabbits was lengthened by 10mm according Ilizarov method. "Classical" lengthening was performed in the first control group (4 rabbits). In the second control group (5 animals) osteoporosis was created (ovariectomy, hypodynamia, dietotherapy). In the first experimental group (6 animals) Bivalos was inserted (800mg peroral) starting from the fifth day after surgery and till removing the animal from the experiment. In the second experimental group (5 animals) osteoporosis was created and Bivalos was inserted. Radiography was performed before surgery, on the 1st, 10th, 15th, 25th, 35th and 45th days after surgery. Morphological investigation was performed on 25th, 35th and 45th postoperative day. Results: According to radiological research in rabbits who received Bivalos therapy, formation and organotypic reorganization of distraction regenerate were accelerated: formation of cortex occurs on 30th day of fixation. The group were animals don't taken the drug, the formation of cortex happened to 45th day of fixation. According to morphometric data while Bivalos use, growth of relative area of bone trabeculae was 30% in healthy animals and 10% animals with artificially created osteoporosis. Conclusion: The preliminary data show that the Bivalos use accelerates organotypic reconstruction of distraction regenerate, and increases the density of newly formed cortical bone both in the presence of osteoporosis and without it.

Date: 2011-09-09
Session: Hip - Metal-on-Metal Bearing
Time: 08:00 - 09:30
Room: Forum Hall

Abstract no.: 28804

NINE-YEAR CLINICAL EXPERIENCE WITH METAL-ON-METAL HIP RESURFACING

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Introduction: As literature reports document contradictory results on the use of metal-on-metal hip resurfacing (MOMHR), we wanted to describe our clinical results for this procedure up to 9 years. Methods: Our single surgeon series includes 550 patients (592 hips) treated with Birmingham Hip Resurfacing (BHR) and 259 patients (262 hips) treated with the Adept Hip System. Standard acetabular cups were used in 828 hips, cups with supplementary screw fixation were used in 26 hips. The study includes 536 men and 273 women. Primary diagnoses included 621 osteoarthritis, 48 avascular necrosis, 110 congenital dysplasia, 4 Perthes disease, 5 rheumatoid arthritis patients, and 21 post-traumatic pathologies. Mean age was 53.77 ± 2.1 years (16-82). All surgeries were performed using a postero-lateral approach. Results: Mean acetabular component inclination angle was 43° . The femoral component was implanted with a mean valgus of 6.6° compared to the femoral neck/shaft angle. The average preoperative Harris hip score improved from 48 ± 10 to 95 ± 12 at the latest follow-up. Eleven hips were revised (1.3%), 6 because of femoral neck fractures, 1 because of a pseudotumor which developed two years after surgery, 1 because of progressive loosening of the femoral component, and 2 due to mechanical loosening of the acetabular components. Technical errors were identified as being responsible for 8 out of the 11 revised hips. Three hips dislocated within 3 weeks of surgery and were successfully treated with closed reduction. Discussion and conclusion: MOMHR is a viable surgical indication. In order to optimize outcomes and minimize complications, surgical accuracy is fundamental.

Date: 2011-09-09

Session: Hip - Metal-on-Metal Bearing

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 29552

EARLY RESULTS OF TREATMENT OF ADVERSE REACTION TO METAL DEBRIS

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Introduction: Adverse reaction to metal debris (ARMD) is an increasingly recognised complication of metal-on-metal hip arthroplasty. A previous study described poor results following revision and recommended early intervention¹. We determined the outcome of revision for ARMD and present the largest series to date. Methods: Between 2005 and 2010, 98 patients (101 hips) underwent revision for ARMD. Patients were reviewed at 3, 6 and 12 months and annually thereafter. Patient satisfaction, Harris hip scores (HHS) and metal ions were analysed. Results: 54 patients (55 hips) with an average age of 58 years (29 to 81 years) completed minimum one year follow-up (range 1 to 5 years). The mean HHS improved from 49.7 (10 to 79) to 86.3 (40 to 100). Forty-five (81%) patients were satisfied and nine (16%) patients were not satisfied with the outcome. The mean serum cobalt 24.5 (1.65 to 96.6) improved to 1.17 (0.31 to 6.99). Two patients died from unrelated diseases. There were 8 (14%) dislocations and one (1.8%) sciatic nerve palsy. Eight (14%) patients needed re-revision (dislocation: 5 and pain: 3). 26 % had severe soft tissue damage. Discussion: Treatment of ARMD is technically demanding because extensive soft tissue damage can compromise stability. Early intervention reduced the dislocation rate in this series. A small group of patients may have persistent pain and recurrent effusions that may require re-revision. Reference: 1) Grammatopoulos et al. Hip resurfacings revised for inflammatory pseudotumour have a poor outcome. JBJs (Br) 2009; 91-B: 1019-24.

Date: 2011-09-09
Session: Hip - Metal-on-Metal Bearing
Time: 08:00 - 09:30
Room: Forum Hall

Abstract no.: 28157

ACCURACY, SENSITIVITY, SPECIFICITY AND PREDICTOR VALUE OF SERUM METAL IONS FOR DIAGNOSIS OF ARMD IN MOM HIP

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Purpose: To establish the relation of conclusive Metal Artefact Reduction Sequence (MARS) hip MRI with serum metal ions for Adverse Reactions to Metal Debris (ARMD) based on Medicines and Healthcare products Regulatory Agency (MHRA) guidance of serum metal ions ($\geq 7 \mu\text{g/L}$) and local protocols with lower threshold ($\geq 3.5 \mu\text{g/L}$). Method: A retrospective review of investigation for painful MoM hips with MARS-MRI and serum metal ions over two year period. Results: Eighty nine patients had both investigations of painful metal-on metal hips. Median Serum Cobalt and Chromium level were $3.66 \mu\text{g/L}$ (0.06 -335.6) and $3.66 \mu\text{g/L}$ (0.24-163.0) respectively. Thirty six (40.44%) scans were positive for ARMD. Increased serum metal ions based on MHRA Guidance had Accuracy: 64%, Sensitivity: 50%, Specificity: 73.58%, Positive predictor value: 56.25%, Negative predictor value: 68.42%. Results for local protocols were: Accuracy of 57%, Sensitivity of 61.11%, Specificity of 54.71%, Positive predictor value of 47.82% and Negative predictor value was 67.44%. Conclusion: With emerging evidence about ARMD in MoM hip device, there is an urgent need of an effective surveillance programme. A threshold of raised serum metal ions for cross sectional imaging remains an important issue due to cost and resources. These results identify that serum metal ions are not adequate screening tool for ARMD. A low threshold for obtaining MARS-MRI in symptomatic metal-on-metal hips even in the presence of low serum metal ions is recommended.

Date: 2011-09-09

Session: Hip - Metal-on-Metal Bearing

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 28443

OSTEOLYSIS AFTER CONTEMPORARY METAL-ON-METAL TOTAL HIP ARTHROPLASTY

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A single surgeon series of 149 cementless total hip arthroplasties that were performed in 146 patients using a contemporary metal-on-metal bearing were retrospectively analyzed. There were 76 men (77 hips) and 70 women (72 hips) with a mean age of 52 years (range, 21 to 80 years) at the time of the index operation. The mean duration of follow-up was 8.5 years (range, 8 to 10 years). Mean Harris hip score improved from 46 points preoperatively to 92 points at the final follow-up examination. Thirteen hips (8.7%) had osteolysis. Of these, five patients (3.3%) with a persistent groin pain underwent revision operation at a mean of 56 months (range, 49-74 months) postoperatively. All five patients exchanged the metal-on-metal bearing into a ceramic-on-ceramic articulation. Intraoperative examination revealed an extensive synovial-like tissue hypertrophy, and histologic analysis showed a perivascular lymphocytic accumulation. Annual volumetric wear rate measured on one retrieved head and liner was 1.03 mm³/yr, and roughness measured on three retrieved femoral heads was consistently very low with 8 nm, 51nm, and 117 nm, respectively. After the revision surgery, all the patients noticed disappearance of pain as well as radiographic evidence of healing of the osteolytic lesion. Survival for both components at 10 years, with failure for any reason as the end point, was 90.6% (95% confidence interval, 75% to 97%). Intermediate-term follow-up of this cohort of patients with a contemporary metal-on-metal total hip prosthesis revealed an unexpectedly high rate of periprosthetic osteolysis possibly in association with metal hypersensitivity.

Date: 2011-09-09

Session: Hip - Metal-on-Metal Bearing

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 28933

**METAL ON METAL HIPS AND ADVERSE REACTION TO METAL DEBRIS,
READING EXPERIENCE**

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There are increasing reports of adverse reaction to metal debris and metal hypersensitivity following surface hip replacements and large metal on metal hip replacements. We would like to share our experience of revising failed resurfacings and MOM Hips for ARMD. All patients undergoing conversion of hip resurfacing and large MOM Hips were included in the study. The notes were reviewed for the reason of revision, the make of the implant, time interval between primary and revision procedure and the final diagnosis. Radiographs, CT and MRI were reviewed for signs of loosening, implant alignment, pseudotumors, neck thinning and AVN. 118 patients identified from NJR during 2004-2010. Of those 65 were ASRs including 13 Large metal on metal THRs and the rest 53 BHRS. 19 revisions performed. (11 ASR, 3 BHR and 5 ASR/Corail THR). F: M 14:5 Most of the patients presented with either groin pain or lateral hip pain at an average of 18 months post surgery. Plain radiographs were unremarkable but CT/ MRI showed varying degree of soft tissue masses and bursae in 16 of them. 9 of them required revision implants. There were no infections. Histology confirmed ALVAL in 9 patients and the rest showed varying degree of inflammation. Of the 5 ASR/Corail combinations, one had significant soft tissue and bony destruction requiring pelvic reconstruction. Another required removal of corail stem because of lysis in the proximal femur and long stem revision. The rest had cup revisions only as the femoral components were well fixed. In summary, the at-risk groups are females and predominantly ASRs. Revision of ASR/Corail THRs can be difficult and challenging. Although the sample is small, these findings are consistent with recent published reports and we hope to present the annual follow-up of these patients in due course.

Date: 2011-09-09

Session: Hip - Metal-on-Metal Bearing

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 29617

ULTRASOUND FEATURES OF ADVERSE REACTION FOLLOWING METAL ON METAL HIP REPLACEMENT: A CASE CONTROL STUDY

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INTRODUCTION: Adverse Reaction to Metallic Debris (ARMD) is an emerging problem with metal on metal (MoM) hip replacements. ARMD is an umbrella term encompassing metallosis, pseudo-tumors and aseptic lymphocytic vasculitis associated lesions (ALVAL). The role of imaging in the diagnosis of this complex problem is still unclear. **METHODS:** A retrospective analysis of prospectively collected data was undertaken to evaluate the efficacy of ultrasound in diagnosis of ARMD. The study group included 35 patients with a histological diagnosis of ARMD. The control group included 10 asymptomatic patients of metal on metal hip replacements with low blood metal ions levels. All ultrasound procedures were performed preoperatively with a high frequency probe of 9-13 MHz. **RESULTS:** All patients diagnosed with ARMD had abnormalities identified on ultrasound. Fluid inside the joint (Group A) was noted in 30 (85.7 %) and outside the joint (Group B) in 33 (94.3 %). In Group B, 32 had fluid in iliopsoas bursa and 30 had in trochanteric bursa. Echogenic effusions were noted in 31 out of 35 procedures (88.6 %). Absence of iliopsoas and gluteus tendons was seen in many patients with echogenic fluid collections around the hip. The findings in ARMD group were statistically significant when compared to the control group (p value < 0.05). **DISCUSSION:** This study is the first to demonstrate the efficacy of ultrasound in diagnosing ARMD in painful MoM hip arthroplasty. Fluid collection around iliopsoas and gluteal tendons is highly suggestive of ARMD and should not be thought of as an uncomplicated tendonitis

Date: 2011-09-09

Session: Hip - Metal-on-Metal Bearing

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 29557

POOR PROGNOSTIC INDICATORS OF ADVERSE REACTION TO METAL DEBRIS OUTCOMES IN METAL-ON-METAL HIPS

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Introduction: Adverse reaction to metal debris (ARMD) is a complication of hip resurfacing/metal-on-metal hip replacement. Various centres have reported their results of treatment. However, poor prognostic indicators have not been reported. Methods: 98 patients underwent revision for ARMD between 2005 and 2010. The pre-operative factors, intra-operative findings, post-revision outcomes were evaluated to determine the poor prognostic indicators from the two groups (good and poor outcome) based on the post-revision pain relief, HHS and complications. Results: 54 patients completed minimum one year follow-up. In the good outcome group (40 patients): Four (10%) had large effusion and 3 (7.5%) had a breach in the capsule with loss of abductors and external rotators. Four (10%) had persistent pain and mean improvement in HHS was 33. In the poor outcome group (14 patients): 10 (71%) had a large effusion and 7 (50%) had a breach in the capsule along with loss of abductors and external rotators that resulted in dislocation. Six (43%) had persistent pain and the mean improvement in HHS was 24. The pre-revision cobalt was lower (4.8) in the poor outcome group. Discussion: The early results of revision for ARMD in the current series are encouraging. The presence of a large effusion and soft tissue damage involving the capsule, abductors and external rotators appear to be the poor prognostic indicators. Early onset of pain following revision is another indicator of poor outcome. High wear does not appear to lead to more complications.

Date: 2011-09-09

Session: Hip - Metal-on-Metal Bearing

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 30025

EARLY FAILURE OF THE 36MM MOM PINNACLE TOTAL HIP ARTHROPLASTY

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Background: We report on the early failure of the Pinnacle cup in combination with a Corail or S-ROM stem which is a 36mm MoM bearing THR system from Depuy. Methods: Following revision of 40 patients with adverse reaction to metal debris (ARMD) of 36mm MoM bearings we conducted a retrospective review of all patients implanted with the corail AMT Pinnacle Hip system at our centre from 2005. Patients were assessed using Harris Hip and UCLA activity scores. 120 patients had metal ion analysis. Ultrasound scans were performed in patients with unexplained pain or high metal ion results. Explants had full independent wear analysis using a coordinate measuring machine (CMM). Results: Three surgeons carried out a total of 640 Corail Pinnacle THRs. Blood Cr and Co results were generally low, with higher levels associated with cups with low inclination and low anteversion. Twenty-eight patients have been revised/listed for ARMD, an overall failure rate of 4.3% at mean 3.5yrs (range 1.8-5yrs). 19 hips were analysed with the CMM. 15 were found to have low bearing surface wear rates of <3mm³ /year. In each of these cases, significant damage was identified at the internal junction of the femoral heads. Median cup inclination/anteversion angles in the ARMD cases were 46° and 11°. X-rays showed a characteristic pattern of femoral loosening. Discussion: Mechanical failure at the head/stem interface appears to be a critical factor in the development of adverse reactions following MoM THR. Paradoxically taper failure is associated with low cup inclination and anteversion.

Date: 2011-09-09

Session: Hip - Metal-on-Metal Bearing

Time: 08:00 - 09:30

Room: Forum Hall

Abstract no.: 27886

METAL ION LEVELS IN METAL-ON-METAL TOTAL HIP ARTHROPLASTY WITH LARGE-DIAMETER HEAD

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Introduction: Metal-on-metal bearings for total hip arthroplasty (THA) have gained popularity. However, aseptic lymphocyte-dominated vasculitis-associated lesion and pseudotumor, which are thought to be due to metal ion toxicity or metal hypersensitivity, are causes for concern for patients with metal-on-metal bearings. We investigated serum levels of cobalt and chromium ions in patients with implanted metal-on-metal THA using large-diameter head. Materials and Methods: Seventy-four patients underwent primary metal-on-metal THA using large-diameter head (40, 44, 48 mm) with cementless Cormet cup and CTi II stem (Corin, Cirencester, UK). Serum samples were taken preoperatively, at 3 months, at 1 year, and at 2 years, and levels of cobalt and chromium were determined. Risk factors for the potential influence on metal levels were evaluated, including gender, age, body mass index, head diameter, cup inclination angle, and clinical score (Japanese Orthopaedic Association score). Results: Significant increase in both cobalt and chromium were observed at 3 months compared to the pre-operative values ($p < 0.01$). At 1 year, levels of both cobalt and chromium had increased significantly compared with levels at 3 months ($p < 0.01$). There were no significant differences between levels of either metal at 1 year and 2 years. Risk factors included male gender and high clinical score in cobalt levels at 3 months, however, no factors were found in chromium at each time-point. Conclusion: Patients with metal-on-metal THA with large-diameter head had higher circulating levels of metal ions at 3 months and 1 year, with no additional significant increases at 2 years.

Date: 2011-09-09
Session: Hip - Revision
Time: 10:00 - 11:30
Room: Forum Hall

Abstract no.: 28136

FEMORAL REVISION WITH IMPACTION GRAFTING WITH THE UNCEMENTED MRP-TITAN REVISION STEM: RESULTS OF A PROSPECTIVE CONTROLLED STUDY OF 243 PATIENTS

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Introduction: We present the results of a prospective controlled study of the uncemented modular revision prostheses MRP-TITAN with a distal diaphyseal anchorage with and without metaphyseal bone stock augmentation. Materials and Methods: In a prospective multicenter study 243 cementless stem revisions in matched patients using the MRP Titan Revision Stem with an average follow-up time of 4.38 ± 1.79 years (2.10–9.62 years) were examined. 70 patients (28.8%) received a metaphyseal bone augmentation, while 173 patients (71.2%) did not and served as controls. The clinical outcome was evaluated by the HHS. X-rays were performed focusing on stability, periprosthetic bone remodeling, defect regeneration and radiolucent lines. Results: No significant differences were seen concerning age, BMI, ASA Score, femoral bone defects (Paprosky I–III) and the HHS ($p > 0.05$). Postoperatively no significant differences concerning the HHS and the intra- and postoperative complication rate occurred ($p > 0.05$), plain radiographs showed increasing axial subsidence for controls (6.9% vs. 2.9%; $p = 0.16$). Secondary, a significant reduction of the proximal femoral bone atrophy due to femoral stress-shielding (5.71% vs. 17.9%); $p \leq 0.05$) could be detected after augmentation. Good integration of bone grafts with subsequent defect regeneration was seen in 65 (92.85%) patients after augmentation. For stem diameters ≥ 17 mm and femoral bone defects \geq Paprosky IIC better clinical and radiological findings were detected in patients with augmentation. The revision rate after augmentation was clearly reduced (2.86% vs. 6.36%). Conclusion: The encouraging results we found accentuate the need of metaphyseal bone defect augmentation for femoral bone defects larger than Paprosky IIC and stem diameters larger than 17mm. Subsequent better bone regeneration after metaphyseal bone augmentation indicates increasing physiological load transmission minimizing femoral stress-shielding as a requirement of a prolonged prostheses life.

Date: 2011-09-09
Session: Hip - Revision
Time: 10:00 - 11:30
Room: Forum Hall

Abstract no.: 28718

REVISION AND RE-OPERATION AT ONE YEAR IN AN RCT OF LARGE ARTICULATIONS IN TOTAL HIP REPLACEMENT

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There are potential risks of using large articulations in total hip replacement as well as benefits. The aim of this study was to compare incidence of revision and re-operation one year after primary or revision total hip replacement in patients randomised to receive either a 36 or 28mm articulation. Patients were excluded if they had a high risk of dislocation. Eligible patients were stratified according to a number of other factors which may influence dislocation risk. Patients were randomized intra-operatively to either a 28 or 36mm articulation. Incidence of revision and re-operation was determined prospectively by each collaborating centre. 644 hips in 644 patients undergoing primary or revision total hip replacement were entered into the randomised controlled trial. This trial has already shown that incidence of dislocation one year following total hip replacement with a 36mm articulation was 1.3%, compared to 5.2% with a 28 mm articulation. Within one year, 15 hips with a 28mm articulation underwent revision or re-operation, compared to seven hips with a 36mm articulation. Of these, seven hips with a 28mm articulation and one hip with a 36mm articulation were revised due to recurrent dislocation or instability. Revision for other reasons was required in two hips with 28mm articulations, compared to four hips with 36mm articulations, and re-operation was required in six hips with 28mm articulations and three hips with 36mm articulations. The majority of revisions or re-operations for reasons other than instability were for infection. This study showed that, compared to 28mm articulations, 36mm articulations in total hip replacement significantly reduced incidence of revision due to recurrent dislocation or instability, as well as reducing incidence of dislocation in the first year. Articulation size did not have any effect on incidence of revision or re-operation for reasons other than instability.

Date: 2011-09-09
Session: Hip - Revision
Time: 10:00 - 11:30
Room: Forum Hall

Abstract no.: 28386

PROXIMAL FEMORAL ALLOGRAFT-PROSTHESIS COMPOSITES WITH CEMENTLESS DISTAL INTERLOCKING STEM IN REVISION TOTAL HIP REPLACEMENT

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BACKGROUND: Repeat revision surgery can lead to extensive bone loss in the proximal femur. We report the clinical and radiological outcomes and complications of reconstruction using a cementless interlocking stem with an allograft-prosthesis composite (APC) in the presence of circumferential bone deficiency of the proximal femur (Gustilo classification type IV). **METHODS:** This study included 10 hips of 10 patients (3 men and 7 women; average age, 59.6 years). The minimum and average follow-up periods were 3 years and 5.4 years, respectively. Of the 10 revision total hip replacements, 1 was aseptic; 7, septic; and 2, periprosthetic fractures. Clinical results were graded using the Harris hip score at the final follow-up. Radiological outcomes were assessed for evidence of healing at the proximal allograft-host bone junction, trochanteric union, allograft resorption, and complication. **RESULTS:** The mean postoperative Harris hip score was 65 points at the final follow-up. The osseous union of the proximal allograft-host bone junction occurred in 9 hips (90%) (1 infection case was included). Under repeated revision surgeries, the greater trochanter did not unite in 4 hips and disappeared in 4 hips. Mild, moderate, and severe allograft resorption occurred in 3, 1, and 1 hip, respectively. Postoperative complications included 1 infection, 2 heterotopic ossifications, and 1 dislocation. One (10%) hip required repeat revision surgery for re-infection 1 month after surgery. **CONCLUSIONS:** Using a cementless interlocking stem with an APC for reconstruction can provide satisfactory results for repeat revision surgery in the presence of circumferential bone deficiency of the proximal femur.

Date: 2011-09-09
Session: Hip - Revision
Time: 10:00 - 11:30
Room: Forum Hall

Abstract no.: 29031

REVISION TOTAL HIP ARTHROPLASTY WITH SEVERE PROXIMAL BONE LOSS

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The purpose of this study was to review the experience with revision total hip arthroplasty in patients with severe proximal femoral bone loss using modular cementless tapered stem. The indications for revision were aseptic loosening in 16 hips and periprosthetic femoral fracture in 4 cases with severe periprosthetic osteolysis. Sixteen patients had a femoral revision for Paprosky type IIIB and four for type IV femoral defect. The mean age at the time of surgery was 71 years (range 55-83 years). There were 14 women and 6 men. The mean Harris Hip Score was 39.4 preoperatively and 92 postoperatively. In all cases we used modular cementless tapered stem ZMR (Zimmer, Warsaw, Indiana). An extended trochanteric osteotomy was performed in all cases. The acetabular component was revised in 18 cases. In all cases morselized cancellous bone grafts were used. In two cases additional strut bone grafting was performed. The average follow-up was 2.5 years. No patients had femoral re-revision for any reason. Postoperatively all patients were placed in abduction brace. The average subsidence was 2.5 mm. There was one case of deep venous thrombosis. According to our short-time follow-up we found that ZMR tapered cementless femoral stem allows successful revision using distal fixation and stable construction in patient with severe proximal femoral bone loss.

Date: 2011-09-09
Session: Hip - Revision
Time: 10:00 - 11:30
Room: Forum Hall

Abstract no.: 28454

ACETABULAR RE-REVISION OF FAILED REVISION TOTAL HIP ARTHROPLASTY

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The purpose of this study was to report the outcomes of acetabular re-revision of failed revision total hip arthroplasty. We performed at least two revisions of the failed acetabular component in 57 patients (57 hips) between August 1996 and April 2008. Of these, fifteen patients who had undergone multiple revisions because of infection were excluded, and one died before the two-year evaluation. Study cohort consisted of 41 patients (41 hips) with a mean age of 55.5 years (range, 37 to 82 years). Preoperative acetabular bone defects was classified as Paprosky Type-2A in four hips, Type-2B in six, Type-2C in nine, Type-3A in sixteen, and Type-3B in two. The mean duration of follow-up was 5.5 years (range, 2 to 12 years). Mean Harris hip score improved 45 points (range, 14 to 74 points) preoperatively to 85 points (range, 50 to 97 points). Four patients required additional revision procedure: two for deep infection, one for aseptic cup loosening, and one for recurrent dislocation. One patient had reactivation of latent tuberculosis with loosening of the acetabular cup but refused further surgery and is being managed on long-term suppressive anti-tuberculosis medication. Other complications included one periprosthetic fracture of the femur requiring stem revision and one dislocation that was managed with closed reduction and brace immobilization. Our findings indicate that repeat acetabular reconstruction with contemporary uncemented acetabular component or antiprotrusio cage is a reliable and straightforward method for the management of failed revision total hip arthroplasty with considerable acetabular bone defects.

Date: 2011-09-09
Session: Hip - Revision
Time: 10:00 - 11:30
Room: Forum Hall

Abstract no.: 29523

TWO-YEAR OUTCOME FOLLOWING THE USE OF TRABECULAR METAL SHELL IN THE TREATMENT OF SEVERE ACETABULAR BONE DEFICIENCY

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Reconstruction of an acetabulum following severe bone loss can be challenging. The aim of this study was to determine the outcome of acetabular reconstruction performed using trabecular metal shell for severe bone loss. Between June 2003 and June 2006 a total of 29 patients with significant acetabular bone stock deficiency underwent revisions using trabecular metal shell. According to Paprosky classification, there were 18 patients with grade IIIA and 11 patients with grade IIIB defects. Nineteen patients required augments to supplement the defects. Functional clinical outcomes were measured by WOMAC and Oxford hip. Detailed radiological assessments were also made. At most recent follow up (average 4.5 years, range 2.5-7.5) the mean Oxford hip score improved from 12 preoperatively to 27.11 postoperatively and WOMAC score from 17.57 preoperatively to 34.14 postoperatively. The osseointegration was 83% according to Moore's classification. There were two reoperations; one was for instability, and one for aseptic loosening. One patient has a chronic infection and one had a periprosthetic fracture, both treated conservatively. Despite challenges faced with severe preoperative acetabular defects the early results using this technique in Grade III A and B is encouraging.

Date: 2011-09-09
Session: Hip - Revision
Time: 10:00 - 11:30
Room: Forum Hall

Abstract no.: 28353

THE UNCEMENTED CANNULATED CANNULOK REVISION PROSTHESIS: DO WE KNOW ENOUGH ABOUT IT?

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Introduction: The Cannulok, a long stem uncemented distally locked cannulated hydroxyapatite coated femoral prosthesis offers many advantages for the management of periprosthetic femoral fractures, proximal femoral bony metastasis and revision of the loose femoral prosthesis. Minimal follow-up data exists for the Cannulok prosthesis since its introduction and this study aims to determine the early outcome of this prosthesis. **Methods:** We retrospectively identified 59 patients who had received a Cannulok prosthesis at one of two UK regional orthopaedic units between 2006 and 2010. We collected demographic, admission and mobility data from case notes and reviewed X-Rays to determine the time to union. Oxford Hip Scores were completed to determine individual patient reported outcome and satisfaction. **Results** 59 patients had a Cannulok femoral revision stem implanted between 2006 and 2010 with a mean age of 78.4 years and an average follow-up of 18 months. The mean operating time was 208 minutes with an average blood loss of 1300mls. Time to union was a mean of 5.4 months and there was a major complication rate of 22.7%. The mean Oxford Hip Score at follow-up was 43. **Discussion** An increasingly elderly population combined with growing primary hip arthroplasty rates and pharmaceutical prolongation of life despite bone metastatic malignancy will increase the requirement for this versatile femoral prosthesis. Our results suggest a satisfactory union time and overall patient satisfaction but we advise careful and precise implantation to reduce the risk of intra-operative femoral fracture and dislocation.

Date: 2011-09-09
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Room: Forum Hall

Abstract no.: 29505

REVISION TOTAL HIP REPLACEMENT USING FULLY COATED DISTALLY LOCKED LONG STEM

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Extensive loss of bone is a problematic issue in revision total hip replacement (T.H.R). Increasing primaries in young age will consequently increase the need for revisions during which poor bone stock due to resorption, osteolysis, infection and periprosthetic fractures add to the complexity of the procedure. 20 revisions were performed between 2006 & 2008 in AL-Helal hospital aiming to bypass the poor bone stock proximally whatever the reason using hydroxyapatite coated cementless stem fixed distally by using locking screws. The reason for revision was aseptic loosening in 9 cases, septic loosening in 3 cases and loosening secondary to periprosthetic fractures in 8 cases. Extended trochanteric osteotomy was performed in 16 cases for adequate removal of cement and the existing implant. Patients who had a previous infection of the involved hip were treated initially with resection arthroplasty and then with staged reimplantation. Harris hip score was determined for each case and the patients were followed up for 30 months and a successful result was defined according to Gross et al., as a postoperative increase in the Harris hip score of more than 20 points, accordingly at the follow up, 7 cases were excellent, 11 cases were good, and 2 poor cases. The reported complications were one dislocation and two infections. Conclusion: The use of modular cementless hydroxyapatite coated femoral stems with distal locking screws is a good biological option for revision of cases with poor proximal femoral bone stock. Keywords: revision hip, modular stem, distal locking.

Date: 2011-09-09
Session: Hip - Revision
Time: 10:00 - 11:30
Room: Forum Hall

Abstract no.: 28446

IS EXTENDED TROCHANTERIC OSTEOTOMY SAFE FOR USE IN 2-STAGE REVISION OF PERIPROSTHETIC HIP INFECTION?

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While an extended trochanteric osteotomy (ETO) has been well documented as an effective exposure technique in revision total hip arthroplasty, it is rarely described in the setting of periprosthetic joint infection. To evaluate the safety of using an ETO in 2-stage revision of periprosthetic hip infection, we performed a retrospective review of 23 patients using an ETO in revision of infected hip arthroplasty and compared them to 46 patients using an ETO in revision of non-infected hip arthroplasty. In the study group of 23 patients, mean Harris hip score improved from 36 points (range, 13-59 points) preoperatively to 82 points (range, 9-72 points) postoperatively. Infection was eradicated in 22 (96%) of 23 patients. The ETO healed in all patients (100%) at a mean of 10.6 weeks (range, 6-28 weeks). No stem revised for aseptic loosening. Complications included 2 periprosthetic fractures, 1 peroneal nerve palsy, and 1 dislocation. Postoperative Harris hip score, ETO union rate, time to healing of the ETO, stem stability, and complication rate did not differ between the two groups. Our data suggest that an ETO can be safely used in treating periprosthetic hip infection.

Date: 2011-09-09
Session: Hip - Revision
Time: 10:00 - 11:30
Room: Forum Hall

Abstract no.: 28516

INTRAOPERATIVE FEMORAL FRACTURES IN REVISION TOTAL HIP REPLACEMENT: WHOM CAN WE BLAME?

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Introduction: Loss of bone stock, stress shielding of the proximal femur and non-weight bearing are predisposing factors to intraoperative fractures Material and methods: In the last five years 172 revision total hip were performed in our unit. Thirty nine of these revisions were for infection and 133 for aseptic loosening, instability and peri-prosthetic fractures. Long cementless revision stems were implanted in 124 of these revisions while short cementless stems were used in 18 and cemented stems were implanted in 30 hips. Intraoperative fracture of the femur was reported in 6 hips. All fractures were fixed by locked plates plus circulage wires. Results: The incidence of intra-operative femoral fracture in this series is 3.4%. All fractures happened in patients who had more than one revision. Three of these hips received anatomic long cementless stems, while one had short cementless stem and two were cemented. The fractures were distal to the the stem in three hips, at level of the stem in two and involving the calcar in one. All fractures went to full bony union within 6 months. Conclusion: A 3.4% incidence of femoral fractures in this series is comparable to what had been published of 4% with anatomic and 15% with straight long cementless stems. The location of the fracture distal to the tip of the stem in four of the cases suggests that the design of the stem and/or instruments should not be blamed. Positioning of the leg and severe osteoporosis are likely to have contributed to these incidents.

Date: 2011-09-09
Session: Trauma - Shoulder
Time: 08:00 - 09:30
Room: Meeting Hall I

Abstract no.: 28837

ENDOSCOPIC STABILIZATION OF ACUTE ACROMIOCLAVICULAR JOINT DISLOCATION USING A SYNTHETIC LIGAMENT: RESULTS AFTER A MINIMUM OF 12 MONTHS

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Objectives: The treatment for acute acromioclavicular (AC) joint dislocation remains controversial because of the elevated level of complications and related morbidity. The objective of this study was to evaluate clinical outcomes, radiographic results, and the complications after arthroscopic stabilization of acute acromioclavicular dislocations. **Material and Methods:** Twenty patients (19 males and 1 female) found to have Rockwood stage III or IV AC joint dislocation were operated. All the patients were stabilized arthroscopically with placement of a synthetic ligament applied between the clavicle and the coracoid. The application of the synthetic ligament reduced the dislocation and stabilized the AC joint, allowing healing of the coracoacromial ligament. Results were assessed clinically (Constant score) and radiographically. **Results:** Despite the excellent clinical results at one year minimum follow-up both in terms of the Constant score (mean, 91 points; range, 60–100) and patient satisfaction, 3 patients required revision surgery while some had pain over the clavicular button. The x-rays showed three cases of partial loss of reduction due to distal migration of the flip button. **Discussion:** Arthroscopically assisted treatment of acute AC joint dislocation is advantageous because it provides good clinical results and few complications. The rate of recurrence and the postoperative loss of reduction require better definition of the indications and improvement of the surgical implants and technique.

Date: 2011-09-09
Session: Trauma - Shoulder
Time: 08:00 - 09:30
Room: Meeting Hall I

Abstract no.: 28852

VARIABILITY IN CLAVICLE FRACTURES DISPLACEMENT ACCORDING TO PATIENT POSITIONING DURING RADIOLOGIC EVALUATION

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Introduction: The purpose of this study is to evaluate the effect of patient positioning (standing or lying position) in the degree of displacement in clavicle fractures, when being studied with X-rays. **Materials and Methods:** An observational prospective study was performed. 54 patients admitted to the emergency room of our hospital with clavicle fracture were included from May 2009 to May 2010. Clavicle X-rays were taken in standing and lying position, comparing the different degree of horizontal and vertical displacement in the two projections. **Results:** Regarding vertical displacement, it was observed that in 46.29% of the cases (25 patients) the displacement went from less than 20mm in the lying position to more than 20mm in the standing position. Regarding horizontal displacement, it was observed that in 18.51% of the cases (10 patients) the displacement went from less than 20mm in the lying position to more than 20mm in the standing position. There was a total of 50% of the cases (27 patients) that had a displacement greater than 20mm when position changed from lying to standing, taking into account that there were 8 patients in which switching the position produced a displacement in both vertical and horizontal plane. **Conclusion:** The degree of displacement is one of the most important factors to consider when deciding the orthopedic or surgical treatment to perform in clavicle fractures, considering that, in general, displacements greater than 20mm have a surgical indication. In our study, 50% of the patients who had a displacement lesser than 20mm in the lying position, showed a displacement greater than 20mm when switched to the standing position, confirming our hypothesis that the degree of clavicle fracture displacements varies depending on the position in which X-rays are taken.

Date: 2011-09-09
Session: Trauma - Shoulder
Time: 08:00 - 09:30
Room: Meeting Hall I

Abstract no.: 28355

OPEN REDUCTION INTERNAL FIXATION OF MIDSHAFT CLAVICLE FRACTURES AUGMENTED WITH AUTOGENOUS BONE GRAFT VERSUS BIORESORBABLE CALCIUM PHOSPHATE: A COMPARATIVE STUDY

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University Hospital Louisville, Louisville (UNITED STATES)

Background: Recent studies have demonstrated that nonoperative treatment of displaced midshaft clavicle fractures have a high prevalence of symptomatic malunion and nonunion with nonoperative treatment. Although good results have been demonstrated with open reduction internal fixation (ORIF), complications still exist thus fixation was augmented. This retrospective study was undertaken to determine the efficacy of open reduction and internal fixation (ORIF) augmented with bioresorbable calcium phosphate (BCP) cement compared with standard autogenous bone grafting (ABG) of acute displaced, midshaft clavicle fractures. Methods: At our level I trauma institute, from July, 2007 to September, 2008 each patient who presented with a clavicle fracture that was deemed operative received plate fixation supplemented with bioresorbable calcium phosphate cement or autogenous bone grafting. Patient records and radiographs were retrospectively reviewed. Follow-up included standard radiographs to evaluate union at a minimum of 6 months. All complications were also reviewed. Results: Two different clavicle plating systems, Smith and Nephew (18 clavicles) and Implant Technology Systems (24 clavicles), were used with autogenous bone graft (14 patients) or bioabsorbable calcium phosphate (28 clavicles). Of forty patients treated with open reduction internal fixation, 6 complications have occurred at a minimum of 6 months follow-up. Three prominent hardware occurrences necessitated plate removal. One nonunion, one distal screw cut-out and one hardware breakage have been treated successfully with revision plating. No statistical significance was seen between the autogenous bone grafting and bioabsorbable calcium phosphate in regard to overall failure incidence ($p=0.66$). Complications necessitating revision ORIF with bioabsorbable calcium phosphate and bone graft were not statistically significant either ($p=0.73$). Conclusion: There appears to be no statistically significant difference between union and complication rates between bioresorbable calcium phosphate cement and autogenous bone graft in this retrospective study.

Date: 2011-09-09
Session: Trauma - Shoulder
Time: 08:00 - 09:30
Room: Meeting Hall I

Abstract no.: 28902

LOCKING PLATE OSTEOSYNTHESIS OF CLAVICLE NON-UNION

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The incidence of posttraumatic clavicle non-union range from 0 to 16,7%. Therapy of clavicle non-union very often is linked to increased high complication rates with challenging operative techniques. During the last 10 years plate osteosynthesis has been selected in nearly 80% of the studies. This correlates with the recommendations of the AO. The platingsystems predominately used are DC, LCDC, Wave (S shaped DC), Reko, Half or third pipe plates. In our literature search, there was no publicated studie or casereports of clavicle non-union treatment with a locking, multidimensional anatomical plating system. The purpose of this consecutive, retrospective study was to proof secure treatment option of the of clavicle non-union with a special locking plate, with a free range of motion physiotherapie program. 10 patients, operated for clavicle non-union from January, 2006 to November, 2009 were included in the study. One patient demonstrated a pathological clavicle non-union, caused by a Plasmozytoms of the Kappa light chain type. The remaining nine patients had a traumati clavicle non union. Eight were found in the midshaft, one in the lateral area. The Operationtime was in median 92.5 minutes (rank 71-179). The hospitaly amounted in median 6.5 days (rank 4-22). There were no wound healing disturbances. We had one plate breakage, requiring a reoperation. The plate break belongs to insufficient bone transplation from our allogen bone stock. The successful Reoperation, using a tricortical pelvic bone transplant, was followed by a postoperative course without complication and free range of motion in the rehabilitation program. The functional outcome was performedusing standard investigation protocols of the shoulder, including Constant Score, DASH score, a visual Analgoscale and a patient's questionnaire. In conclusion, treatment of clavicle non-union with a mutlidimnesional locking plate is a reliable therapy with low complication rates.

Date: 2011-09-09
Session: Trauma - Shoulder
Time: 08:00 - 09:30
Room: Meeting Hall I

Abstract no.: 29923

ACROMIOCLAVICULAR JOINT REDUCTION AND RECONSTRUCTION USING SUTURE ANCHOR AND ENDOBUTTON: A MODIFIED SURGICAL TECHNIQUE

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Introduction: Acromioclavicular joint dislocation is an increasingly common injury requiring surgical intervention. We describe a method for surgical management of acromioclavicular dislocations using suture anchor and endobutton. Material and methods: The study was conducted over the last 2 years. 15 patients were included (11 males), average age being 38 years. Mean period of follow-up was 11 months (range 6-22 months). All patients had AC joint disruption of grade III or above. (Rockwood et al) Technique: It involves insertion of suture anchor into coracoid process; 2 holes, one anteriorly and one posteriorly are drilled into superior surface of clavicle and a fibre wire/ ethibond suture is passed through them, over an endobutton. After reducing ac jt. the suture is tied to the suture anchor. This is checked on image intensifier. The ligaments are then repaired meticulously as in weaver-dunn method. Results: All our patients regained full range of motion postoperatively and were able to function at their pre injury level. Radiographs at 3 months post op showed maintenance of AC joint reduction. ASES score improved from 32 (mean pre-op) to 82 (mean post-op). Conclusions: This is a simple and effective method of fixation. It is strong enough to allow rapid return to normal function. It avoids complications related to wire/screw migration and hardware failure. The suture anchor in coracoid allows for an anatomical line of pull on clavicle and natural healing of remnant coracoclavicular ligament. No arthroscope is required. It favors comparably with other published studies using similar methods of fixation.

Date: 2011-09-09
Session: Trauma - Shoulder
Time: 08:00 - 09:30
Room: Meeting Hall I

Abstract no.: 29700

PLATING FOR FRACTURE CLAVICLE: IS IT ESSENTIAL TO PRESERVE THE SUPRACLAVICULAR NERVES?

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Fractures of clavicle are common injuries in adults, accounting for 5% of all fractures and 44% of all shoulder fractures. Traditionally these fractures have been managed conservatively. Review of literature reveals that certain fracture can benefit from operative treatment. Displaced fractures have an increased risk of mal-union or non-union. In simple displaced fractures intramedullary fixation can give good results, but fails to provide optimal preservation of length and rotation in comminuted fractures. Plate osteosynthesis can be used for all types of clavicular fractures. We report our experience in managing 22 cases of mid-clavicular fractures by plating. According to Robinson's classification there were 9 B1 type and 13 B2 type fractures. The interval from injury to operation varied from 4 to 20 (average 14) days. Injury was caused by road traffic accidents in 8 cases, slip and fall in 12 cases and assault in 2 cases. We used AO (Synthes) anterior superior clavicular plates and LC-DCP. Incision was made along the inferior border of clavicle. In half the cases (n=11) the supraclavicular nerves were sacrificed. In remaining cases (n=11) the nerves were preserved by meticulous dissection. All the cases in whom the nerves were sacrificed complained of loss of sensations, paraesthesia, or numbness in the infrascapular area upto the nipple. Two cases had painful neuroma formation. Other group with preserved nerves had no such problems. It is concluded that it is worth spending little more time during operation and preserve the supraclavicular nerves during plating for clavicular fractures.

Date: 2011-09-09
Session: Trauma - Shoulder
Time: 08:00 - 09:30
Room: Meeting Hall I

Abstract no.: 27392

DISPLACED PROXIMAL HUMERAL FRACTURES: AN INDIAN EXPERIENCE WITH LOCKING PLATE

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Purpose: The treatment of displaced proximal humerus fractures, especially in elderly, remains controversial. The objective of this study was to evaluate functional outcome of locking plate used for fixation of these fractures after open reduction. We also attempted to evaluate the complications and predictors of loss of fixation for such an implant. **Methods:** Over two and a half years, 56 patients with an acute proximal humerus fracture were managed with locking plate osteosynthesis. 47 of these patients who completed a minimum follow up of 1 year were evaluated using Constant score calculation. **Results:** The average follow up period was around 21.5 months. Outcomes were excellent in 17%, good in 38.5%, moderate in 34 % while poor in 10.5%. The Constant score was poorer for AO-OTA type 3 fractures as compared to other types. The scores were also inferior for older patients (> 65 years old). Complications included screw perforation of head, AVN, subacromial impingement, loss of fixation, axillary nerve palsy and infection. A varus malalignment was found to be a strong predictor of loss of fixation. **Conclusion:** Locking plate osteosynthesis leads to satisfactory functional outcomes in all the patients. Results are better than non locking plates in osteoporotic fractures of the elderly. However the surgery has steep learning curve and various complications could be associated with its use. Nevertheless we believe that a strict adherence to the principles of locking plate use can ensure good result in such challenging fractures.

Date: 2011-09-09

Session: ESSSE/SICOT - Shoulder IV

Time: 10:00 - 11:30

Room: Meeting Hall I

Abstract no.: 30002

EPIDEMIOLOGY OF ADULT HUMERUS FRACTURES (1998-2009)

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This study aims at describing the epidemiology of humerus fractures between 1998 and 2009. Demographics of all the patients aged 16 and above with fractures reviewed between 1998 and 2009 were retrieved from database with the help of codes used by the information technology (IT) department. Database was then divided into males and females and further divided according to the number of fractures seen every year. Regional key population and vital statistics were obtained from the database of the Office for National Statistics. Fracture incidence was calculated per 10,000 populations for both sexes. Patients were then grouped according to age into various groups. Regression analysis was performed and correlations were established with age of the patient and year of incidence as independent predictors for fracture incidence. A total of 1766 fractures were seen with 819 males and 947 females. A steady increase in fracture incidence was seen females from 16 years onwards [regression coefficient (RC)=1.25]. A strong correlation was seen between incidence and age ($r= 0.785$). In males, a decrease in the incidence was seen until the age of 64 (RC=-0.285), after which the incidence increased (RC=1.11). A strong correlation was seen between total fracture incidence in adults and the years of incidence in both males and females. For females, the correlation coefficient and regression coefficient were 0.761 and 0.131 respectively ($p=0.004$). For males, the correlation coefficient and regression coefficient were 0.718 and 0.071 respectively ($p=0.009$).

Date: 2011-09-09

Session: ESSSE/SICOT - Shoulder IV

Time: 10:00 - 11:30

Room: Meeting Hall I

Abstract no.: 29666

MANAGEMENT OF FOUR-PART FRACTURE-DISLOCATION OF SHOULDER

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Content: We report 18 cases of four part fracture dislocation of shoulder treated over a period of last 9 years. 1 pt was conserved & 4 referred for hemiarthroplasty were not included in study 13 patients underwent operation (ORIF) within 2 to 7 days from injury. 5 patients were male and 8 were female. Age group varies from 35 to 70 years with an average of 50 years. 4 patients were laborers, 7 house wives and 2 were doing sedentary jobs. 10 patients had a fall, 2 patients had RTA & 1 patient had epilepsy. 10 patients had anterior and 3 patients had posterior dislocation of the head of the humerus. Open anatomical reduction and fixation of 4 parts using Tension Band Wiring technique was done. Two cancellous screws were used to fix greater and lesser tuberosity to the head of the humerus after its closed reduction and wire was used to fix proximal shaft of humerus with screws. After completion of rehabilitation program, fracture union was achieved in 12 patients, 3 patients had excellent, 5 had good, 4 had fair and remaining 1 had poor result. Results were evaluated by using constant score at the time of recent follow up (minimum 3 months to maximum 8 years of follow up). Complications such as superficial infection in 1, redislocation in 3, 1 nonunion and AVN changes in 4 patients were observed. ORIF using TBW technique gives good functional results inspite of many complications seen in this series. However, in selected patients, hemiarthroplasty is another option.

Date: 2011-09-09

Session: ESSSE/SICOT - Shoulder IV

Time: 10:00 - 11:30

Room: Meeting Hall I

Abstract no.: 29839

FUNCTIONAL OUTCOME OF HUMERAL SHAFT FRACTURES WITH ANTEGRADE HUMERAL LOCKING INTRAMEDULLARY NAIL

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Humeral shaft fractures are relatively common injuries and compression plating has been the gold standard operative treatment. Previous studies on intramedullary nailing have shown mixed results. 152 patients among all called came for follow up. In 124 (81.58%) patients closed interlocking nail was done and open reduction was done in 28 (18.42%) patients. 15 (9.87%) patients had sustained multiple trauma and 12 (7.89%) fractures were open. Delayed union or non union was found in 16 (10.53%) patients and autogenous iliac crest bone graft was done. The mean follow up period was 25 months. The outcomes were evaluated using constant shoulder score and Short Form 36 score. In 129 (84.87%) patients primary union was observed. The average time for union was 14.8 weeks. All patients of delayed union and non union had fracture union. In 11 (7.24%) patients revision surgery was done. 135 (88.82%) patients had constant shoulder score as excellent or good. Physical component score more than 45 on Short form-36 scale was seen in 132 (86.84%) patients. Complications included impingement due to prominent nail in 9 patients, radial nerve involvement post operatively in 3 patients, irritation due to prominent interlocking bolts in 11 patients and stiff shoulder in 12 patients. Antegrade Humeral Locking intramedullary nailing is a reliable and effective method with excellent results and good shoulder function in most cases. It can be recommended as a primary treatment where conservative treatment is not possible or if it fails.

Date: 2011-09-09

Session: ESSSE/SICOT - Shoulder IV

Time: 10:00 - 11:30

Room: Meeting Hall I

Abstract no.: 29674

ANGULAR STABILITY PLATE FOR TREATMENT OF THE FRACTURES OF PROXIMAL HUMERUS IN OLD PATIENTS

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Purpose: The aim of this study is to valuate the clinical and radiologic result of angular stability plate osteosynthesis of proximal humeral fractures in old patients. **Material and methods:** From 1998 to 2009 197 patients were treated for proximal humeral fractures. Of those 50 patients, with 3 and 4 part humeral fractures were treated with angular stability plate with a minimun follow up of 24 months. To all patients were made an X-ray valuation in A-P view, Axillar view and Outlet view; we evaluated the clinical and functional outcome in term of ROM and with the costant score. **Results:** In all cases the fractures were consolidated. The ROM post-operatively, compared with the controlateral arm, has shown a deficit of 10° in flexion, 15° in abduction, 15° in external rotation and II vertebral level in intrarotation. The mean Costant score was 77%. We obtain a Costant score of 83,5% in the patients under 50 years. The complications include 4 ANV, 1 mechanical failure and 1 head perforation. **Conclusion:** The analysis of the results evidenced that, after a good and correct reduction, angular stability plate osteosyntesis provides good mechanical stability and allows a rapid mobilization without compromising fracture healing. We have observed most complications in fractures with varus angulation of the humeral head.

Date: 2011-09-09

Session: ESSSE/SICOT - Shoulder IV

Time: 10:00 - 11:30

Room: Meeting Hall I

Abstract no.: 30088

COMPLEX HUMERAL FRACTURES: SHOULD WE FIX THESE?

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Introduction: Fractures of the proximal humerus account for approximately 4-5% of those in orthopaedic outpatients. These fractures have a uni-modal distribution and are mainly of an osteoporotic nature. Management of these proximal/middle third humeral fractures is controversial. Around 85% of fractures are either undisplaced or minimally displaced and respond well to conservative treatment. There remains no real consensus in the literature with regards to optimum treatment. Materials and Methods: We retrospectively collated data for humeral fractures over the past 4 years at the Worcester Royal Hospital. The data was divided into conservative, conservative management followed by fixation and immediate fixation. 33 patients were identified. Each patient was then telephone interviewed to assess function and effect on occupation using the Quick-Dash questionnaire and work score. 8 patients were lost to follow up and one was deceased. Results: The average work time lost was greatest for those who were conservatively managed and then underwent ORIF at a later stage. The quick dash work score demonstrated that the ORIF group had the highest scores and the lowest scores were obtained by the conservatively managed group. The patients least likely to return to work were also those who underwent conservative and then surgical management. Conclusion: Our data has shown good outcomes for both conservative and operative management of humeral fractures. The group of patients with the worst outcomes are those that were initially managed conservatively and then proceeded to have operative treatment. Subsequently decisions to operate must be considered early.

Date: 2011-09-09

Session: ESSSE/SICOT - Shoulder IV

Time: 10:00 - 11:30

Room: Meeting Hall I

Abstract no.: 30119

OUTCOME OF PROXIMAL HUMERUS FRACTURE FIXATION WITH LOCKING PLATES

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Aim - Analyze the outcome following ORIF for proximal humeral fractures. To compare it with published literature
Methods - 20 consecutive patients who underwent open reduction internal fixation for proximal humerus fracture with locking plate by a single surgeon. - Outcome was assessed using Oxford score and Constant score. We also recorded the complications rate, reoperation rate and analysed those with poor outcome.
Results - 20 consecutive patients with mean age of 61 were included. 6 were displaced two part fractures, 8 were three part and 6 were four part fractures. Mean period of follow up was 7 months. The mean Oxford score was 23. Mean Constant score was 73. Outcome was excellent in 20%, good in 45%, moderate in 15% and poor in 20%. Overall outcome was satisfactory in 80%. Outcome was better in two or three part fractures as compared to four part fractures. Outcome was better in patients less than 60 yrs of age as compared to those >60. Implant failure was noted in 3 cases. Reoperation was required in 3 cases. The results were comparable with other published literature.
Conclusion - Open reduction and internal fixation of proximal humerus fractures with locking plates achieve consistently good results. Careful selection of patients for surgery can minimise poor outcome.

Date: 2011-09-09

Session: ESSSE/SICOT - Shoulder IV

Time: 10:00 - 11:30

Room: Meeting Hall I

Abstract no.: 28126

COMPARATIVE STUDY OF PROPOSED MUKHERJEE'S SHOULDER SCORE FOR EFFECTIVE EVALUATION OF SHOULDER HEMIARTHROPLASTY IN INDIAN SCENARIO

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Background: There are a number of established scoring systems like the Neer's, UCLA and the Constant & Murley for the purpose of evaluation of shoulder hemiarthroplasty but none are practically suitable for the evaluation in the Indian scenario. So we tried to evolve a new scoring system based on the ADL's and the work considerations of the Indian patients for the proper evaluation of such cases. Methods: Neer 's scoring system, UCLA and the Constant & Murley scoring systems were included for comparative analysis of the Mukherjee's scoring system while the self administered scoring systems were excluded from the study(e.g. SPADI, ASES, DASH etc.). The results of Mukherjee's shoulder hemiarthroplasty performed on 51 patients between August 2001 and July 2008 were evaluated with the proposed Mukherjee's scoring system and the other scoring systems. Results: The majority of the patients obtained satisfactory results with the Neer score being 81.38, UCLA being 29.69 and finally the Constant & Murley score being. The result with the proposed Mukherjee's shoulder scoring system was 75.51. Discussion: The variable scores obtained above with the different standard scoring systems were due to (i) disproportionate scoring (ii) variable non-identical parameters being compared together (iii) non – accountability of specific ADL's related to the Indian customs. So the Mukherjee's scoring system was proposed taking into account the ADL's, social customs and the work considerations of the Indian patients. It is also highly suitable for evaluation of trauma and shoulder pathologies besides Shoulder Hemiarthroplasty.

Date: 2011-09-09

Session: ESSSE/SICOT - Shoulder IV

Time: 10:00 - 11:30

Room: Meeting Hall I

Abstract no.: 28388

PLATING VERSUS INTRAMEDULLARY PIN OR CONSERVATIVE TREATMENT FOR MID-SHAFT CLAVICLE FRACTURE: A META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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Background: Clavicle fractures account for 2-2.6% of all fractures. Plating has been considered the gold standard for treating mid-shaft fracture of the clavicle. Intramedullary pinning and conservative treatments have also been commonly used. Methods: To evaluate the effect of plating versus intramedullary pinning or conservative treatment for mid-shaft clavicle fracture, the Cochrane Central Register of Controlled Trials (CENTRAL) (Wiley Online Library, October 2010), PubMed (1950 to October 2010) and EMBASE (1980 to October 2010) were searched. Randomized and quasi-randomized controlled clinical studies evaluating plating versus intramedullary pinning or plating versus conservative treatment for mid-shaft clavicle fracture in adults were collected. After independent study selection by two authors, data were collected and extracted independently. The methodological quality of the studies was assessed. Pooling of data was undertaken when appropriate. Results: Four studies, involving 305 clavicle fractures, were included. There were no significant differences between plating and intramedullary pinning with regard to outcome for Constant shoulder score, Oxford shoulder score, non-union, infection, fixation failure, and hardware removal. There were more symptomatic hardware events with plating compared to intramedullary pinning. Reduced nonunion, malunion, and neurological symptoms, as well as more satisfaction with ultimate appearance, were associated with plating as compared to conservative treatment. Conclusion: The available evidence suggests that there is no difference in treatment effects between plating and intramedullary pinning, but the use of plating is associated with more side effects. Plating is associated with improved treatment effects when compared to conservative treatment.

Date: 2011-09-09
Session: Knee - Soft Tissue
Time: 08:00 - 09:30
Room: Meeting Hall IV

Abstract no.: 28156

IMPLANT POSITION AND KNEE ALIGNMENT AFTER PATIENT-SPECIFIC UNICOMPARTMENTAL KNEE ARTHROPLASTY

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Introduction: Implant positioning and knee alignment are two primary goals of successful unicompartmental knee arthroplasty (UCA). The aim of this study was to evaluate the precision of implant positioning and accuracy of leg alignment using novel CT-based, patient-specific instruments and fixed bearing implants in UCA. We hypothesized that the patient-specific UCA solution would result in a precise component orientation and leg axis restoration. Patients and methods: This prospective study outlines the radiographic results following 32 patient-specific unicompartmental medial resurfacing knee arthroplasties. By means of standardized pre- and postoperative radiographs of the knee in strictly AP and lateral view, AP weight bearing long leg images as well as preoperative CT-based planning drawings an analysis of implant positioning and leg axis correction was performed. Results: The mean preoperative coronal femoro-tibial angle was corrected from 7° to 1° (p<0.001). The preoperative medial proximal tibial angle of 87° was corrected to 89° (p<0.001). The preoperative tibial slope of 5° could be maintained. The extent of the dorsal femoral cut was equivalent to the desired mean value of 5 mm given by the CT-based planning guide. The mean accuracy of the tibial component fit was 0 mm in antero-posterior and +1 mm in medio-lateral projection. Conclusion: Patient-specific fixed bearing UCA can restore leg axis reliably, obtain a medial proximal tibial angle of 90°, avoid an implant mal-positioning and ensure maximal tibial coverage.

Date: 2011-09-09
Session: Knee - Soft Tissue
Time: 08:00 - 09:30
Room: Meeting Hall IV

Abstract no.: 28298

PERIPROSTHETIC TIBIAL FRACTURES USING THE MINIMAL INVASIVE MEDIAL UNICOMPARTMENTAL KNEE ARTHROPLASTY “OXFORD UNI”

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Analysis of periprosthetic tibial fractures after performing unicompartmental knee arthroplasty (UKA) on fresh frozen tibia. Showing excellent clinical and functional results unicompartmental knee arthroplasties gain more and more importance in the supply of knee joints. Periprosthetic tibial fractures are rare but serious complications. Usually they appear perioperatively and are caused by an error during implantation, especially by sawing defects. In a randomized study unicompartmental knee arthroplasty (UKA) was performed on 10 paired fresh frozen tibiae with and without placing sawing defects of 10° during tibial preparation. The specimens were fractured under controlled conditions with a standardized testing machine. Maximum fracture loads and load capacities were analysed subject to sawing defects. Twenty fresh frozen tibiae (10 corresponding pairs; donor data: f/m = 6/6, age = 75.7 years (47-92 years) and a weight of 65.7kg (32.7 – 136.1kg)) were analyzed with DEXA bone density measurement (BMD). UKA was performed using a tibial sawing jig for standardized positioning of the sawing defect (10°). Customized tibial implants with sizes B to F were implanted. The distal parts of the tibiae were cut off 20 cm distally of the tibial component. Specimens were fixed in a metal base fixture frame using polyurethane and maximum fracture loads of up to 10.000N were applied to the specimens using a standardized machine. Group comparisons were done with the Wilcoxon-Test using SPSS. Maximum fracture loads in the group with 10° sawing defect were statistically significant lower than for the group without sawing defects. Mean fracture loads of 4,473N in comparison to 7,327N in the group without sawing defects could be seen. Unexperienced surgeons seem to place vertical sawing defects while preparing the tibial plateau during UKA. These sawing defects most highly lead to periprosthetic tibial fractures.

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Abstract no.: 28480

TEN-YEAR SURVIVAL AFTER UNICOMPARTMENTAL KNEE ARTHROPLASTY

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Introduction: The following prospective study describes the clinical outcome and the 10 years survival rates in a series of 242 cemented and uncemented medial Unicompartmental Knee Arthroplasty cases performed in 236 patients for medial osteoarthritis. Material and Methods: Details from patients with unicompartmental knee arthroplasty were recorded and updated on an annually base from 1991 up to the present. Patients were assessed by an independent clinical observer using the Knee Society Rating System as a validated outcome measure. Kaplan-Meier analysis was used to calculate the 10 year survival rates using the endpoint of revision for any cause. Results: The mean elapsed time since the day of surgery was 10.4 years (maximum 18.7 years). There were no failures due to progression of lateral osteoarthritis, aseptic loosening of the femur component or due to polyethylene wear. There had been thirteen surgeries for revision because of failures for any reason and 41 patients had been withdrawn because they had died, giving an all over cumulative survival rate at ten years (knees at risk = 201) of 94.07 %. The Knee Society Rating System (KSRS) showed a significant improvement. The knee (function) score showed an increase from pre 33.5 (54.7) to post operative 94 (83.6) Points. The Range of Motion gained in average from 106.8 to 122.3 degrees. We could not detect a significant difference in the ten year survival rate of patients with a BMI <30 (95.59 %), BMI from 30 to 36 (92.39 %) and a BMI >36 (100 %). Summary: Given strict indication criteria's and appropriate surgical expertise, UKA has a high survival rate comparable to TKA and shows a significant improvement in knee and function scores. The results indicate that there is no relationship between BMI and 10 year survival rate in this cohort.

Date: 2011-09-09
Session: Knee - Soft Tissue
Time: 08:00 - 09:30
Room: Meeting Hall IV

Abstract no.: 29375

BONE LOSS DURING REVISION UNICOMPARTMENTAL AND TOTAL KNEE REPLACEMENT: AN ANALYSIS OF THE NATIONAL JOINT REGISTRY DATA

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Purpose: To identify if revision of primary UKR to TKR involves greater bone loss, requiring larger poly thickness; and whether it is more complex, requiring increased use of stabilised implants, than primary TKR. Bone loss during revision knee replacement surgery presents a challenge to the surgeon. It is of multi-factorial origin, resulting from the original degenerative process, associated with bone cuts at the time of primary replacement, the pathological process of loosening associated with the need for revision, explantation of primary prostheses and further bone cuts to seat revision implants. We analysed National Joint Registry data for 273146 primary TKR, 13943 revision TKR and 512 revision UKR to TKR procedures over 2003-2009. Using the thickness of the polyethylene bearing as a surrogate for bone loss reveals a mean poly thickness of 10.43mm for primary TKR, 11.31mm for complex primary TKR, 14.86mm for revision TKR and 12.79mm for revision of UKR-to-TKR. Constrained knee replacements were used in 4.9% of UKR-to-TKR revision in comparison to 2.15% of primary TKR. Revision of a primary UK to a TKR is not as simple as a primary TKR. It results in thicker polyethylene bearings, which may represent greater bone loss when compared to a primary or complex primary TKR, but less than that seen with revision TKR. This can lead to the use of more stabilised implants. This data used in conjunction with longevity data can help the orthopaedic surgeon counsel patients regarding the most appropriate primary procedure.

Date: 2011-09-09
Session: Knee - Soft Tissue
Time: 08:00 - 09:30
Room: Meeting Hall IV

Abstract no.: 29008

TREATMENT OF MEDIAL KNEE OA: AN ALTERNATIVE TO ARTHROPLASTY FOR YOUNGER ACTIVE PATIENTS

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Statement of Purpose: Knee OA patients who have exhausted conservative treatments, but are not ideal candidates for arthroplasty (due to age, activity level, or disinclination), face a lack of therapeutic options. We investigate an extra-capsular implant (KineSpring® System, Moximed, USA) designed to relieve pain by reducing the load acting on the knee. The potential reversibility of the procedure combined with the preservation of normal knee anatomy and flexibility makes the device an attractive option for these patients. Methods and Results: The device was implanted in 67 young and active members of the working population (mean: 52, 31–68 years). Early surgical experience and adverse events were recorded, and clinical outcomes were collected using validated patient reported outcomes tools at regular intervals. Subcutaneous, extra-capsular implantation was successful, with a mean surgical time of 73 minutes. After a mean hospital stay of 1.4 days (range 1-3), patients resumed full weight bearing within 1-2 weeks and achieved normal range of motion by 6 weeks. Mean WOMAC pain (0-100 scale) improved from 43.2 to 18.6 ($p < 0.001$); mean WOMAC function (0-100 scale) improved from 42.9 to 16.3 ($p < 0.001$) at last follow-up (11.8 ± 7.2 months). This trend continues for patients two years after surgery and beyond. Conclusions: The load absorber demonstrated clinically meaningful and statistically significant pain relief and functional improvement in an active, working-age patient population. The anatomy-sparing procedure and extra-capsular device provide clinical value for patients with medial knee OA and should be considered as an alternative to arthroplasty in this challenging patient group.

Date: 2011-09-09
Session: Knee - Soft Tissue
Time: 08:00 - 09:30
Room: Meeting Hall IV

Abstract no.: 29292

DIAGNOSIS AND MANAGEMENT OF PROXIMAL TIBIAL STRESS FRACTURES IN PATIENTS UNDERGOING TKR

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Sixteen patients (all females) with long standing osteoarthritis of the knee presented with an acute increase in the intensity of pain with inability to walk over a short duration. All patients had distinct point tenderness in the upper tibial shaft. X rays revealed a stress fracture in the proximal tibia in 7 patients. The other 9 patients were subjected to radio-nucleide whole body bone scan which revealed a unicortical or bicortical stress fracture in the tibia. All patients underwent TKR with an uncemented tibial stem crossing the site of the stress fracture. Additional plate fixation was required in 3 patients who had rotational instability. Results: The pain of the stress fracture disappeared in the immediate post operative period and all patients were able to walk with support on the second post operative day. recovery of knee function was satisfactory and all the stress fractures healed in 3 months. Conclusions: Occult or overt stress fracture is a common complication in long standing OA knees in osteoporotic patients particularly in post menopausal women. A sudden increase in pain with specific point tenderness on the tibia should raise suspicions of a stress fracture even in the presence of a normal X ray. These fractures can be well delineated by a bone scan. Stabilization with a stem across the fracture during TKR results in rapid control of pain, allows early weight bearing, leads to union and prevents progression to an overt fracture.

Date: 2011-09-09
Session: Knee - Soft Tissue
Time: 08:00 - 09:30
Room: Meeting Hall IV

Abstract no.: 29295

MANAGEMENT OF MAJOR BONE DEFICIENCY OF THE MEDIAL TIBIAL CONDYLE IN PATIENTS WITH SEVERE VARUS DEFORMITY UNDERGOING TKR

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A total of 23 knees in 17 patients (11 females and 6 males) with osteoarthritis and varus deformity greater than 45 degrees were treated with TKA and followed up for a mean duration of 2.4 years. All patients had large bony deficiency of the medial tibial condyle. The operative procedure involved extended medial soft tissue release. The size of the defect was minimized by taking a 10 mm tibial cut, lateralizing and downsizing of the tibial tray. The residual defect was treated as follows: Less than 5 mm - cementoplasty 5mm to 10mm - Autogenic bone graft fixed with screws More than 10 mm - Bone graft with tibial stem The implant used was cemented PFC Sigma PS design in 17 and TC3 implant in 6 cases. Results: All patients had satisfactory correction of deformity and were able to weight bear with support from the second post operative day. The mean range of motion gained at the end of 3 months was 118 degrees. All grafts incorporated well and there was no loosening of the cement mantle. Conclusion: Minimizing the tibial bone defect by appropriate cuts and lateralization and downsizing of the tibial tray followed by cementoplasty or bone grafting gives gratifying results in long standing osteoarthritic knees with severe medial condylar tibial bone defects and is significantly less expensive than metallic wedges and augments.

Date: 2011-09-09
Session: Knee - Soft Tissue
Time: 08:00 - 09:30
Room: Meeting Hall IV

Abstract no.: 29167

CORRECTING VARUS DEFORMITY WITH FLEXION CONTRACTURE DURING TOTAL KNEE ARTHROPLASTY: THE “INSIDE-OUT” TECHNIQUE

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Introduction: Traditional method of correcting a fixed flexion/varus deformity was described in 1979, which required detachment of the posteromedial capsule from the tibia and semimembranosus tendon, partial or complete. The tight superficial medial collateral ligament (SMCL) was released subperiosteally. To address the risks of over release, hematoma formation and elevation of joint line, the Inside-Out technique was evolved. Our hypothesis is that this technique effectively corrects varus and flexion contracture while reducing these complications. Material and Methods: This method requires femoral and tibial resection at 90 degree of the mechanical axis, and creation of a balanced rectangular extension gap. This is achieved by transverse capsulotomy of the posteromedial capsule at the level of the tibial resection in full extension. The semimembranosus insertion is not released. The tight SMCL is pie-crusting and with serial manipulations a balanced extension gap is achieved. The flexion balance gap is achieved by the “parallel to tibial cut technique” of posterior condyles. Forty-five patients with severe biplanar deformity, with varus > 15 degrees and flexion contracture > 10 degrees underwent TKR with Inside-Out technique. The mean age was 73.3 years. Results were assessed according to WOMAC and Knee Society Scores. Results: The mean Knee Society Score and WOMAC were 95 and 29 respectively. The mean coronal plane alignment was 5.5 degrees. There were no cases of instability or residual flexion contracture. DISCUSSION: The Inside-Out technique is very effective in correcting biplanar deformity without over or under release, hematoma or elevation of joint line.

Date: 2011-09-09
Session: Knee - Soft Tissue
Time: 08:00 - 09:30
Room: Meeting Hall IV

Abstract no.: 29596

PATIENT SPECIFIC INSTRUMENTATION – WHEN TO TRUST AND WHEN DO YOU DITCH THEM?

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Patient specific instrument for knee arthroplasty use the data obtained from the CT or MRI scan and Xrays to design patient matched jigs. The manufacturers claim that these will help to improve the postoperative alignment in a fashion similar to computer navigation. These will also have additional advantage in terms of decrease OR time and inventory. Given the early enthusiasm for the product it is essential to understand the situations in which these can be blindly adapted and also where there use can potentially jeopardise the results. The talk is going to give different scenarios in which it may be necessary to ditch them in favour of conventional methods and also why and how they can potentially replace computer navigation in simple uncomplicated knee replacements. The talk is a case series level IV evidence and will contain examples like extra articular deformity, racial variations, Tibial Tubercle position and its effect on calculations, effect of different proprietary software on outcomes and end results with different rapid prototyping and manufacturing machines.

Date: 2011-09-09

Session: Knee - Infection & Revision

Time: 10:00 - 11:30

Room: Meeting Hall IV

Abstract no.: 29112

REVISION IN KNEE ARTHROPLASTY WITH BONE LOSS USING ROTATING HINGED PROSTHESIS. MID TERM RESULTS

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Aim: Presentation of the results of rotating - hinge prosthesis use in knee revision surgery.
Material – Methods: Between 2002 and 2010, fourteen patients (12 women, 4 men) underwent 16 primary revisions. Nine patients had two-stage procedure due to infection. Five patients had one-stage procedure due to aseptic loosening of the prosthesis. The mean age was 67 years old (range 48 to 72 years old). Endo–Model rotational knee prosthesis was used. We evaluated the results with the KSS knee score and the KSS function score. The postoperative x-rays were examined for knee alignment, bone quality, radiolucent lines and thereafter for sign of loosening. **Results:** The average follow-up was 63 months (range 14 months to 98 months). Knee stability and proper alignment were achieved in all cases. The mean KSS knee score was improved from 42 to 68 ($p<0,05$) and the mean KSS function score from 44 to 57 ($p<0,05$). The use of walking aid was always present for outdoor activities for the first year postoperatively. There were no major complications. Superficial infection was recorded in two operations and was treated with antibiotics for six weeks. Wound breakdown was noted in four patients and they were treated with the standard wound care policy of the hospital. **Conclusions:** Revision in total knee replacement is mainly a salvage procedure. The rotating- hinge prosthesis can relieve the patient from the symptoms of a failed prosthesis especially when there is massive bone loss and ligament insufficiency.

Date: 2011-09-09

Session: Knee - Infection & Revision

Time: 10:00 - 11:30

Room: Meeting Hall IV

Abstract no.: 29519

REVISION TOTAL KNEE ARTHROPLASTY USING TEMPORAL SPACERS

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Aim: to analyze the revision total knee arthroplasty using temporal spacers. **Materials and methods:** over the period of last 9 years, 16 revision surgeries of the earlier located implants were performed. In every case, the implants were removed due to the infection. For four patients we used the bone cement as a spacer with antibiotic. For 12 patients we used the so called "functional" spacer – bone cement with antibiotic together with femoral component, articular surface of tibia component. The postoperative treatment regime was the same as for the patients after the primary operation. The revision surgery was held within 3 months after the condition normalization. During the operation, the previous spacer was removed and instead the new implant was introduced. We used models LCCK "Zimmer" (5 patients), models for the primary arthroplasty with posterior stabilization and stems to tibia plateau and/or femoral component (11 patients). **Results:** the treatment effect was evaluated over the period of 2 – 9 years using 100 points Knee Rating Scale. Thus, for 3 patients out of 5 (with LCCK "Zimmer" implants) the functioning was rated as good (70- 84 points), 2 patients were assessed as satisfactory (60-69 points). For 3 patients (out of 11 who had the model for primary TKA with stems) the knee functioning was rated as excellent (more than 85 points), for 8 as good (70-84 points). **Conclusions:** The use of "functional" spacer after the primary implant removal (due to infection), allows preserving the function of knee joint better.

Date: 2011-09-09

Session: Knee - Infection & Revision

Time: 10:00 - 11:30

Room: Meeting Hall IV

Abstract no.: 30019

SURFACE MODIFICATION OF IMPLANTS INHIBITS PRIMARY ATTACHMENT IN BIOFILM FORMING BACTERIA

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Introduction: Prosthetic infections by Biofilm forming organisms continue to be a menace to the success of orthopaedic surgery, this poses a tremendous social and economic burden in terms of morbidity associated with infections. Recent analysis shows that the incidence of deep infection will exceed 50% by 2030. Materials & methods: Superhydrophobic surfaces were produced using atmospheric plasma liquid system on titanium coupons-surface area; 0.7857cmsquare with contact angles >150 degrees. Laboratory strains of Staph aureus BH1CC and Staph epidermidis 8325-4 were used. Single colonies of BH1CC and 8325-4 were incubated in Brain-Heart infusion broth (BHI), (Oxoid,UK) supplimented with glucose and salt solutions respectively as previously described. The overnight broth cultures were diluted to optical density(OD) of 1.0, and Primary attachment assays were performed by incubating the super hydrophobic titanium coupons in the overnight broth cultures(OD=1.0) in 24 wells tissue treated plates at 37 degrees celcius for 1hour. The coupon is then gently rinsed in sterile deionised water (dH20). This is then treated in 1ml of sterile dH20 in a universal bottle by vortexing and sonication. The 1ml aliquot is then plated on an agar plate (spread plating), and incubated at 37degrees for 24hours. The numbers of colony forming units (CFU) are counted and these represent the number of bacterial attachment. All experiements are in triplicate and a direct comparison is made between the superhydrophobic coupons and plain titanium coupons as controls. Results: There is a statistically significant reduction (p=0.01) in bacterial primary attachment on the superhydrophobic surface suing the paired T test.

Date: 2011-09-09

Session: Knee - Infection & Revision

Time: 10:00 - 11:30

Room: Meeting Hall IV

Abstract no.: 30012

REVISION TYPE KNEE ARTHROPLASTIES: SEMI-CONSTRAINED OR CONSTRAINED? RESULTS AFTER MEAN FOLLOW-UP OF 7 YEARS

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INTRODUCTION: How constrained implants used in the revision knee arthroplasty are, is critical to preserve the stability of the knee and so to obtain good results. **OBJECTIVES:** To assess if there is any difference between the radiological, clinical and functional situation and the quality of life of patients in whom a semi-constrained (sc) or a constrained (c) knee arthroplasty have been implanted. **MATERIALS AND METHODS:** We studied two comparable groups of 50 patients each, distinguishing how constrained the implants are. The mean age of the patients at the time of surgery were 74(sc-group) and 75(c-group). We assess the functional and clinical situation using the Knee Society Score; the radiological situation and the quality of life using the Short Form 12. We have analyzed the survivorship rate of our arthroplasties as well. Then we compare the results in order to find if there is any difference between the groups. **RESULTS:** We contacted 95 patients. 5 patients (2(sc-group) 3(c-group)) had died without any surgeries in the knee. The survivorship rate of the arthroplasties are 92% (sc-group) and 96 % (c-group) at the time of follow up. 77.4% of the patients of c-group declared themselves satisfied or very satisfied in the last follow up, comparing with 68% of sc-group. The results of the KSS-Clinical were excellent or good in 87.1% of the patients of c-group and 83 % in the sc-group. While in the KSS-Functional were 77.5% in the c-group and 74 % in the sc-group. **CONCLUSIONS:** Assessing the results of both groups we could recommend the constrained implants. However the results were very similar the constrained group is better in all the items.

Date: 2011-09-09

Session: Knee - Infection & Revision

Time: 10:00 - 11:30

Room: Meeting Hall IV

Abstract no.: 29264

USE OF FEMORAL HEAD ALLOGRAFT FOR SEVERE BONE DEFECT IN REVISION TOTAL KNEE ARTHROPLASTY

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Purpose: The aim of this study was to assess the clinical and radiographic results of revision total knee arthroplasty using a fresh frozen femoral head allograft for a severe bone defect. **Materials and Methods:** Twenty-seven patients who had undergone revision TKA in our department from March 1996 to March 2003 using a fresh frozen femoral head allograft were retrospectively reviewed. All patients had a severe bone defect. Seven distal femurs, 9 proximal tibias and 11 on both sides required an allograft. The average age at revision and average follow-up period was 69.2 years and 7years 6months. The diagnoses necessitating the revision TKA were aseptic loosening in 19 knees, instability in 6 knees, and infection in 2. The patients were evaluated using The Hospital for Special Surgery knee rating scale. The radiographic evaluation consisted of an inspection for the union of the host, tibiofemoral angle and radiolucent lines. **Results:** The mean range of motion increased from 71 to 113 degrees. The mean HSS knee score improved from 46 to 83. The overall tibiofemoral angle improved from varus 7.3° to valgus 6.1°. In all cases, radiolucency was below 4 scores and there was no loosening of implant. But, 3 cases were found the radiopaque line around the extended rod of tibial stem. In 26 out of 27 knees, union was noted and no collapse occurred. Only one knee had an infection. **Conclusion:** A femoral head allograft can provide a satisfactory method for managing severe bone defects in revision TKA.

Date: 2011-09-09

Session: Knee - Infection & Revision

Time: 10:00 - 11:30

Room: Meeting Hall IV

Abstract no.: 30131

SURVIVORSHIP AND REVISION CAUSES IN FIXED MODULAR, FIXED NON-MODULAR AND MOBILE TIBIAL BEARINGS IN PRIMARY TOTAL KNEE ARTHROPLASTY. A REPORT FROM THE NORWEGIAN ARTHROPLASTY REGISTER, 1994-2009

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Background: Mobile, fixed modular or fixed non-modular bearing (mono-block) are favorable options in TKA. No register studies have compared the revision causes of these designs. Materials/methods: Cemented primary TKAs, without patella resurfacing, registered in the Norwegian Arthroplasty Register the years 1994-2009, were analyzed. With Kaplan Meier and Cox regression analysis we evaluated 8144 fixed modular bearing, 6372 mobile bearing and 3317 mono-block knees. Mean follow-up was 4.2, 4.1 and 5.4 years respectively. Results: 10-years KM survivorship was 94.5% (CI: 93.7-95.3), 93.4% (CI: 92.2-94.6) and 93.1% (CI: 91.7-94.5) in the fixed modular, mobile, and the mono-block groups respectively. The mobile and the mono-block groups had a 20% increased risk for revision relative to the fixed modular group (RR=1.2, CI: 1.0-1.4, p=0.047, RR=1.2, CI: 1.0-1.5, p=0.038). With the fixed modular group as reference, the risk for revision due to tibial component loosening was higher in the mobile (RR=4.8, CI: 3.1-7.2) and the mono-block groups (RR=2.0, CI: 1.2-3.4), loosening of the femoral component was more common in the mobile group (RR=2.5, CI: 1.4-4.3), and revision due to pain was more common in the mono-block group (usually insertion of a patellar component, RR=1.4, CI: 1.0-1.8). Conclusion: Risk for revision due to tibial component loosening or femoral component loosening was lower in the fixed modular bearing group than in the mobile bearing group. Insertion of a patellar component as a revision procedure because of pain was more frequent in the mono-block group. Due to divergent results within groups, a causative explanation cannot be established.

Date: 2011-09-09

Session: Knee - Infection & Revision

Time: 10:00 - 11:30

Room: Meeting Hall IV

Abstract no.: 28722

DETECTION OF PERIPROSTHETIC OSTEOLYSIS IN TOTAL KNEE REPLACEMENTS USING A HUMAN CADAVER MODEL

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Sensitive and accurate measures of osteolysis around total knee replacement (TKR) are needed to enhance clinical management and assist in planning revision surgery. Our aim was to examine, in a cadaver model of osteolysis around TKR, the sensitivity of detection and the accuracy of measuring osteolysis using plain radiographs, computed tomography (CT) and magnetic resonance imaging (MRI). Fifty-four simulated osteolytic defects were created around six cadaver knees implanted with either a cemented or uncemented TKR. Twenty-four defects were created in the femur and thirty in the tibia ranging in size from 0.7cm³ to 14cm³. Standard anteroposterior (AP) and lateral fluoroscopically guided radiographs and CT and MRI scans with metal reduction protocols were taken of the knees prior to the creation of defects and at every stage as the defect sizes were enlarged. The location, number and size of the defects, measured from images obtained by each method, were recorded by three blinded assessors. Overall, the mean sensitivity of defect detection was 48% for AP radiographs only, 66% for AP and lateral radiographs, 83% for CT and 89% for MRI. Mean specificity was 60% for AP radiographs only, 51% for AP and lateral radiographs, 98% for CT and 90% for MRI. Both CT and MRI had significantly higher sensitivities and specificities than AP radiographs and combined AP and lateral radiographs ($p < 0.005$). For a mean defect volume of 3.5cm³, the mean accuracy error (\pm SEM) was 1.3cm³ \pm 0.4 for CT and 1.4cm³ \pm 0.1 for MRI. Overall, there was no difference in the accuracy of defect volume measurements between CT and MRI ($p = 0.574$). This study demonstrates the limitations of plain radiographs and the high sensitivity and specificity of both CT and MRI to assess osteolysis around TKR.

Date: 2011-09-09

Session: Knee - Infection & Revision

Time: 10:00 - 11:30

Room: Meeting Hall IV

Abstract no.: 29658

PROPIONIBACTERIUM ACNES AS AN AGENT OF PROSTHETIC JOINT INFECTION AFTER HIP AND KNEE ARTHROPLASTY: DIAGNOSTIC AND THERAPEUTIC STRATEGIES

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Propionibacterium acnes is increasingly recognised as a causative organism in prosthetic joint infection. It is an organism of low virulence and often causes low-grade infections producing pain or loosening in a prosthetic joint with no overt signs of infection. As a result, it frequently remains un-diagnosed. This is compounded by the fact it is often found in the presence of normal inflammatory markers, and negative routine investigations such as radiographs and joint aspiration. We present a series of 15 patients who presented to our unit over one year with a spectrum of complaints from a painful joint replacement in the absence of infective signs, to systemic sepsis. P. acnes, sensitive to penicillin, was isolated from all patients but took from 5-7 to be identified. We describe their clinical presentation and investigation findings and give recommendations for the diagnosis and management of such patients.

Date: 2011-09-09
Session: Hip - Osteotomy
Time: 10:00 - 11:30
Room: Meeting Hall V

Abstract no.: 28558

CROSS-OVER SIGN AFTER ROTATIONAL ACETABULAR OSTEOTOMY FOR DYSPLASIA OF THE HIP

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Background: A retroverted acetabulum has been identified as a cause of osteoarthritis. This study was performed to evaluate whether radiographic cross-over sign (COS) influence the long-term result after rotational acetabular osteotomy (RAO) for dysplastic hip. Methods: Between 1987 and 1999, 140 patients (151 hips) who had pre- or early stage osteoarthritis of the hip due to dysplasia underwent a RAO. There were one hundred twenty-nine women and eleven men; their mean age at the time of surgery was 34.7 years. The mean follow-up period was 13 years. Clinical follow-up was performed with use of the system of Merle d'Aubigne. Radiographic analyses included measurements of the center-edge (CE) angle, acetabular cartilage (AC) angle, head lateralization index (HLI), and COS. Results: The mean clinical score improved significantly from 14.5 preoperatively to 17.0 at follow-up. The CE angle improved significantly from mean -0.2 degrees to a postoperative mean of 34 degrees. The AC angle improved from 30 degrees to 2.7 degrees, and HLI from 0.64 to 0.60. The COS was observed in 14 hips (9.3%) preoperatively and in 62 hips (41%) postoperatively. Radiographic progression of osteoarthritis was observed in 14 hips (COS positive; 8 hips, negative; 6 hips). The Kaplan-Meier survivorship analysis predicted a survival rate of 85.9 % at 15 years. The only factors significantly associated with radiographic progression of osteoarthritis were fair (rather than excellent and good) postoperative joint congruency ($p < 0.0001$) and age at surgery ($p = 0.001$). Conclusions: Presence of postoperative COS had no effect on the outcome ($p = 0.211$) in this study.

Date: 2011-09-09
Session: Hip - Osteotomy
Time: 10:00 - 11:30
Room: Meeting Hall V

Abstract no.: 27800

PERIACETABULAR OSTEOTOMY: A SEVEN YEARS EXPERIENCE

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Introduction: The Ganz's Periacetabular Osteotomy (PAO) is a worldwide accepted redirection. Our results after the first consecutive cases in seven years are presented. Materials and Method: 54 patients (42 female, 12 male) with a mean age of 27,2 years (16-45) were treated by means of PAO and followed up at 48 months (12-68). Pre- and postop evaluated data included Wiberg's CE angle in AP and Lateral view on plain x-ray, Acetabular Index, Intra operative bleeding, need for post-op blood transfusion, surgical time, WOMAC and Merle d'Aubigne scores. Results: mean Wiberg's CE Angle improvement was 19,5 degree (15-38) in AP view and 22 degree (10-45) in Lateral view, with a mean post-op value of 32,5 and 35,10 degrees respectively. The mean Acetabular Index improvement was 6 degree (2-13) with a mean value of 28 degree (22-38). The mean WOMAC Score improved from a pre-op value of 47,3 to a post-op value of 92,7. The mean Merle d'Aubigne Score improved from a pre-op value of 14,6 to a post-op value of 17,1. We had 19 cases of transient neuroapraxia of the LCFN, one case of transient paresia of the sciatic nerve, 2 cases of delayed bone union at isquion cut. One case of post-op anterior acetabular overcoverage required a mini open anterior acetabuloplasty. One case required THR conversion. Conclusion: PAO provided promising results at short- and midterm, according to other published studies with similar follow-up.

Date: 2011-09-09
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Time: 10:00 - 11:30
Room: Meeting Hall V

Abstract no.: 28288

MODIFIED SALTER INNOMINATE OSTEOTOMY WITHOUT INTERNAL PINS FIXATION FOR THE TREATMENT OF HIP DISORDERS

Jun Li

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The Salter innominate osteotomy is one of the effective surgical procedures with complete pelvis osteotomy for the treatment of hip disorders. However, it has drawback of internal fixation with pins and the subsequent removal procedure. We describe a modification of this osteotomy that does not require pin fixation and secondary removal. We retrospectively reviewed 24 hips in 21 patients who had been operated on by a single surgeon. An oblique rather than the original horizontal osteotomy was used without internal fixation. There were 16 female and 5 male patients. The mean age at operation was 25 months (18 to 84) and the mean follow-up was 30 months (12 to 88). Most patients required additional open reduction, capsuloplasty, and proximal femoral shortening or rotating osteotomy. Clinical outcomes were assessed using the modified McKay criteria to measure pain symptoms, gait pattern, Trendelenburg sign status, and the range of hip joint movement. Radiographic outcomes were evaluated using the Severin method to measure the acetabular index and the centre-edge angle. The clinical and radiographic outcomes were satisfactory with the mean pre-operative acetabular index was 37.9° (24° to 54°), which decreased to 19.9° (7° to 29°) in the immediate post-operative period, and improved to 14.6° (5° to 25°) at the final follow-up (student's t-test, $p < 0.0001$). Post-operative complication was comparatively lower than the traditional Salter innominate osteotomy procedure. The clinical and radiological outcomes of this method are comparable to those of the original technique, but longer follow-up will be necessary.

Date: 2011-09-09
Session: Hip - Osteotomy
Time: 10:00 - 11:30
Room: Meeting Hall V

Abstract no.: 29829

**CHIRON'S VIEW FOR CAM FEMOROACETABULAR IMPINGEMENT:
AN ANATOMIC STUDY**

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CHIRON
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Since AAOS symposium 2008, Hip Imaging should include specific lateral radiographs: Frog Leg, Dunn or Cross table views. We use an original view (Chiron) for the diagnostic of cam femoroacetabular impingement. The patient is installed lying supine; hip in 45° flexion, external rotation and 45° abduction. X-ray beam should be perpendicular to the table with the crosshairs directed on the femoral head. Objective: To compare our incidence with the three above mentioned. Evaluation criteria were Alpha Angle (Notzli) and Anterior Offset Ratio (Eijer). Methods: Cadaver study: we created artificial cam femoroacetabular impingement on normal femoral necks. Femurs were positioned at several angles using orthogonal landmarks. The number of cases necessary to show a 5° difference between the tested view and Dunn view was 19. Validity (Spearman correlation rate with Dunn view) and reproducibility (intraclass correlation coefficient) were analyzed with Stata SE v11.0 Results: 19 femurs were included. The highest mean values of alpha angle were obtained with our view, the lowest with the Cross table. We measured a mean difference of 8.95° with Dunn (p=0.00007), Dunn 45° (p=0.004) and 13.47° with cross table (p=0.002). The intra and inter-observer variability were both excellent (0.99 and 0.87). Spearman's correlation rate with Dunn view was r=0.7. Results concerning Offset Ratio were not statistically significant. Discussion: Chiron's view is useful to detect mild abnormalities. Our screening of hip impingement now relies only on clinical examination and Chiron's view.

Date: 2011-09-09
Session: Hip - Osteotomy
Time: 10:00 - 11:30
Room: Meeting Hall V

Abstract no.: 29857

DOES AN EFFECTIVE NON-OPERATIVE TREATMENT EXIST FOR FEMOROACETABULAR IMPINGEMENT? A SYSTEMATIC REVIEW OF THE LITERATURE

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It is not clear if an effective non-operative treatment exists for Femoroacetabular Impingement (FAI). We undertook a systematic review of the literature. Pubmed, Medline, EMBASE, CINAHL, AMED and Cochrane Library databases were searched using the term: Femoroacetabular Impingement, Femoro-Acetabular Impingement and Hip Impingement. Any article which made reference to, described or provided evidence that related to a non-operative treatment for FAI was included. 45 articles met our criteria. 41 articles were review/discussion based. The detail of non-operative treatment in all articles was limited and could universally be grouped into the categories shown: • A trial of conservative treatment - 28 (68%) • Activity modification - 33 (80%) • Avoiding excessive hip movement and or rest - 15 (37%) • Physical therapy - 18 (44%) detail on the type of physical therapy - 13 (72%). • Non Steroidal Anti-inflammatory Medications - 29 (71%). • Intra-articular steroid injections - 4 (10%). Four articles were primary experiments involving non-operative treatment and were level 4 evidence or below. Two of these articles suggested a favourable outcome with non-operative treatment. One case-series reported poor outcomes for non operative management compared to surgery. However, the groups were not similarly matched with more pre-existing degenerative disease present in those treated non-operatively. The literature on non operative treatment for FAI is limited, lacks detail and has a poor evidence base. Non-operative treatment regimes need to be clarified and formally compared against surgery to determine if they are realistic effective alternatives to FAI surgery.

Date: 2011-09-09
Session: Hip - Osteotomy
Time: 10:00 - 11:30
Room: Meeting Hall V

Abstract no.: 28754

PELVIC AND FEMORAL OSTEOTOMIES IN SPASTIC HIP

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Introduction: Proximal femoral osteotomies are being very often performed in patients with cerebral palsy (CP), especially derotation varus osteotomy. This procedure offers excellent or good X-ray outcome, although the clinical outcome is usually much worse. That is why we have oriented to the pelvic procedures in the last years. Material and Method: We use two methods of roofing procedures. The first one is an acetabuloplasty. It is a standard method usually recommended in patients from 1,5 yrs.to 10 yrs.of age. We have been performing this procedure since 1988 and due to the excellent results we spread the indication even up to the age of 16. The second one is a periacetabular osteotomy after Ganz. It is a standard, but extensive method which is indicated from the age of the Y-shaped cartilage closure. We have started to perform this procedure in 2005 in our clinic. We have performed the acetabuloplasty in 45 spastic hip of 39 patients (age 4-16 yrs.) from Jan 2004 to Dec 2010. We have performed the periacetabular osteotomy in 4 hips of 4 patients (age 14-42 yrs.) in the same period. Technique of deep transiliac acetabuloplasty and periacetabular osteotomy is reminded. Some interesting case reports are presented. Conclusion: 1.Soft tissue procedures are the golden standard and the first step in CP surgery, aiming to reach the muscle balance. 2. We recommend a derotation osteotomy (it is the most frequent proximal femoral osteotomy performed in CP patients in our clinic). The varus osteotomy is being very rarely indicated. The Schanz osteotomy is being used as a palliative procedure. 3. The acetabuloplasty is a method of choice up to the age of about 15. The periacetabular osteotomy is a very useful method in patients with spastic hip after the Y-shaped cartilage closure.

Date: 2011-09-09
Session: Hip - Osteotomy
Time: 10:00 - 11:30
Room: Meeting Hall V

Abstract no.: 28751

FEMOROACETABULAR IMPINGEMENT SYNDROMA – OUR EXPERIENCE WITH OSTEOCHONDROPLASTY VIA SURGICAL DISLOCATION AND VIA ANTERIOR MIS APPROACH

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Introduction: The prevalence of Femoroacetabular impingement (FAI) is estimated up to 15 %. This disease leads to osteoarthritis of the hip joint. If we accept the impingement concept as a reason of osteoarthritis, it is necessary to accept principles of therapy. Material and Method: Diagnosis: A conventional arthrography, arthroMRI respectively are very helpful in pre-operative decision-making besides typical clinical finding and standard X-ray – AP and lateral view. Treatment: we perform surgical dislocation of the hip with the aid of trochanter flip osteotomy and resection of osteofytes at head-neck junction to restore the femoral head offset. If acetabular retroversion is present, we perform acetabular trimming with labrum refixation if it is possible. We perform osteochondroplasty only via anterior approach without dislocation in elder patients when osteoathritic changes grade II is present. From Jan 2005 to Dec 2010 we have performed osteochondroplasty via surgical dislocation in 58 hips of 48 patients (25 male hips, 33 female hips), via anterior MIS approach without dislocation in 23 hips of 23 patients (11 males, 12 females). Results: Assesment after various scales is discussed, survivorship after both procedures, which are compared, too. Discussion: We tried to perform other approaches (anterior, lateral) in the past but the surgical dislocation seems to be the most proper in younger patients - both femoral head and acetabulum and labral pathology are very well accesible. On the other hand, the osteochondroplasty via anterior approach is very well tolerated even in elder patients. Conclusion: Most patients are satisfied – up to short-term result. Nowadays the quality of labrum-cartilage complex besides femoral head shape seems to be a limiting factor.

Date: 2011-09-09
Session: Paediatric Trauma
Time: 08:00 - 09:30
Room: Panorama Hall

Abstract no.: 30322

**FRACTURE INVOLVING THE ENTIRE DISTAL HUMERAL PHYSIS:
A PROBLEMATIC PEDIATRIC FRACTURE**

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The aim of the study: definition of distal humeral physeal injuries involving the entire physis is not unique. Sometimes terms as low supracondylar fracture or separation of the distal humeral epiphysis are used. Low grade of ossification and problematic diagnosis are characteristic. The aim is to present variability of this injury and diagnostic as well as therapeutic approach. Material: during last 3 years (2008-2010) altogether 7.074 pediatric fractures were treated in the Department of Pediatric and Trauma Surgery, 3rd Faculty of Medicine, Charles' University, Prague. From this number 869 fractures were localized in the humerus and only 16 children sustained injury to the entire distal humeral physis (0,23% of all fractures, 1,89% of humeral fractures). Results: fractures involving the entire distal humeral physis can be classified into three types: infantile type (no secondary ossification center visible); children's type (capitellum center visible); adolescent type (physis divided into three parts and all four centers manifested). Diagnosis is difficult and is based on X-rays, USG, MRI and sometimes dynamic skiascopy under general anaesthesia. The distal humeral epiphysis can be separated en-bloc or divided in more fragments. Except in newborns fractures involving the entire distal humeral physis are usually treated surgically. Closed or open reduction and internal fixation should be performed. Conclusion: fractures involving the entire distal humeral physis are from the diagnostic point of view one of the most serious pediatric fractures. They are rare, often misdiagnosed, incorrectly treated with serious sequels.

Date: 2011-09-09
Session: Spine - Lumbar
Time: 10:00 - 11:30
Room: Panorama Hall

Abstract no.: 28662

THE INFLUENCE OF MUSCLE FORCES ON THE STRESS DISTRIBUTION IN LUMBAR SPINE

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Introduction: Previous studies of bone stresses in the lumbar spine have relied on simplified musculature models, even though muscle forces are major contributors to vertebral bone stresses. Detailed musculoskeletal spine models have recently become available and show good correlation with experimental findings. Purpose: A combined inverse dynamics and finite element analysis study was conducted in the lumbar spine to investigate the effects of muscle forces on a detailed musculoskeletal finite element model of the 4th lumbar vertebral body. Method: The muscle forces were computed with a detailed and validated inverse dynamics musculoskeletal spine model in a lifting situation, and were then applied to an orthotropic finite element model of the 4th lumbar vertebra. The muscle model consisted of roughly 1000 individually activated muscle fascicles. The FE model consisted of 63974 volumetric elements for trabecular bone and 8886 shell elements with a thickness of 0.6 mm for cortical bone. Static analysis of the FE model was performed and the results were compared with those from a simplified load case FE model without muscles. Results: Inclusion of muscle forces in the FE model increased the Von Mises stress by 30 % in the superioranterior and central part of the vertebral body and in the pedicles. Conclusion: Muscle forces play a large and non-negligible role for the stress distribution in the vertebrae. This is important, when considering compression fractures in the elderly population with decreased trabecular strength, where small changes in the load axis combined with muscle forces would lead to such fractures.

Date: 2011-09-09
Session: Spine - Lumbar
Time: 10:00 - 11:30
Room: Panorama Hall

Abstract no.: 28213

LONGITUDINAL RADIOGRAPHIC CHANGES IN SUCCESSFUL ARTHRODESIS PATIENTS AFTER POSTERIOR LUMBAR INTERBODY FUSION USING AN INTERBODY CARBON CAGE – A PROSPECTIVE 5-YEAR STUDY

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Objective: Using plain radiographs and helical CT scans, the study aimed to show longitudinal radiographic changes for >5 years in bone fusion sites of successful arthrodesis patients after posterior lumbar interbody fusion (PLIF) using current interbody cages. Methods: For 135 consecutive patients who underwent PLIF using interbody carbon cages at 1 and 2 levels, a prospective longitudinal radiographic evaluation including plain radiographs and CT scans was performed for >5 years after surgery. Radiographic findings in the interbody bone fusion site were determined by observing a contrast between radiographic densities of the bone and carbon cage struts (cross sign), continuous bony bridging, extension of bridging bone fusion density, and remodeling status of the grafted bone to the trabecular bone. Interpretation of radiographs and CT scans were graded on a 4-point scale. Results: The average grades for all assessments increased for 5 years after surgery, and differences between these grades at each time interval compared to the previous interval were statistically significant for 3 years after surgery ($p < 0.05$). Only 57.5% of the total 114 fusion levels showed >50% trabecular bone formation in the original bone graft area at 2 years after surgery. Nevertheless, the proportion of levels that showed >50% trabecular bone formation increased to >80% at 3 years after surgery ($p < 0.01$). Conclusions: Longitudinal changes in the interbody fusion site status after PLIF using interbody cages continued beyond 3 years after surgery. Therefore, final assessment regarding success should also be made at least 3 years after surgery.

Date: 2011-09-09
Session: Spine - Lumbar
Time: 10:00 - 11:30
Room: Panorama Hall

Abstract no.: 28838

SYNOVIAL FACET CYSTS AFTER DECOMPRESSIVE SURGERY FOR LUMBAR SPINAL CANAL STENOSIS – A PROSPECTIVE COHORT STUDY

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INTRODUCTION: It is known that synovial cysts arise from the facet joints after decompressive lumbar surgery. However, it is not well known about the incidence or when postoperative synovial facet cysts (PSFC) arise. The purpose of this study is to clarify the incidence and about what time PSFC arises after the surgery. This study is a prospective cohort study. **METHODS:** There were 81 patients who underwent partial facetectomy and flavectomy of the involved level for lumbar spinal canal stenosis. There were 52 male and 29 female (mean age 70 years, ranged from 42 to 85 years). Mean follow up period was 33.8 months (ranged from 24 to 48 months). All patients underwent MRI at 1 month, 3 months, 6 months, 1 year and 2 years after the surgery. Cystic lesions demonstrating low signal intensity in T1 weighted and high signal intensity in T2 weighted MRI axial images, which connected with the facet joints were defined as PSFC. The incidence, the involved levels and about what time PSFC arose were noted. **RESULTS:** Twenty eight of 81 patients (34.6 %) had PSFC at the operated levels. Twenty two (75.9%) were observed at L4-5 level. PSFC was found 4.8 months (ranged from 1 to 23 months) after the surgery in average. **DISCUSSION:** The high incidence of PSFC (34.6%) was observed. Resection of the hypertrophic flavum has to be performed in decompressive surgery. As progress of the facet joint degeneration, synovitis deteriorates and hypertrophied synovium may protrude from the exposed facet joint.

Date: 2011-09-09
Session: Spine - Lumbar
Time: 10:00 - 11:30
Room: Panorama Hall

Abstract no.: 29783

THE PREVALENCE OF SPONDYLOLYSIS AND ITS RELATIONSHIP WITH LOW BACK PAIN IN SELECTED POPULATION

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Objectives: To determine the prevalence rate of spondylolysis in a selected population and to evaluate the association of spondylolysis with low back pain. **Methods and Materials:** A sample of eight hundred fifty five participants from our medical center and who underwent multidetector CT imaging to assess abdominal and urological lesions were included in this study. The occurrence of LBP needed medication in the preceding 12 months was evaluated using a self-report questionnaire. The presence of spondylolysis was characterized by the CT imaging. We used multiple logistic regression models to examine the association between spondylolysis and LBP. Seventy-eight study subjects (9%) demonstrated spondylolysis on the CT imaging. There is no statistically significant difference among age group ($p=0.177$). And the P value of gender is 0.033 but there is no statistically significant due to the selected population bias. Three hundred eleven study subjects (36%) had back pain. There is statistically significant difference among gender ($p=0.001$). No significant association was identified between spondylolysis and the occurrence of LBP. **Conclusions:** The prevalence of LBP is 36.37% and the prevalence of lumbar spondylolysis based on the CT imaging is 9.12% among a selected population who visited hospital for abdominal or urological lesions except LBP. Male demonstrated a similar presence of LBP to female and a significantly greater of presence of spondylolysis ($p=0.033$). The prevalence rate of spondylolysis demonstrated no significant association with the presence of LBP and age group in adulthood.

Date: 2011-09-09
Session: Spine - Lumbar
Time: 10:00 - 11:30
Room: Panorama Hall

Abstract no.: 29648

ARE "PATTERNS" OF LUMBAR DISC DEGENERATION ASSOCIATED WITH LOW BACK PAIN? NEW INSIGHTS BASED ON SKIPPED LEVEL DISC PATHOLOGY

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Introduction: The clinical relevance of "patterns" of disc degeneration of the lumbar spine is unknown. In the setting of multilevel disc degeneration (2 or more levels), this study addressed the clinical implications of skipped level disc degeneration (SLDD) to that of consecutive, multilevel disc degeneration (CMDD) of the lumbar spine. Methods: A population-based radiographic and clinical study of 3,099 Southern Chinese. Individuals with multilevel disc degeneration of the lumbar spine on MRI (N=1,457) were stratified to SLDD (n=301) or CMDD (n=1,156) groups. SLDD was classified into five types based on location of non-degenerated normal disc(s). Subject demographics, low back pain (LBP), pain status and functional disability were assessed. Results: CMDD increased the likelihood of historical LBP (OR: 1.39) and pain severity (OR: 1.83) in comparison to SLDD (p<0.05). A higher prevalence of LBP and pain intensity was observed in SLDD classification Type V. Functional disability scores did not differ between CMDD and SLDD nor within SLDD classification-types (p>0.05). Conclusions: Our large-scale study is the first to describe novel variants of SLDD-types and their clinical relevance. LBP and severity of pain was more pronounced in individuals with CMDD rather than SLDD. Our study suggests that subjects with similar degree but with different patterns of multilevel disc degeneration do differ with respect to low back symptoms, providing new evidence with regards to the mechanism of LBP.

Date: 2011-09-09
Session: Spine - Lumbar
Time: 10:00 - 11:30
Room: Panorama Hall

Abstract no.: 28482

**ACUPUNCTURE THERAPY FOR CHRONIC LOWER BACK PAIN:
A SYSTEMATIC REVIEW**

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Introduction: Chronic low back pain is a very common condition affecting a significant proportion of the population and has large economic implications on the society. Acupuncture has grown in popularity as an alternative therapy for chronic low back pain. Recent NICE guidelines on low back offer a course of acupuncture as a base line treatment option according to patient preference. Objective: The aim of this systematic review was to evaluate if this treatment option is justified in view of recent evidence available on the efficacy of acupuncture. Method: Studies included were identified by a PubMed search for relevant randomised controlled trials on the 23rd of July 2009. A systematic review was performed. Results: Fifteen randomised controlled trials were identified. Of these, 4 met the eligibility criteria and were critically appraised. Discussion: These trials suggest acupuncture can be superior to usual care in treating chronic low back pain, especially, when patients have positive expectations about acupuncture. Conclusion NICE guidelines of a course of acupuncture, offered according to patient preference as a treatment option for chronic low back pain, are justified.

Date: 2011-09-09
Session: Spine - Lumbar
Time: 10:00 - 11:30
Room: Panorama Hall

Abstract no.: 29502

ROLE OF FACET JOINT TROPISM IN LUMBAR DISC HERNIATION

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Facet tropism is defined as asymmetry between left and right facet joints and is postulated as a possible etiological cause in occurrence of disc herniation. Research hypothesis 1: Facet tropism is associated with an increased occurrence of lumbar disc herniation at that level, and 2. Lumbar disc herniation is more common on the side of the more coronally oriented facet joint. Sixty patients (18-40 years) with single level disc herniation (L3-L4, L4-L5, or L5-S1). Facet angles were measured using MRI of 3 tesla using the method of Karacan. Facet tropism was defined as difference of 10 degrees in facet joint angles between right and left sides. Normal disc adjacent to the herniated level was used as control. We also examined if disc herniated towards the side of more coronally oriented facet. Twenty five herniations were at L4-L5 level and 35 at L5-S1. Statistical analysis was performed using the Chi-square test. At L4-L5 level 6/25 cases had tropism compared to 3/35 controls ($p=0.145$). At L5-S1 level 13/35 cases had tropism as compared to 1/21 controls ($p = 0.0094$). Of 19 cases having tropism, the disc had herniated towards the coronally oriented facet in 6($p = 0.11$). There was statistically significant association between facet tropism and lumbar disc herniation at L5-S1 and none at L4-5. How presence of facet tropism at a particular motion segment leads to disc herniation and why only the L5-S1 segment and not the L4-L5 segment showed an association are discussed.

Date: 2011-09-09
Session: Spine - Lumbar
Time: 10:00 - 11:30
Room: Panorama Hall

Abstract no.: 29657

INTERVERTEBRAL DISC DEGENERATION ON MRI IS ASSOCIATED WITH LOW BACK PAIN: A POPULATION-BASED STUDY

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Introduction: The presence of disc degeneration based on MRI and its association with low back pain (LBP) remains under heated debate. As part of the largest radiographic and clinical population-based study of the lumbar spine, this study addressed the association of disc degeneration as noted on MRI with the presence and severity of LBP. Methods: Sagittal T2-weighted MRIs of the lumbar spine were obtained of 2,702 adult individuals of Southern Chinese origin. The presence and severity of lumbar disc degeneration was assessed. An overall degenerative disc disease (DDD) score (range: 0 to 15) was obtained. Additional assessment of spine pathology/abnormalities, LBP, VAS pain scores, and subject demographics were performed. Results: There were 1,614 females and 1,088 males (mean age=42 years). Individuals with disc degeneration had a higher prevalence of LBP ($p<0.001$). VAS pain scores were significantly higher in individuals with disc degeneration ($p<0.001$). DDD scores were significantly greater in individuals with LBP ($p<0.001$). Logistic regression modeling noted a significant quadratic trend ($r^2=0.95$) increased association of disc degeneration severity and LBP ($p<0.001$). Conclusion: This large-scale study noted that disc degeneration based on MRI is significantly associated with LBP. The “global severity” of disc degeneration was found to increase the risk of having LBP. These findings support that the study of disc degeneration on MRI is clinically relevant, and that treatment strategies, such as biological therapies, that can reduce degeneration can also diminish the incidence of LBP.

Date: 2011-09-09
Session: Spine - Lumbar
Time: 10:00 - 11:30
Room: Panorama Hall

Abstract no.: 29699

PARS INTERARTICULARIS REPAIR WITH PERCUTANEOUS SCREW FIXATION

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Pars interarticularis repairs are conventionally performed using instrumentation and bone grafting through open surgical exposures, placing the nerve supply of multifidus at risk. As the goal of surgery is to preserve the motion segment function, it is logical to minimise the damage done at surgery to the muscles that control movement. We describe a 2 stage operation that allows the insertion of a cannulated compression screw [Perpos] using a single midline 1 cm incision, followed by limited paravertebral exposure of the fracture to enable preparation and grafting [Actifuse and BMP-2] using a Metrx Endoscopic camera system [Medtronic]. 6 patients (15 to 42 years) underwent the aforementioned procedure [5 with grafting, 1 with fixation only]. Pars repair was performed on 10 sites at the L5 level in all patients. Post-operatively the patient is discharged after a one night stay, with a simple corset to be worn for 6 weeks. Running is commenced at 3 months and full activity at 6 months following a CT to confirm healing. Out of a total of ten sites, nine demonstrated union on CT at 6-8 months. No screw required repositioning. 4 patients are without symptoms, 2 have improved significantly (including the patient with non-union). No wound related problems. Operating time was circa 2.5 hours average. CT scans showed no diminution of multifidus muscle CSA post operation. This operation enables rapid return to activities, and provides the opportunity to treat symptomatic pars defects especially in adolescents with minimal disruption to their academic and physical development.

Date: 2011-09-09
Session: Spine - Deformities II
Time: 08:00 - 09:30
Room: Terrace I

Abstract no.: 28354

NEW UNDERSTANDING OF ETIOLOGY AND PATHOGENESIS OF IDIOPATHIC SCOLIOSIS (IS). PROSPECTS FOR ITS SUCCESSFUL TREATMENT

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Most complicated problem in orthopedics is treatment of idiopathic scoliosis (IS), what takes place in more than 90% of cases, etiology is unknown. Our aim was to investigate etiopathogenesis of this disease. More than 6900 patients with IS and associated spinal pain syndrome, aged from 1 to 89, were under our investigation and treatment during 14 years period (1996 till 2010). Conclusions: 1. Development of IS is based upon asymmetrical structure of human body, linked with difference of sizes and activity of brains hemispheres. 2. One-sided tension of m. erector spinae leads to inclination of pelvis on a side of weak muscles and following development of sideways curvatures of a spine. Since such a situation is typical for all living people this deformation may be named as functional scoliosis. 3. Further development of bodies of vertebrae, their arches, processes, intervertebral discs, ligaments and other anatomical elements in position of deviation leads to one-sided underdevelopment of mentioned structures. As a result, zones of instability appear in each segment of spine (neck, chest, lumbar and sacral areas). 4. Growing body's muscles asymmetry violates dynamic spinal-pelvic balance and, on the ground of laws of biomechanics and gravitation, initiate rotatory dislocation of vertebrae in zones of instability in all parts of spinal column. Thus, torsion of deformed clinoid vertebrae leads to formation of structural scoliosis. 5. Rotation of vertebrae, described above, has a character of regularity and does not depend upon sex, age and nationality of a patient. Thus, the term "idiopathic scoliosis" must be changed to another one- "spinal muscle's asymmetrical deformation of a reflex origin". Understanding of this regularity gave us a possibility to work out effective nonsurgical method of treatment of scoliosis and associated spinal pain syndrome in patients of all ages.

Date: 2011-09-09
Session: Spine - Deformities II
Time: 08:00 - 09:30
Room: Terrace I

Abstract no.: 28319

RIGHT THORACIC CURVATURE PROCESS IN ADOLESCENT PERIOD IN THE NORMAL SPINE

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Background: Adolescent idiopathic scoliosis (AIS) results in complicated deformities, such as coronal curvature, vertebral body rotation, and rib cage rotation. Right thoracic curvature, trunk asymmetry and vertebral rotation, at times observed in the normal spine, resemble the characteristics of AIS. If it is determined that the features of right thoracic side curvature in the normal spine are the same as those observed in AIS, these findings might provide a basis for elucidating the etiology of this condition. For this reason, we investigated right thoracic curvature in the normal spine. Material and Methods: For normal spinal measurements, 1,200 samples (400 child, 400 adolescent, 400 adult) who underwent a posteroanterior chest radiographs were evaluated. Cobb angle from T5 to T12 was measured and right thoracic curvature was given a positive value. Results: In the child group, the mean Cobb angle from T5 to T12 was 0.6 degrees in males and 0.1 degrees in females. In the adolescent group, the Cobb angle from T5 to T12 was 1.8 degrees in males and 1.5 degrees in females. In the adult group, the Cobb angle from T5 to T12 was 2.3 degrees in males and 2.3 degrees in females. For both genders, a significant right side curvature was observed in the adolescent and adult groups. Conclusion: Based on standing chest radiographic measurements, a right thoracic curvature was observed in normal spines after adolescence.

Date: 2011-09-09
Session: Spine - Deformities II
Time: 08:00 - 09:30
Room: Terrace I

Abstract no.: 29276

**SURGICAL CORRECTION OF SCOLIOSIS IN NEUROFIBROMATOSIS:
ARE ALL PEDICLE SCREW CONSTRUCTS BETTER?**

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Introduction: All pedicle screw constructs are currently widely used in the treatment of spinal deformities and accurate evaluation of this recent application in Neurofibromatosis patients is necessary. The aim of this work is to compare the results of segmental all pedicle screw constructs versus hybrid instrumentation analyzing the amount of correction achieved, clinical outcome and the incidence of complications. Methods: The study included 28 patients with non-dystrophic NF spinal deformities followed-up for an average of 5.5y (range 2 - 10y). They included 13 consecutive patients corrected by a single stage segmental all pedicle screw construct (Group 1) compared to an earlier series of 15 patients who had an anterior release followed by posterior hybrid instrumentation (Group 2). The average age was 13y+2m and 14y+1m respectively. The average preoperative scoliosis was 61.6° (Group 1) and 57.3° (Group 2). Results: Group 1 had better correction with an average of 80.3% compared to 73.8% in Group 2 and 1.3% correction loss at final follow-up compared to 2.5% at Group 2. The average operative time was 320min (Group 1) and 410min (Group 2). The average blood loss was 740 cc in Group 1 and 1100 cc in Group 2. Group 2 patients had a longer hospital stay and had 4 complications in 4/15 patients. Conclusion: A better correction of non dystrophic spinal deformities was achieved in NF patients by all pedicle screws instrumentation; with less operative time, blood loss, hospital stay and complications.

Date: 2011-09-09
Session: Spine - Deformities II
Time: 08:00 - 09:30
Room: Terrace I

Abstract no.: 29163

THE EFFECTIVENESS OF POSTERIOR ONLY PEDICLE SCREW INSTRUMENTATION IN THE TREATMENT OF SEVERE SCOLIOSIS (GREATER THAN 70 DEGREES)

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In this study we aimed to bring out the effectiveness of posterior only pedicle screw instrumentation in severe scoliosis. A total of 9 consecutive patients with severe scoliosis (>70 degrees) were operated with posterior only pedicle screw instrumentation between 2006 and 2009. In all cases Cobb angle reduction was less than 50 degrees in bending radiographs. After placement of pedicle screws, wide facet resections, and posterior release; final correction was performed. In the concave side of apical region long-arm reduction screws were used and gradual correction was accomplished. In the proximal part of curve for correction of shoulder balance, compression distraction; and in the distal part of the curve for pelvic balance, compression distraction, or segmental derotation maneuvers were used. During the surgery continuous neuromonitorization was performed. The mean age was 13.8 (11-26 years). All patients had double thoracolumbar curves. The mean preoperative Major Thoracic curve magnitude was 81.1 degrees (75-105) and major compensatory lumbar curve magnitude was 32 degrees (22-44). The mean thoracic curve correction was 64 degrees (60-73) and mean lumbar curve correction was 28 degrees (20-40). Mean follow up was 20.7 months (12-36). There were no infections, curve progression, no pseudoarthrosis during the postoperative and follow up course. In severe scoliosis which are not reduced less than 40-50 degrees in the bending radiographs, modern multiple segment pedicle screw instrumentation methods under neuromonitorization achieve remarkable curve correction.

Date: 2011-09-09
Session: Spine - Deformities II
Time: 08:00 - 09:30
Room: Terrace I

Abstract no.: 29823

CORONAL AND SAGITTAL PLANE CORRECTION OF THE MAIN THORACIC CURVE IN ADOLESCENT IDIOPATHIC SCOLIOSIS: A COMPARISON OF DIFFERENT FIXATION DENSITY

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Objective: This study aims to compare coronal and sagittal correction results of AIS that underwent posterior approach with different fixation density. **Methods:** The fixation density was calculated as the number of anchors over the fusion level. 72 patients were divided into Group A with fixation density no more than 1.25(39 patients), and Group B included 33 patients with fixation density >1.25. **Results:** The fixation densities of the 2 groups was 1.0(range, 0.7 to 1.25) and 1.5(range, 1.3 to 2.0), respectively (P=0.000). The mean preoperative Coronal Cobb angles of the MT curves were 50.4° and 48.4°, respectively. At final follow-up, they were 18.0° and 10.5°, with an average correction rate of 64.0% and 78.8%, respectively(P=0.000). The mean coronal correction loss was 3.1° and 2.1°, respectively (P=0.280). The decompensation rate at final follow-up in these 2 groups were 7.7%(3/39) and 6.1% (2/33), respectively (P=1.000).The mean preoperative sagittal Cobb angles of MT (T5-T12) were 19.4° and 12.4°, respectively. At final follow-up, they were 20.3° and 18.6° (P=0.386). **Conclusions:** Both groups can get good correction results of the MT curve in AIS. While with greater fixation density, the correction of the coronal Cobb angle of MT curve is better than that with a lesser fixation density with no increased decompensation rate.

Date: 2011-09-09
Session: Spine - Deformities II
Time: 08:00 - 09:30
Room: Terrace I

Abstract no.: 29344

**POSTERIOR SELECTIVE THORACIC FUSION IN LENKE IC
ADOLESCENT IDIOPATHIC SCOLIOSIS**

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BASARA, Vladimir LALOSEVIC, Budimir JESIC, Zdravko POLEKSIC,
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We have analyzed outcome of selective thoracic fusion in 34 patients operated between 2000 and 2006 with Lenke I C type of curves (King type II). All patients were followed until the skeletal maturity. In all patients posterior surgery was done with the lowest instrumented vertebra not bellow L1. Postoperatively all noninstrumented lumbar curves show spontaneous correction. Only 5 patients (all skeletally immature with Risser sign of 3 or less) needed additional bracing for coronal decompensation of lumbar curves. Additional surgery for correction of lumbar curves was not necessary. Selective thoracic fusion can be used as safe and effective method for preserving lumbar motion segment in selected cases.

Date: 2011-09-09
Session: Spine - Deformities II
Time: 08:00 - 09:30
Room: Terrace I

Abstract no.: 29130

ASYMMETRIC PEDICLE SUBTRACTION OSTEOTOMY: A USEFUL TOOL FOR SEVERE SCOLIOTIC DEFORMITIES

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Introduction: Different osteotomies are used to improve correction power and to eliminate the need for anterior release and traction in severe spinal deformities. The use of asymmetric PSO for correcting coronal plane deformities has been inadequately reported in the literature. The aim of this work is to study the outcome and safety of using asymmetric PSO in treating severe scoliotic deformity. Methods: Twenty-two patients (14 females, 8 males, age range 15-27 years) with severe rigid scoliosis that does not correct on fulcrum bending to less than 50° were treated by asymmetric PSO and were prospectively followed for a minimum of 2 years. This group was compared to a historical group of 25 patients treated by staged anterior release and posterior fixation and fusion 2 weeks later. Preoperative Cobb angle ranged between 75°- 145° in the asymmetric PSO and between 70°-150° in the staged group. Both groups were stabilized posteriorly with pedicle screws only. Results: The total operative time and the duration of hospital stay were significantly shorter in the asymmetric PSO group. The amount of blood loss was significantly less in the asymmetric PSO group. The average preoperative Cobb angle improved from 110° to 38° postoperatively in asymmetric PSO group (65%), and from 102° to 50° in staged surgery group (50%). The difference between the two groups was statistically significant in favor of the PSO group. Complications were minimal in both groups. Conclusion: Asymmetric PSO appears to be a very effective tool to correct severe coronal plane deformities.

Date: 2011-09-09
Session: Spine - Deformities II
Time: 08:00 - 09:30
Room: Terrace I

Abstract no.: 29396

TRUNK DIS-PROPORTIONALITY REGRESS DYNAMICS IN THE SCOLIOTIC SPINE DEFORMITIES SURGICAL CORRECTION

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The aim was to study the dis-proportionality regress in scoliosis surgery. 249 patients with IS at the age of 15-19 years with deformity arches from 41°-157° with surgical correction by Cotrel-Dubouset were observed. Comparative clinic-radiological method using devised three-dimensional diagnostic algorithm applied. Trunk proportionality was analyzed by the defined Scoliosis Disproportionate Syndrome (SDS). Results: Patients were divided into 4 groups according to the SDS stages. The SDS primary manifestations stage covered 106 patients with arc value 41°-60°. Medium expressiveness stage was defined in 68 people with arc 61°-90°, the significant expressiveness stage - in 47 with arc 91°-120° and super-expressiveness stage - in 28 with arc 121° or more. The arcs angle decreased in frontal plane to 42°-71°; correction effect was 32,0-94,1%. In sagittal plane the spine profile improved, in horizontal plane apical segments de-rotation was 14,2-20,7%. The first group patients marked the elimination of the primary SDS stage after the surgery. In the second group 52 cases showed the normal proportionality, 16 marked the I SDS stage. Among the third group after the surgery in 8 patients absence of SDS marked, in 26 – the I SDS stage and 13 - the II SDS stage. In the fourth group in 26 cases II stage left, in 2 cases – III stage. Surgery results analysis determined the applicable technology effectiveness with the stages of SDS and its possible regress that should be used as prognostic information at the initial surgery planning.

Date: 2011-09-09
Session: Spine - Deformities II
Time: 08:00 - 09:30
Room: Terrace I

Abstract no.: 27238

**NAVIGATED PERCUTANEOUS LUMBOSACRAL INTERBODY FUSION:
A FEASIBILITY STUDY WITH 3D SURGICAL SIMULATION AND
CADAVERIC EXPERIMENT**

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Introduction: New possibilities are opened by the latest navigation technologies. Lumbosacral fusion surgery could be performed in a percutaneous and navigated way. The aim of our current study is to prove the concept of the new surgical method. Methods: Firstly, the new method, Navigated Percutaneous Lumbosacral Interbody Fusion (NPLSIF), was simulated on the 3D models of lumbosacral spine. The 3D models were established using the CT data of 60 patients. Secondly, the NPLSIF was performed on two cadavers. After the procedures, the lumbosacral spines were separated from the cadaver trunks in the Department of Anatomy. The lumbosacral disc of one cadaver was bisected coronally, while that of the other cadaver was bisected sagittally. Results: In the 3D surgical simulation experiment, the feasibility of the NPLSIF procedure was verified in every case. In the cadaveric experiment, the NPLSIF procedures were successfully executed. The surgical procedure on the first cadaver took 1.5 hours. On the navigation workstation, the preoperative plan was completed in 3-5 minutes and each intraoperative CT scanning took 30 seconds. The quality of the intra-operative CT images was comparable to that of normal CT images. CT images and the internal view of the lumbosacral discs showed that the NPLSIF procedures had yielded satisfactory discectomy and endplate preparation. Discussion: The feasibility of navigated percutaneous lumbosacral interbody fusion (NPLSIF) was verified by means of 3D surgical simulation and cadaveric experiment. Clinical studies are needed to further investigate the efficacy and efficiency of NPLSIF in clinical practice.

Date: 2011-09-09
Session: Spine - Deformities II
Time: 08:00 - 09:30
Room: Terrace I

Abstract no.: 27237

**POSTOPERATIVE SPINAL ALIGNMENT REMODELING IN LENKE 1C
TYPE SCOLIOSIS TREATED WITH SELECTIVE THORACIC FUSION**

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Summary: Selective thoracic fusion may cause spinal imbalance in certain patients, how the spinal alignment changes after selective thoracic fusion is highly correlated with postoperative spinal balance condition, however, it hasn't been well investigated. Aims: To investigate change in spinal alignment after selective thoracic fusion in Lenke 1C type AIS treated with posterior pedicle-screw only constructs. Methods: In each standing AP radiograph, CSVL was first drawn, followed by measuring the translation of some key vertebrae, such as the LIV, LIV+1, LIV+2, LIV+3, lumbar apical vertebra, thoracic apical vertebra and T1. Additionally, the Cobb angles of major thoracic and lumbar curves were also measured. Furthermore, clinical photos were taken preoperatively and postoperatively. Results: Of the 278 patients reviewed, 29 met the inclusion criteria. The continuous follow-up of our current study revealed an interesting phenomenon: postoperative spinal alignment remodeling. The results of our current study showed that selective thoracic fusion tended to cause leftward imbalance in these Lenke 1C AIS patients. Although some patients regained spinal balance through postoperative spinal alignment remodeling, there were still about 1/3 of the patients who remained imbalanced at 2-year follow-up. Conclusion: Selective thoracic fusion is prone to cause leftward spinal imbalance in Lenke 1C scoliosis patients. Postoperative spinal alignment remodeling can enable some patients to regain spinal balance. The postoperative spinal balance condition in Lenke 1C scoliosis patients could be improved by selecting LIV at stable vertebra or above, or by checking balance condition during surgery to prevent overcorrection.

Date: 2011-09-09

Session: Trauma - Soft Tissue & Miscellaneous

Time: 10:00 - 11:30

Room: Terrace I

Abstract no.: 30298

PERCUTANEOUS REPAIR OF ACUTE ACHILLES TENDON RUPTURE

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Introduction: Achille tendon rupture can be treated by cast but re-rupture occurs, or by open surgery, but infection is also frequent. Is percutaneous suture able to avoid these complications? Material and Methods: A prospective study of 60 cases of percutaneous suture for Achille tendon rupture was done from January 2001 to September 2006. Suture technic was close to the Ma and Griffith one. Local anesthesia only was used in 48 cases (80%). Non resorbable thread was used first (18 cases), then replace until now by resorbable vicryl® (42 cases). Twenty- Eight patients practiced sport, three with high competitor level. Results Mean follow-up was 13 months (6–58). Eighty-nine percent patients return to sport activities at mean 5.2 months (3-12) at the same level in 68%. Return to work was 85days (15–270). One leg hop was possible in 90%, ankle was never stiffer than the other site. The repair tendon was always bigger than the other, and in all cases a lighth amyotrophy of the gastrocnemius was noted. There was no sural nerve complication. Five minor and three major complications occurred (one painful subcutaneous knot, oneAchille tendinosis, one algodystrophy and two vein thrombosis; two secondary ruptures and one deep infection). Conclusion The technique is simple, reliable, cheap, and gives better results than a classic open surgical procedure.

Date: 2011-09-09

Session: Trauma - Soft Tissue & Miscellaneous

Time: 10:00 - 11:30

Room: Terrace I

Abstract no.: 29865

A SYSTEMATIC REVIEW OF THE USE OF PLATELET CONCENTRATES ON TENDON AND LIGAMENT INJURIES OF THE EXTREMITIES

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Introduction: Despite its extensive use, research on the efficacy of platelet concentrates (PC) in treating orthopaedic injuries is limited. We conducted a systematic review of RCTs to study the use of PC in tendon and ligament injuries of extremities. Methods: The Cochrane methodology for systematic reviews was implemented. Results: The literature search yielded five RCTs involving 410 patients with mean age of 40.8 years (range 18-70) for the PC treated and 40.9 years (range 18-70) for the control group. Mean follow-up was 46 weeks (range 24-104). Types of injuries included acute ACL tears in two studies, chronic Achilles tendinopathy, chronic subacromial compression and chronic lateral epicondylitis of the elbow. Despite favourable results from observational studies, our study showed conflicting evidence of PC benefit regardless of whether the injury was acute or chronic; PC was given as part of nonsurgical or surgical management and even within the two studies dealing with ACL injuries. The only significant finding was when comparing injuries affecting the upper versus lower limbs where using PC has been associated with better functional outcome and pain scores in upper limb injuries. However, there remains a lot of variability among the study protocols and administered doses to draw firm conclusions. Conclusions: Given the limited amount and conflicting nature of the current data, the benefits of using PC in tendon and ligament injuries remain questionable. Larger multi-centred RCTs on specific injuries that use standard operating procedures are needed to clarify PC's role in these types of injuries.

Date: 2011-09-09

Session: Trauma - Soft Tissue & Miscellaneous

Time: 10:00 - 11:30

Room: Terrace I

Abstract no.: 27975

**ANATOMICAL REATTACHMENT OF DISTAL BICEPS TENDON RUPTURE
– MID-TERM RESULTS AND COMPLICATIONS OF THE TWO
TECHNIQUES**

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REPUBLIC)

Purpose: To present the techniques (Modified Mac Reynolds and Mitek Anchor), results and complications of anatomical reattachment of distal biceps tendon rupture. Methods: Between 1987 and 2007, 22 patients had surgery for distal biceps tendon rupture. Only one side was affected. All patients were men, mean age 47.5 years at the time of injury. 21 patients were included in this study as one passed away a year after surgery. Analysis was performed by clinical examination and DASH score at the end of 2009. Mean follow-up was 8 years (2-21). Results: 13 patients (62%) had an excellent result. A good outcome with moderate muscle strength limitation was reported in 7 (33%) and one patient (5%) had pain on moderate exercise with recurrent heterotopic ossification. Early surgical repair was performed in all patients except one who was delayed to the 16th day after injury. In all cases, the tendon was detached from its site of insertion but never torn. Intra-operative complications included bleeding from iatrogenic damage of the cubital artery (one patient). Early post-operative complications noted were superficial skin necrosis in one patient and transient neurological deficit of ramus dorsalis nervi radialis, nervus cutaneus antebrachii lateralis (in 3 patients). Late complications were heterotopic ossification in 3 patients and screw migration in one. The results and complications of both methods are similar. The mean DASH was 7,6. Conclusion: Early surgical repair via an anterior single-incision approach is recommended when a rupture of the distal insertion of the biceps brachii is diagnosed.

Date: 2011-09-09

Session: Trauma - Soft Tissue & Miscellaneous

Time: 10:00 - 11:30

Room: Terrace I

Abstract no.: 27383

ARTHROSCOPIC MANAGEMENT OF PARTIAL ACL INJURY

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Isolated injuries of the ACL are defined as complete or partial tears. In many cases, however, partial tears are not diagnosed clinically, and they may mimic a variety of internal derangements of the knee. Although not as common as complete ruptures the partial tear requires the same thorough treatment plan. Patients and Methods: 42 patients with history suggestive of ACL tear Like tearing sensation or a pop, difficulty bearing weight, a sensation of Instability and an inability to continue activity, poorly localized knee pain and hemarthrosis in some cases. Clinical examination: In 16 cases Lachman test was positive with firm point and grade I positive pivot shift test , in 18 cases positive Lachman test and negative pivot shift test and in 8 cases both Lachman and pivot shift tests were negative. MRI findings of those cases were variable as abnormal intrasubstance signal intensity within intact ligament fibers, bowing or undulation of otherwise intact fibers, non visualization on the T1-weighted image with intact fibers seen in T2-weighted pulse sequences. Surgical Technique: Arthroscopic evaluation, probing of the ACL, generous notchplasty has been done followed by graft harvesting, tunnels drilling and graft fixation. Results: Average follow-up was 14.6 months .All subjects resumed their pre injury level of sports participation and dynamic activities. The subjects had a median Lysholm score of 95 points (range, 92 to100 points) and a median Tegner score of 7 points. Conclusion: Single bundle augmentation of partial ACL tear appears to be effective and allows accelerated early rehabilitation.

Date: 2011-09-09

Session: Trauma - Soft Tissue & Miscellaneous

Time: 10:00 - 11:30

Room: Terrace I

Abstract no.: 29886

OPERATIVE TREATMENT OF DISPLACED MID SHAFT CLAVICLE FRACTURES: USE OF RECONSTRUCTION LOCKING PLATE

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Clavicle fracture is a common injury caused by direct impact and fall on shoulder tip. Mid-shaft fractures account for 80 % of all clavicle fractures. Traditionally good results with minimal functional deficit have been reported with non operative treatment. Recent studies have shown increased rates of mal union and symptomatic non union following non operative treatment of displaced mid shaft clavicle fractures. Patient based measures have shown more functional deficit and patient dissatisfaction following non operative treatment. In this prospective clinical study 28 patients with mid shaft displaced clavicle fractures were included, all patients were operated by open reduction and internal fixation by reconstruction locking plate over superior surface after molding. Bone grafting was not done in any case. Arm sling pouch was used for immobilization for 7-10 days, followed by physiotherapy and return to work at 12 weeks. Patients were followed up at 3 weeks, 6 weeks, 3months, 6 months and 9 months after surgery. Mean constant score and DASH score were better when compared with the non-operatively treated patients. Locking reconstruction plate offers a good option for fixation of mid shaft clavicle fractures with good results low rates of malunion and non union with minimum complication rates.

Date: 2011-09-09

Session: Trauma - Soft Tissue & Miscellaneous

Time: 10:00 - 11:30

Room: Terrace I

Abstract no.: 28663

MANIPULATION OF THE INVOLUCRUM FOR FEMORAL RECONSTRUCTION AFTER CIERNY-MADER TYPE IV OSTEOMYELITIS: A NEW CLASSIFICATION SCHEME AND MANAGEMENT ALGORITHM

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• Objective: The Ain Shams University classification scheme (ASU) is developed to radiologically characterize the involucrum in type IV (diffuse) femoral osteomyelitis and suggest a new management algorithm. • Patients and Methods: Six patients with type IV chronic femoral osteomyelitis (5 males and one female) who showed radiological evidence of involucrum formation were operated upon. Three involucra were ASU type II, two were type IA1 and one was type IB1 involucrum. After adequate debridement, the involucrum was manipulated according to the proposed algorithm scheme by Ilizarov external fixator to span the post resection defect. At the end of treatment the external fixation time was compared to the same situation if the involucrum was absent and bifocal bone transport was attempted • Results Mean external fixation time was 97.5 (range: 60-135 days) compared to an expected mean external fixation time of 205 (range: 90-450 days) if involucrum was absent and bifocal bone transport was attempted. Manipulation of an existing involucrum decreased external fixation time by a mean of 107.5 (range: 30-315 days) • Conclusions: Involucrum manipulation with the Ilizarov frame can successfully reconstruct femoral bone gaps with significant decrease in external fixation time and consequently less complication rate. Key words: Chronic osteomyelitis, Ilizarov bone transport, femoral bone defects.

Date: 2011-09-09

Session: Trauma - Soft Tissue & Miscellaneous

Time: 10:00 - 11:30

Room: Terrace I

Abstract no.: 27111

CORRECTION OF COMPLEX FOOT DEFORMITY IN SKELETALLY MATURE PATIENTS BY ILIZAROV EXTERNAL FIXATION VERSUS STAGED EXTERNAL-INTERNAL FIXATION

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Complex foot deformity is a multi-planar foot deformity with many etiologic factors. Different corrective procedures using Ilizarov external fixation have been described which include, soft tissue release, V- osteotomy, multiple osteotomies and triple fusion. Although a high success rate with the Ilizarov method have been reported, many complications related to the Ilizarov external fixation itself have been also reported. These include; pin tract infection, psychological stress to the patient and family, difficult ambulation was the frame. In this study we compare the results of two groups of skeletally mature patients with complex foot deformity who were treated by two different protocols. The first group (27 patients, 29 feet) were treated by triple fusion fixed by Ilizarov external fixator till full union of fusion. The second group (29 patients, 30 feet), were treated by triple fusion with initial fixation by Ilizarov external fixation till correction of the deformity is achieved clinically, and then the Ilizarov fixation was replaced by internal fixation using percutaneous screws. Both groups were compared as regard the surgical outcome and the incidence of complications.

Date: 2011-09-09

Session: Sports Traumatology - Cartilage

Time: 10:00 - 11:30

Room: Club A

Abstract no.: 28466

EVALUATION OF OUTCOMES IN CONSERVATIVELY MANAGED CONCOMITANT TYPE A AND B POSTEROLATERAL CORNER INJURIES IN ACL DEFICIENT PATIENTS UNDERGOING ACL RECONSTRUCTION

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PRABHAKAR

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Introduction: There is enough evidence to suggest operative management of Type C PLC injuries in knees with ACL tear. However there is paucity of literature regarding the outcomes of ACL reconstruction in ACL deficient knees with concomitant Type A and Type B PLC injuries. Materials and Methods: We prospectively evaluated all the patients who underwent arthroscopic ACL reconstruction over a period of 3 years from January 2007 to December 2009. Patients with multi-ligament injury, Type C PLC injury, associated bony/chondral/meniscal injury or those undergoing revision ACL surgery were excluded from the study. A total of 102 patients (who completed a minimum follow up of at least 1 year) were ultimately included in the study. These were divided into three groups: group A with isolated ACL injury (88 patients), group B1 with concomitant Type A PLC injury (6 patients) and group B2 with concomitant Type B PLC injury (8 patients). Outcome assessment was based on IKDC scores measured preoperatively and at last follow up visits. Results: The mean age of the patients was 25.33 years (16-38 years) with 95 males and 7 females. The average follow up was almost 2.5 years (13-46 months). The preoperative IKDC scores were comparable for all the groups. The follow up IKDC scores were similar (statistically insignificant, p value: 0.421) for group A and group B1. Group B2 had poorer follow up IKDC scores as compared to group A and this result was found to be statistically significant (p value: 0.0001). Conclusion: We believe that conservative management of a concomitant Type B PLC injury adversely affects outcomes of ACL reconstruction and should be avoided. Type A PLC injuries, on the other, do well without surgery and can be left as such even when associated with a concomitant ACL tear.

Date: 2011-09-09
Session: Sports Traumatology - Cartilage
Time: 10:00 - 11:30
Room: Club A

Abstract no.: 29516

**ISOLATED INJURIES OF THE POSTERIOR CRUCIATE LIGAMENT:
A SEVEN-YEAR FOLLOW-UP**

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There is still controversy concerning the clinical importance and method of treatment of posterior cruciate ligament injuries, especially when this lesion is isolated. Our retrospective study concerns 20 patients that sustained an isolated tear of the posterior cruciate ligament and were treated conservatively. The average follow-up interval from the injury was 7 years and 3 months. The average age of the patients (18 men, 2 women) was 33 years at the time of the follow-up. The evaluation consisted of clinical and radiological examination as well as a modified Noyes questionnaire. Nine patients were submitted to MRI scan. We found that 12 patients had a very good or excellent result (mean Noyes score 88), 6 had a moderate one (mean score 68) and 2 a poor result (mean score 57.5). In the plain radiographs, 14 patients were found to have degenerative lesions affecting the medial and patellofemoral compartments, while 13 reported symptoms affecting mostly the patellofemoral joint. In the MRI scan the signal was similar to normal in eight out of nine cases. For that period of follow-up, conservative treatment of posterior cruciate ligament tears appears to have a good functional outcome (especially when there is little residual posterior translation) with patients complaining more about the patellofemoral joint and less about the remaining instability.

Date: 2011-09-09

Session: Sports Traumatology - Cartilage

Time: 10:00 - 11:30

Room: Club A

Abstract no.: 28492

THE EFFECT OF PROXIMAL TIBIAL VALGUS OSTEOTOMY ON ARTICULAR CARTILAGE PRESSURE AFTER MEDIAL MENISCECTOMY: A FINITE ELEMENT MODEL STUDY

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Removal of the meniscus, in whole or in part, increases the contact stresses on the articular surface of the tibia. Degenerative changes of the knee joint and clinical follow-up after total or partial meniscectomy are well documented. We hypothesized that proximal tibial valgus osteotomy (PTO) can achieve to decrease the maximum equivalent stresses (MES) on the articular cartilage of the tibia after medial meniscectomy. This study comprises eleven types of models to analyze the effect of medial meniscectomy type and the influence of PTO on articular cartilage pressure after medial meniscectomy. The models were constituted according to location (anterior, posterior, and longitudinal) and percent medial meniscectomy (25%, 50%, 75% and total). While the MES on tibial articular cartilage in the reference model was 0.860 Mpa; the mean MES was 1.510 Mpa in 25% meniscectomy group, 2.390 Mpa in 50% meniscectomy group, 4.935 Mpa in 75% meniscectomy group and 7.333 Mpa after total meniscectomy, respectively. Afterwards we analyzed the all models by increasing the mechanical load bearing axis from 0° to 2.5°, 5°, 7.5°, 10°, 12.5° and 15° valgus position. There was a significant increase of mean MES in all groups of percent meniscectomies when compared with reference model. There were no significant differences in MES between neither 25% and 50% nor 75% and total meniscectomy (respectively, $p= 0.46$, $p= 0.06$). In all models, the MES decreased after PTO. Furthermore; there were no significant differences in MES between reference model with either in all location of 25% or anterior and posterior 50% meniscectomies values that obtained after PTO. As a conclusion of this study; PTO reduce the load bearing stresses on articular cartilage and may prevent the knee osteoarthritis that occurs after meniscectomy.

Date: 2011-09-09
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Time: 10:00 - 11:30
Room: Club A

Abstract no.: 27892

**ARTHROSCOPIC CARTILAGE REGENERATION FACILITATING
PROCEDURE FOR OA KNEE**

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In the year of 2005, 571 knees of 367 patients with osteoarthritic knee received a concept of arthroscopic cartilage regeneration facilitating procedure based on the conceptualization of a possible pathogenesis process for osteoarthritic knee featured by focal abrasion phenomenon and soft tissue imbalance. The Knee Society score and the knee injury and osteoarthritis outcome score were used for subjective outcome study. The roentgenographic changes of femoral-tibial angle and joint space width were evaluated for objective outcome. The mean follow-up period was 38 months (range, 36 to 49). The subjective satisfactory rate for the whole series was 85.5%. For 134 knees with complete follow-up evaluation, the Knee Society score and all subscales of the knee injury and osteoarthritis outcome score improved statistically. The femoral-tibial angle improved from 1.52 (95% confidence interval, 0.84~2.19) to 1.93 (1.21~2.64) ($p=0.03$). The joint space width increased from 2.03 millimeters (2.81~3.24) to 2.18 millimeters (2.97~3.38) ($p=0.01$). The degeneration process of the medial compartment was found being reversed in 82.1% of these knees by radiographic evaluation. Based on these observations arthroscopic cartilage regeneration facilitating procedure is an effective option of treatment for osteoarthritic knee. The degenerative process could be reversed and most patients satisfied.

Date: 2011-09-09

Session: Sports Traumatology - Cartilage

Time: 10:00 - 11:30

Room: Club A

Abstract no.: 28683

A GENERALISED LINEAR MODEL TO PREDICT OUTCOME FOLLOWING AUTOLOGOUS CHONDROCYTE IMPLANTATION FOR OSTEOCHONDRAL DEFECTS OF THE KNEE

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The results of Autologous Chondrocyte Implantation (ACI) for the the treatment of osteochondral defects (OCD) of the knee are variable. Several papers have only used linear regression to identify predictors of outcome. This study utilised a generalised linear model to assess which factors had the greatest effect on outcome, thereby taking into account confounding variables. 100 patients had undergone ACI in a 2-year period. The Modified Cincinnati Score (MCS) was used to assess knee function before, 6, 12 and 24 months after surgery. The predictive factors were aetiology and anatomical site of the OCD. The predictive co-variables were the MCS pre-operatively (MCS 0), age of the patient and size of lesion. The significant predictors of outcome were MCS 0 and aetiology. Those patients who had previous marrow-stimulating procedures had on average 25 points less than those patients treated for osteochondritis dissecans and 11 points less than patients treated for traumatic reasons ($p=0.01$). A single point increase in MCS 0 is likely to increase the MCS 24 by 0.5 points ($p=0.001$). Overall, site was not a significant factor in the model, but when patellar lesions were compared directly with lateral femoral condyle or trochlear lesions, there was a significant difference. Whether patients had received ACI or Matrix-carried autologous chondrocyte implantation (MACI) made no difference to outcome. This study highlights the importance of conducting an appropriate statistical model when analysing predictors of outcome from a surgical procedure. The pre-operative function and aetiology have the greatest effect on outcome and if ACI is being considered in a patient, then marrow-stimulating techniques should be avoided.

Date: 2011-09-09

Session: Sports Traumatology - Cartilage

Time: 10:00 - 11:30

Room: Club A

Abstract no.: 30135

MESENCHYMAL STEM CELLS IN COMBINATION WITH CHONDROCYTES IN THE TREATMENT OF DEEP ARTICULAR SURFACE DEFECT

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Articular cartilage is a tissue with very low regeneration ability; therefore the new treatment methods of injuries in this location are constantly sought. Improved healing shows the lesions with current violation of the subchondral bone. Therefore, many treatment methods purposefully violate the subchondral bone and allow travel progenitor cells from bone marrow into the defect and ensure at least partial healing (microfracture, forrage). This study describes the results of experimental treatment of deep subchondral articular surface defect of the femur with chitosan nanofibers scaffold transplantation staffed mesenchymal stem cells and chondrocytes mixture. Experimental animals were twenty pigs, the frequency of monitoring 20 weeks. After this period knee arthroscopy and microscopic evaluation was performed and after the protocol culling of the animal followed the histological examination of the healed lesions. The control group was the same defect created by the stress area of the articular surface of the distal epiphysis of the femur on the other leg, left without treatment. The treatment of iatrogenic lesions using transplantation of MSCs and chondrocytes in the composite scaffold led to the filling of defects by a tissue of the appearance of hyaline cartilage. Lesions treated by implantation of the scaffold alone or by the method of microfractures were filled with fibrous cartilage with worse macroscopic, histological and immunohistochemical indicators. This work was supported by the Ministry of Education, Youth and Sports of the Czech Republic (NPV II 2B06130).

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Session: Sports Traumatology - Cartilage

Time: 10:00 - 11:30

Room: Club A

Abstract no.: 28631

COMBINED ANTERIOR CRUCIATE LIGAMENT REPAIR AND AUTOLOGOUS CHONDROCYTE IMPLANTATION

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We present our experience of ACI repair with ACL reconstruction. Three groups were assessed: Group 1: Simultaneous ACL Reconstruction and ACI; Group 2: Previous ACL Reconstruction with subsequent ACI repair; Group 3: Previously proven partial or complete ACL rupture deemed stable and not treated with reconstruction with ACI procedure subsequently. Those who underwent simultaneous ACL Reconstruction and ACI had a 47% improvement in Bentley functional scale, 36% improvement in visual analogue score and 38% improvement in the modified Cincinnati rating system. This is in contrast to only a 15% improvement in the modified Cincinnati rating system, 30% improvement in Bentley functional scale, and 32% improvement in visual analogue score in patients who had ACI repair after previous ACL reconstruction. 68% of patients who had the procedures simultaneously rated their outcome as excellent/good and 27% felt it was a failure. In contrast 38% of patients rated their outcome as a failure if they had ACI repair without reconstruction of ACL rupture. Symptomatic cartilage defects and ACL deficiency may co-exist in many patients and represent a treatment challenge. Our results suggest that a combined ACL and ACI repair is a viable option in this group of patients and should reduce the anaesthetic and operative risks of a two-stage repair. Patients with complete rupture of ACL despite being deemed stable performed poorly at review and our study suggests all complete ruptures regardless of stability should be treated with a reconstruction when performing an autologous chondrocyte implantation.

Date: 2011-09-09

Session: Sports Traumatology - Cartilage

Time: 10:00 - 11:30

Room: Club A

Abstract no.: 29832

**PRELIMINARY RESULT OF CLINICAL FEASIBILITY TO REPAIR
ARTICULAR CARTILAGE DEFECT WITH AUTOGENOUS
CHONDROCYTE IMPLANTATION BY A NOVEL BIPHASIC
OSTEOCHONDRAL COMPOSITE**

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Autologous chondrocyte implantation (ACI) has been used to treat cartilage defects. We had previously developed a biphasic osteochondral composite for ACI. We further studied the clinical feasibility study of such device to treat osteochondral lesion of knee joints. Ten patients with symptomatic isolated osteochondritis at the femoral condyle were treated by replacing the pathological tissue with autologous chondrocyte-laden biphasic plug of DL-poly-lactide-co-glycolide, with its lower body impregnated with beta-tricalcium phosphate as osseous phase. Osteochondral lesion was drilled to fashion a pit of identical size and shape as the plug. Chondrocyte-laden plug was inserted press-fitting to fill the pit. Outcome was examined by KOOS score at 3, 6, and 12 months postoperatively; tissue sample was collected with second-look arthroscopic needle-biopsy at 12 months. Primary outcome parameter was the postoperative change of KOOS score; and secondary outcome parameter was the regeneration of cancellous bone and hyaline cartilage, in their respective phases, at the repair site. Mean KOOS scores were compared with paired t-test. Mean KOOS score at 3 months significantly improved than the pre-operative baseline. The score kept improving thereafter, but the change from 3 to 6 months was insignificant. At 12 months, gross appearance of the repair site under arthroscopy showed full-filling of the grafted site, with surface of regenerate cartilage flush with the surrounding native joint surface. Microscopically, the regenerate tissue was hyaline cartilage. The preliminary result of ACI with the novel biphasic matrix showed that the matrix was feasible for ACI to treat such lesion in the femoral condyle.

Date: 2011-09-09
Session: Miscellaneous I
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 29733

AUTOLOGOUS BONE MARROW CELLS WITH COLLAGEN FLEECE IN TREATMENT OF LOWER LIMB NON-UNION: A NEW METHOD

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INTRODUCTION: The hypothesis of using autologous bone marrow cells implanted on collagen fleece for treatment of non-union of long bones with or without bone loss of the lower limb is not tested before. The aim of this study is to asses this new method in a prospective manner. **METHODS:** There were 13 patients with 14 fractures (10 tibiae, 3 femori, and one transplanted fibula) were treated with the same technique. In 6 cases, there was bone loss more than 5 cm. The bone marrow cells was aspirated from the anterior iliac crest and injected inside collagen fleece. Then implanted at the fracture site or bone defect, then the fracture was fixed with external fixator or locked plate. All patients were followed according to follow up protocol over 18 months. **RESULTS:** In all cases starting bone formation was noticed radiologically at 6th postoperative weeks. At 9 months following the operative procedures (the primary end-point of this study), all patients achieved full weight bearing clinically. Radiological new bone formation was observed replaced collagen fleece filled with bone marrow cells. No case required another different surgical procedure to achieve union. **CONCLUSIONS:** The current study proved the benefit of using collagen fleece filled with bone marrow cells in treatment of lower limb long bone fractures non-union. It is a safe and effective tool in the treatment of these challenging cases. Bigger number of cases and longer period of follow up will validate the early results of this new technique.

Date: 2011-09-09
Session: Miscellaneous I
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 27275

**STIMULATION OF FRACTURE HEALING WITH PULSED
ELECTROMAGNETIC FIELDS: POTENTIALS IN NON-UNION
MANAGEMENT**

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Background: 5-10% of fractures worldwide go on to delayed union or non-union. Several non-invasive methods of bone stimulation have been developed in order to enhance bone healing, such as ultrasound lithotripsy, low-intensity pulsed ultrasound waves and pulsed electromagnetic field (PEMF) treatment. We present our four year experience with PEMF. Methods: We retrospectively reviewed the medical notes and X-rays of all patients with non-united fractures that received PEMF during 2006-2010, to assess the healing effect of this method. The device used was Physio-Stim by Orthofix. 45 patients were included and followed up. Data was considered non-parametric. Numeric variables are presented as median with range in brackets. Mann-Whitney U test, Spearman's rho test and Kaplan-Meier survival plots were performed. Results: Union was achieved in 32/45 patients (70.1%). Median time to union with PEMF was 29 (11-58) weeks. No statistical significance was demonstrated when comparing union with time of treatment ($p=0.841$) or with time until the onset of treatment ($p=0.081$). No significant correlation was found between time from last intervention to onset of PEMF and duration of PEMF, as far as achieving union was concerned ($p=0.583$). Conclusion: PEMF can enhance the management of fracture non-unions, especially in cases where a non-surgical intervention is indicated. Treatment with PEMF device augments fracture healing, although the duration of application cannot be related to a definite outcome. Different PEMF protocols limit comparison with existing studies in order to produce a high level of evidence for PEMF.

Date: 2011-09-09
Session: Miscellaneous I
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 29177

INTRAOSSSEOUS BLACKTHORN GRANULOMA: A RARE CASE REPORT

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Introduction: Many cases of blackthorn soft tissue injury has been reported in the literature. We believe, that no case of intraosseous blackthorn granuloma has been reported till now. Case report: A 12 year old boy attended orthopaedic clinic with painful, swollen right wrist for 5 months. He sustained blackthorn injury 6 months back. On examination, there was swelling on the dorsum of wrist. There was no redness. He was tender over the capitate. Wrist movements were restricted. Radiograph showed an osteolytic lesion in the capitate. MRI scan revealed a sharp foreign body in the capitate within the lytic lesion. Exploration surgery revealed a blackthorn of about 1 cm length within the capitate surrounded by inflammatory granuloma. The histological examination confirmed the inflammatory granuloma. At 3 months follow-up, he was asymptomatic. Discussion: Blackthorn is seen all over the UK. Blackthorn injury commonly occurs in the upper limb. But knee and leg can be affected in women and children. This is seen between March and August, which correlates with the hedge cutting time. It can present as chronic monoarticular synovitis or tenosynovitis or soft tissue non-suppurative inflammation. In this patient, because the blackthorn penetrated into the capitate, it took sometime for it to cause the inflammatory reaction. Radiographs are not of much help unless the bone is involved. MRI scan can help to identify the foreign body. Treatment of blackthorn injury is removing the blackthorn fragments. Once the blackthorn is removed, it causes resolution of symptoms, as evidenced in our case scenario.

Date: 2011-09-09
Session: Miscellaneous I
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 29647

DEVELOPMENT OF THE FLEXIBLE AXIAL STIMULATION (FAST) INTRAMEDULLARY NAIL

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Animal studies and clinical trials have suggested that early application of controlled axial micromotion can accelerate healing of long bone fractures compared to rigid fixation. However, experimental investigations of micromotion constructs have been limited to external fixators, which have a higher incidence of complications than intramedullary (IM) nails. Providing the benefits of mechanically-stimulated healing via an IM nail requires knowledge of the resistance to axial movement presented by the interaction between the IM nail and the bone fragments. Therefore the purpose of this study was to measure the forces required to generate interfragmentary micromotion in a tibial osteotomy fracture model with IM fixation. Eight human cadaver tibiae were reamed, osteotomised, and implanted with commercially-available IM nails. Nails were fitted with a custom-designed proximal stem insert that admitted 1.0 mm of controlled axial micromotion. Specimens were subjected to axial loading while interfragmentary motion was measured using an extensometer. The average force required to cause distraction micromotion was 3.78 ± 2.21 kgf based on repeated measures testing of all samples. Correlations between micromotion force, implant size, and reaming clearance from computed tomography (CT) imaging were also assessed. The results of this study support the development of a micromotion-enabled IM nail because the forces required to cause interfragmentary movements are very low. In contrast to current rigid-fixation IM nails, which require significant weight-bearing to induce interfragmentary motion, the micromotion-enabled nail may allow movement in non-weight-bearing patients and during the early healing period when the benefits of mechanical stimulation are most critical.

Date: 2011-09-09
Session: Miscellaneous I
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 29859

CAN IN-HOSPITAL MEDICATION REVIEWS REDUCE RE-ADMISSIONS, NEW FALLS AND FRACTURES AFTER HIP FRACTURE?

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Polypharmacy is a risk factor for falls. Hip fracture patients have in average 6 medications, 11 percent of Swedish individuals over 80 years have >10 medications. In a pseudo-randomized study, where hip fracture patients in two wards are included in an intervention group, and the other two wards are control group; medication reviews is performed by a pharmacist and a internal medicine consultant. Dosage and indications are checked, unsuitable drugs are withdrawn. The patient's GP gets written information, as do the patient. Information regarding re-admissions to hospital, new falls and fractures are drawn from the medical records. Information regarding actual medication is drawn from the Swedish Pharmaceutical Register. Patients are followed for 6 months. From December 2009 to December 2010 the intervention group included 220 patients. We aim to include 300 patients before April 1st 2011. Results regards endpoint data will be presented at the meeting for the first 220 patients, compared with control group. Preliminary data shows that in the first 187 patients 740 drug related problems were identified. Most common faults are medication without known indication (i.e. the patient did not know why they took a certain drug, neither could medical records confirm it) or incorrect dosage. Strengths of the study: All consecutive hip patients in two wards were offered medication reviews (except holiday periods), no one denied participation. Malmö is served by only two large hospitals, treating all emergency cases and admissions to hospital. All medical records within these hospitals are scrutinized by the researchers.

Date: 2011-09-09
Session: Miscellaneous I
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 29683

NEGATIVE PRESSURE WOUND THERAPY IN AN INDIAN SETTING

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NPWT is a beneficial treatment modality for soft tissue management after high energy trauma as also for chronic wounds. For an average indian patient the commercially available NPWT system is expensive. They are unable to afford such high costs and the change per dressing. Hence at our institute we have created our own NPWT unit which works out to be economical for our patients. The NPWT unit consists of foam (used for making seat cushion for cars) which is autoclaved. A small corrugated tube is passed between two layers of foam and attached by means of a plastic tube to the suction machine. The machine has been devised by us. It maintains the required pressure along with an auto-timer. The foam is held onto the wound with help of an iodine drape. We have applied this unit to all compound traumas and non-healing wounds admitted in our hospital from the year 2009. We have studied its effect on 80 patients and found it to be more beneficial than a routine dressing in terms of edema control, appearance of faster granulation tissue on the wound bed, elimination of infection and limitation of cross-infection in the hospital environment. It has thus helped in a faster soft tissue coverage for the wound. NPWT is an important adjunct in the management of orthopedic wounds. It can be made a standard hospital protocol anywhere in the world without the fear of unaffordability on the part of the patient as is shown by our ingeniously designed unit.

Date: 2011-09-09
Session: Miscellaneous I
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 28857

CAN PATIENT DISCHARGE FROM A TRAUMA UNIT BE IMPROVED BY DEDICATED DISCHARGE NURSES?

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Introduction: Delayed discharges within a surgical ward are a serious problem, which can lead to a poor outcome in the rehabilitation pathway and ultimately a failure to achieve full functional potential. They also cause a significant cost to the NHS, and can lead to a decrease in availability of acute beds in the trauma unit. This can have serious knock-on effects on the provision of care for emergency admissions. This audit aims to show that Early Discharge Nurses are a valid solution to this problem. Methods: We audited the trauma admissions to a district general hospital Orthopaedic Department over three separate periods: January-March 2006, 2007 and 2008. The first period was prior to the implementation of the Early Discharge Nurses, the second during a trial of their services and the final after the conversion of these posts to full-time. Each trial period was then compared to see if there was a significant decrease in length of stay. The pre audit standard was set at 90% discharge / transfer at seven days and 100% at fourteen days. Results: 2006 - 139 patients in total, average stay 7.1 days, > 7 days 46 (33%), > 14 days 17 (12%) 2007 - 151 patients in total, average stay 4.8 days, > 7 days 29 (19%), > 14 days 6 (4%) 2008 - 193 patients in total, average stay 5 days, > 7 days 32 (17%), > 14 days 7 (4%) Discussion: The implementation of Early Discharge Nurses appears to be an effective strategy in decreasing the occupancy rates of acute beds by inappropriate patients. This should streamline rehabilitation services and improve the standard of care delivered to our patients.

Date: 2011-09-09
Session: Miscellaneous I
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 26974

CK-MB/CK RATIO AS AN INDIRECT PREDICTOR FOR SURVIVAL IN PATIENTS WITH POLYTRAUMA

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Introduction: Accurate assessment of injury severity is critical for decision making related to the prevention, triage and treatment of critically injured patients. Early estimation of mortality risk of severely injured patients is mandatory for adequate therapeutic strategies. Current risk stratification relies on clinical diagnosis and scoring systems. In our study we speculated whether a simple laboratory test: the CK/CKMB ratio could help improving risk prediction in severely traumatized patients. Methods: In a 9 year period, 328 non-selected trauma patients were included in our retrospective study at a Level I trauma center. Inclusion into the present study was according to the following criteria: (1) ISS score above 16 and (2) rescue period under 2 hours. Results: The mean age of our study population was 34.6 years (range from 6.7 to 81), 234 (71.4%) were males and 94 (28.6%) were females. Mean ISS was 29 (range from 17 to 57) with an overall mortality of 78 (23.8%). Negative correlation between ISS (Injury Severity Score) and leukocytes was shown. A positive correlation was detected for liver enzymes and CK-MB. Correlation between ISS and Na⁺ was significant. No correlation between ISS and K⁺ and Hb/Ht could be observed. Exitus was associated with ISS, alteration in Thrombocytes, CK, CK-MB, CRP, Crea and Na⁺. Conclusion: In our study population, CK-MB levels showed a significant correlation with overall survival in polytrauma patients. In our opinion this might suggest that CK-MB levels could be taken as an indirect predictor for survival.

Date: 2011-09-09
Session: Miscellaneous I
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 28330

DISTRACTION OSTEOGENESIS AND BONE TRANSPORT BY MONOLATERAL EXTERNAL FIXATOR FOR INFECTED NONUNION OF FEMUR DIAPHYSIS WITH BONE LOSS

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Methods: Fifteen adult patients underwent débridement and resection of nonviable bone and bone transport using a monolateral external fixator to treat infected nonunion of femur diaphysis with bone defect. Associated chronic osteomyelitis was classified according to the UTMB staging system as proposed by Cierny et al. Assessment protocol included lengthening index, radiographic consolidation index, functional status of the patient, bone healing, and various problems, obstacles and complications encountered during the treatment. **Results:** The study included 15 patients (13 men and 2 women) with the median age of 28.5 years (range, 18 to 47 years). The patients had had an average of 2.9 surgical procedures (range, one to seven) before presentation. The mean size of defect created after adequate débridement was 7.9 cm (range, 5.5 to 17 cm). They were followed-up for a mean duration of 19 months (range, 15 to 41 months). The mean duration of treatment was 7.3 months (range, 5 to 15 months). The mean lengthening index and radiographic consolidation index were 12.3 and 27.9 days/ cm respectively. The results in terms of functional status were excellent for 5 patients, good for 8 patients, and fair for rest 2 patients. The bone results were excellent for 12 patients and good for rest 3 patients. Eradication of infection as well as bone union was achieved in all the patients. Pain during distraction phase and pin tract infection were the most common problems encountered in the study. None of the patients had neurovascular complications, joint subluxations or refracture of regenerate. **Conclusions:** A monolateral external fixator is a safe and effective method of treatment for infected nonunion of femur diaphysis.

Date: 2011-09-09
Session: Miscellaneous I
Time: 08:00 - 09:30
Room: Club C

Abstract no.: 27702

OUTCOME OF HIP FRACTURE PATIENTS WITH RENAL IMPAIRMENT

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Introduction: The outcome of renal impairment in hip fracture patients was investigated. Materials and methods: A retrospective study was undertaken in 59 consecutive hip fracture patients. Demographic data and clinical data of the patients were obtained including pre-operative and post-operative biochemical blood tests results, and we looked at the mortality rate. Results: There were 59 hip fracture patients. 44 patients (group 1) were alive at 30 days, and 15 patients (group 2) were dead at 30 days. The patients were age-matched with a mean age of 79.3 and 79.7 years in group 1 and 2 respectively. 29 patients underwent hip hemiarthroplasty, and 30 patients had hip fixation. Pre-operative and post-operative mean serum urea were significantly higher in patients who died within 30 days of operation compared with those alive (pre-op 10.2 vs. 6.7 mmol/l [$p=0.001$], post-op 12.1 vs. 6.4 mmol/l [$p=0.0001$]). The concentrations of pre-operative and post-operative mean sodium and potassium levels were not significantly different between the 2 groups. Conclusion: Hip fracture patients with elevated urea are at risk of increased mortality. It is important to have clinical strategies for early identification of these patients, and instigation of cautious management of fluid and electrolytes balance to help improve their outcome.

Date: 2011-09-09
Session: Miscellaneous II
Time: 10:00 - 11:30
Room: Club C

Abstract no.: 28414

KNEE JOINT STIFFNESS ELIMINATION USING COMPUTER-ASSISTED ORTHO-SUV FRAME

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Aim: It's known Ortho-SUV Frame which work is based on the computer navigation (<http://www.rniito.org/download/ortho-suv-frame-eng.pdf>). The advantage of Ortho-SUV Frame is capability of precise reproduction of the mechanics of tibia joint end motion in relation to the joint end of the femur. The aim of the study was to investigate the optimal assembly of Ortho-SUV Frame for increasing of knee ROM and/or knee joint stiffness elimination. Methods: 122 series of graphic modeling, 3 series of mechanic modeling and 6 series of tibia and femur osteosynthesis rigidity testing by Ortho-SUV Frame in comparison with Volkov-Oganesjan device were performed. Results: On the base of experimental data it was revealed that use of the oval supports is reasonable. The angulation of proximal support to the bone must be 120°, of distal - 60°. The proximal support must be placed at the distance 200-210 mm from the knee joint space, distal support must be placed at the distance 120 mm. This assembly provides the knee joint ROM 120°/0°/0°. Use of ring supports allows reaching ROM 70°-90°/0°/0°. The rigidity of investigated assembly of Ortho-SUV Frame exceed the rigidity of tibia and femur fixation by Volkov-Oganesjan device in 1,5 times. Developed assemblies of Ortho-SUV frame were successfully applied in treatment of 6 patients with knee joint pathology. Conclusion: The preliminary data show that Ortho-SUV Frame is prospective in treatment of knee joint stiffness and/or in elimination of the rigid invalid position of the tibia.

Date: 2011-09-09
Session: Miscellaneous II
Time: 10:00 - 11:30
Room: Club C

Abstract no.: 29727

DETECTING POST REDUCTION FIBULAR MALROTATION USING CONVENTIONAL FLUOROSCOPY

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Background: When treating ankle fractures with associated syndesmosis injury failure to anatomically reduce the syndesmosis may lead to poor outcome. While shortening and posterior subluxation of the distal fibula are readily detected by intraoperative fluoroscopy, distraction of up to 3mm can only be detected by CT. The ability of fluoroscopy to detect rotational malreduction of the fibula is unknown and is the subject of this study. Methods: Distal fibula fractures with complete syndesmotic injury were created in three pairs of cadaveric ankles. Two Kirschner wires were used to fix the fibula in neutral, 10°, 20° of external rotation (ER), and 10°, 20° of internal rotation (IR). Thirty pairs of fluoroscopic mortise views of the ankles in the different fibular rotation positions versus the normal contralateral ankle were evaluated by two orthopaedic trauma surgeons. The observers were asked whether the fibula was in neutral, IR or ER using four radiographic criteria: for IR - tibiofibular clear space widening and a spoon shape of the fibula; for ER - divergence of Shenton's lines and point blade shape of the fibula. Results: Overall accuracy for detecting fibular malrotation was 73% with 60% agreement between observers. Accuracy for detecting 20 degrees of IR or ER was 96% with 92% agreement between observers. Overall accuracy was higher for detecting IR (83%) than ER (75%). Conclusions: Using the above mentioned criteria during intraoperative fluoroscopy it is possible to detect a high percentage of 10° and nearly all 20° post reduction malrotations of the fibula.

Date: 2011-09-09
Session: Miscellaneous II
Time: 10:00 - 11:30
Room: Club C

Abstract no.: 29757

COMPLICATIONS OF PRE-CONTOURED LOCKING PLATES

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Treatment of fractures by Open Reduction and Internal Fixation with a locking plate can confer improved fracture stability due to its fixed-angle construct, especially in osteoporotic bone. We present our data over a 8 year period (from 2002 to 2010) highlighting the number of devices used and low complication rate. The various pre-contoured locking plates that were used include the LCP distal femur and proximal tibia, Philos plate, distal tibial plate and calcaneum locking plates. Over 400 cases were identified and complications reviewed. Overall there were no incidences of significant co-morbidity or deep infection. In 70 cases using the LCP proximal tibia plate 2 required revision, and 1 needed total knee arthroplasty due to osteoarthritis. In 80 cases for distal tibial fractures 5 had established non-union. 50 cases were operated with the LCP distal femur with 3 cases having to be revised due to improper fracture reduction at primary application. The Philos plate was used in 150 cases and only several have lead to removal due to impingement. Intra-articular calcaneum fractures have been fixed in 60 cases and only 3 cases have required metalwork removal. No significant complications have been reported with excellent patient outcomes. The use of a pre contoured locking plate is an important device in the fixation of complex fractures especially in osteoporotic bone. Optimised clinical outcomes are achieved with precise knowledge of its use and surgical technique, thus reducing complication rate.

Date: 2011-09-09
Session: Miscellaneous II
Time: 10:00 - 11:30
Room: Club C

Abstract no.: 28496

LOCKING COMPRESSION PLATE BREAKAGE AND FRACTURE NON-UNION: A FINITE ELEMENT STUDY OF THREE PATIENT-SPECIFIC CASES

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The Locking Compression Plate (LCP) system offers a number of advantages in fracture fixation combining angular stability through the use of locking screws with traditional fixation techniques. However, the system is complex, requiring careful attention to biomechanical principles and good surgical technique. From a series of clinical cases, where locking plate fixation was used in fractures of long bones, three were selected. Patient specific geometric information was obtained from AP and lateral plain radiographs, and the Finite Element (FE) models were generated manually. The first case study highlighted the importance of the working length on the construct stability. By increasing the working length the construct became more flexible. The resulting increase in interfragmentary motion promoted indirect healing with the formation of callus. In the second case study, plate breakage occurred as a result of an inappropriate fixation technique. The fixation involved the use of locked screws at the level of the fracture passing the fracture line. This reduced the flexibility of the implant which hindered the micro-motion needed for callus formation. Fatigue failure eventually occurred due to cyclic loading past the yield stress of the LCP. In the third case study the long working length of the construct made it relatively flexible. The larger area of stress distribution on the plate reduced the local strain, resulting in a protective effect against fatigue failure of the implant. In Conclusion, successful application of the LCP demands a good understanding of the biomechanics and careful pre-operative planning.

Date: 2011-09-09
Session: Miscellaneous II
Time: 10:00 - 11:30
Room: Club C

Abstract no.: 28668

**COMMONLY MISSED INJURIES OF CLINICAL SIGNIFICANCE IN
POLYTRAUMA PATIENTS**

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The incidence of polytrauma is rising day by day due to various factors like rapid urbanisation, industrialisation, natural disasters etc. Every death leaves at least ten major injured patients. Not much data is available on missed injuries but it is seen that missing of injuries is not random it follows a definite pattern. This is a study on 2000 patients studied over a period of 5 years. It is seen that in the initial survey 30 to 40 % of injuries are missed this comes down to 15 % by secondary & 10 % by tertiary survey. Two patients expired due to missed injuries to vital organs. In 7 patients injuries were serious enough to cause death, in 57 injuries were serious enough to cause permanent disability & morbidity if neglected & in remaining were minor of not much importance. One can use any method to treat but missing an injury can cause havoc for treating surgeon, institution & also for the patient himself. This paper highlights how such incidences can be avoided to avoid the suffering of the patient.

Date: 2011-09-09
Session: Miscellaneous II
Time: 10:00 - 11:30
Room: Club C

Abstract no.: 28795

ROLE OF LOCKING COMPRESSION PLATE IN THE MANAGEMENT OF NON UNION OF DIAPHYSEAL FRACTURES

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Introduction: Non-union of long bones still remains a challenge in terms of difficulties faced in management. The basic locked internal fixation technique aims at flexible elastic fixation to initiate spontaneous healing, including its induction of callus formation. This locking minimizes the compressive forces exerted by the plate on bone. Locking compression plate is an internally placed external fixator, offering better construct in surface fixing modality by stable fixation and early mobilisation, making healthy healing environment around the bone, thus fracture healing. This created a hope to step and to study the success rate of locking compression Plate in stabilizing the non union fractures of long bone and its functional outcome. Materials and Methods: This is a prospective study. 36 diaphyseal aseptic non unions were operated with LCP and iliac crest bone grafting. On follow up all patients were examined clinically and follow up radiological examination and proforma (SF 36 score) were completed on each visit. The outcomes were studied with respect to various factors like age, gender, region of nonunion, duration of nonunion, type of nonunion. Results: All 36 cases united with average time of 4.13 ± 0.79 months, the average SF -36 score at final follow up was 87 ± 7.7 . The age of the patient and duration of nonunion had statistically significant difference ($p < 0.05$) on union time but none of the factors influenced the final SF – 36 scores. Conclusion: Locking Compression Plate with bone grafting is an excellent method for achieving union in non union diaphyseal fractures when used in selected patients. Age of the patient and duration of non union significantly affect the duration for achieving union however this did not have any significant effect on the final functional outcome.

Date: 2011-09-09
Session: Miscellaneous II
Time: 10:00 - 11:30
Room: Club C

Abstract no.: 29385

ORTHOPAEDIC CARE IN A SOUTHWESTERN NIGERIAN SECONDARY LEVEL HOSPITAL: ARE PATIENTS' SURGICAL NEEDS BEING MET?

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Background and objectives: Musculoskeletal conditions are a major cause of morbidity the world over but only a few orthopaedic surgeons are available to treat 40 million people worldwide with disabilities treatable by surgery. Over a one year period, we analyzed patients at the orthopaedic unit of a public general hospital in a developing country highlighting the spectrum and peculiarities of diseases, their surgical management and limitations. Materials and methods: The demographic data, clinical features and diagnoses of 914 patients, as well as therapeutic modalities and complications of operated patients were analyzed. Results: The mean age was 38.5 ± 23.8 years and 440 were males (48.1%). Trauma accounted for 327 (35.8%) cases. The mean age of trauma patients was 33.4 ± 22.3 years while orthopaedic patients were about 8 years older ($p < 0.001$). The average duration of symptoms before presentation was 106.4 days. Of the 15.5% who required operative treatment, only 7.3% had the required operations done. Children who needed surgery were more likely to get it done than adults ($p = 0.002$). The commonest operative procedure was fracture fixation. There were four moderately-severe complications (6.0%). Conclusion: The study showed that there was a considerable patient-load with inadequate facilities for treatment when compared with contemporary practice worldwide. Although the results of surgical treatment were acceptable, there was a need for timely access and quality care to people with musculoskeletal problems.

Date: 2011-09-09
Session: Miscellaneous II
Time: 10:00 - 11:30
Room: Club C

Abstract no.: 29590

USE OF GIS APP AS TOOL FOR MONITORING TRAUMA CASES

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Road traffic injuries belong to the ten leading causes of death and disability worldwide, and have emerged as a serious public health concern. Identifying human, technical, and environmental factors that contribute to the incidence and severity of accidents and their health-related consequences is mandatory to establish effective prevention strategies. App or applications is the word of the year and its use on smart phones has grown by leaps and bounds. GIS is the abbreviation for geographic information system. Originally developed for urban and facilities management. GIS depicts and analyzes the spatial features of, and the location and chronology of events occurring in the area of interest. In this study, various features of 180 road crashes were linked to a GIS generated digital map of an area close to a national highway in India using an APP developed by local software firm. By overlay tools, clusters of accidents were identified, and color-coded according to accident mechanisms and injury patterns. Results: Spatial analysis revealed a cluster with a high incidence of motorbike injuries resulting in fractures. Examination of the spot demonstrated the risky combination of a speed breaker and a broken traffic light. After fixing the light, no further accidents occurred at the site. Conclusion: GIS is a promising technology for geo-referencing accident data, and may be a valuable tool to identify areas of priority for injury prevention.

Date: 2011-09-09

Session: World Orthopaedic Concern: Infections

Time: 10:00 - 11:30

Room: Club D

Abstract no.: 30311

CONSERVATIVE, NON OPERATIVE MANAGEMENT OF FRACTURES

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Fractures can be treated using many different ways, broadly conservative or surgical. Recently there has been a remarkable change in the treatment of fractures and dislocations from non-operative to operative thanks to advances in anesthesia, improvements in sterile technique, and advances in the technology of internal fixation. The availability of these facilities is however not universally guaranteed. In developing countries, lack of well-trained surgeons and other health care providers, lack of appropriate and affordable equipment and implants, and of reliably clean surgical environments increases the risks of surgical complications of orthopedic procedures often to unacceptable levels. Conservative management remains a viable and very often the only option for 'relative cost-sensitive' management of fractures in these countries. Today's Orthopaedic surgeons must be as skilled in nonoperative as they are in operative techniques; for sound knowledge of nonoperative techniques makes the use of operative techniques more effective and safer. Moreover there are many absolute indications for nonoperative care of fractures and dislocations. The combined risks of devascularization, slower and weaker bone union, and operative complications must be considered when operative treatment is being offered on a relative indication basis. The purpose of this paper is to demonstrate how we in Kenya as well as do similar neighbouring developing African Nations continue to often rely on nonoperative treatment of fractures. The choice of the method employed considers several factors including: surgeon's experience, availability of implants modalities of imaging and other equipment, cost, desired anatomical and functional outcomes and complication rates. Closed treatment requires as much thoughtfulness, technical expertise, and attention to detail as does surgery.

Date: 2011-09-09

Session: World Orthopaedic Concern: Infections

Time: 10:00 - 11:30

Room: Club D

Abstract no.: 29990

**DEWORMING THE PATIENTS REDUCES SURGICAL SITE INFECTIONS
IN A DEVELOPING COUNTRY**

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According to a WHO report about 25% of world population is suffering from worm infestations. The incidence of round worms, hook worms, tapeworms, amoebiasis, giardiasis and filarial infestations is very high in developing countries. The parasites not only steal the nutrients from the host but they also cause immuno-suppression for their own survival and predispose the host for bacterial infections. Two groups of 2000 patients each undergoing elective orthopaedic operations were studied for the incidence of surgical site infection (SSI). In group-1 the patients were only given analgesics and prophylactic antibiotics. No attention was paid to parasites. Most of the surgeons do it as no orthopaedic book mentions about deworming. In group-2 the patients were thoroughly investigated for any parasitic infestation eg. stool for ova and cyst and blood for microfilariae and other parasites. Patients were dewormed before surgery and their nutrition was also improved by giving calcium, vitamins, iron, protein and blood transfusions where necessary. The two groups were almost similar in other parameters like age, sex, type of operations done and treated in the same operation theatre and ward by senior consultants. The Incidence of SSI was 13% in the un-dewormed cases and only 0.2% in the dewormed group ($p < 0.05$). It is concluded that in the developing countries surgeons should see the patients as a whole and not through a hole. Deworming reduces the rate of surgical site infections in the developing countries, especially tropical countries where parasitic infestations are very high.

Date: 2011-09-09

Session: Trauma - Proximal Femur II

Time: 08:00 - 09:30

Room: Club E

Abstract no.: 28119

PATHOLOGICAL FRACTURES OF THE PROXIMAL FEMUR: A REVIEW OF 143 CASES

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We report on the 143 cases of pathological metastatic fractures of the proximal femur with a minimum follow-up for the survivors of three years. 2.5% of all hip fractures were pathological. The average age was 72 years, 61% were females. 47% of fractures were intracapsular, 28% trochanteric and 25% subtrochanteric. The most common sites for the primary tumor were breast (36%), prostate (23%) and lung (17%). Mean survival following operation was 270 days (range 2 to 3053 days), being longest for those with myeloma (662 days), lymphoma (> 312 days) and breast tumours (492 days) and lowest for lung tumours (110 days). 99% of the fractures were treated surgically. Mean hospital stay was 19 days. The commonest fracture healing complication was further fracture of the femur around or immediately below the implant which occurred in 9/143 (6.3%) of operations. This complication appeared to be reduced with a change to cemented arthroplasties and long intramedullary nails.

Date: 2011-09-09
Session: Trauma - Proximal Femur II
Time: 08:00 - 09:30
Room: Club E

Abstract no.: 27703

HIP FRACTURE PATIENTS ON WARFARIN – CAN WE MINIMISE DELAY TO SURGERY?

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Hip fracture patients on warfarin require careful preparation for surgery. Whether surgery should be accelerated with use of low dose vitamin K or fresh frozen plasma is unclear. We performed a retrospective audit to assess the management of hip fracture patients on warfarin admitted to our trauma unit over 1 year. Our local guideline was warfarin reversal with 1 mg of Vitamin K intravenously administered based on patient's thromboembolic risk stratification. We identified 11 patients from 1/4/09 to 1/4/10. Their medical records were scrutinised. The indication for warfarin was as follows: 7 cases of atrial fibrillation, 1 case with prosthetic heart valve, 2 cases with DVT, 1 case with both AF and DVT. The INR on admission ranged 1.3–7.4 with a mean of 2.8. Patients were given on average 2.2 mg of Vitamin K for warfarin reversal (range 1 - 5 mg). The mean INR at surgery was 1.5, ranging from 1-1.8. The mean delay to surgery was 1.9 days. The mean length of stay of the patients was 25 days. 2 patients needed blood transfusion post-operatively, and there was no surgery related complications. We had no mortality at 30 days. With a mean of 2.2 mg of vitamin K administered, patients had their surgery within 48 hours. We have now developed new departmental guidelines, and altered the dose of vitamin K administered for warfarin reversal to reflect this change to avoid unnecessary delay to surgery.

Date: 2011-09-09

Session: Trauma - Proximal Femur II

Time: 08:00 - 09:30

Room: Club E

Abstract no.: 27804

TO STUDY THE DYNAMIC MRI CURVE PATTERNS OF HIP IN PATIENTS WITH INTRACAPSULAR FRACTURE NECK OF FEMUR PREOPERATIVELY AND 6 MONTHS POSTOPERATIVELY

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OBJECTIVE: The vascular status of femoral heads in the post-traumatic period of intracapsular femoral neck fracture (ICFNF) remains uncertain until the patient actually develops avascular necrosis (AVN). Several methods for predicting the viability of femoral head have been reported, that are not effective or widely used because of unreliability, potential complications, and technical difficulties. The present study involved the use of Dynamic MRI (DMRI) in assessing femoral head vascularity to predict AVN. **MATERIALS AND METHODS:** The role of DMRI was studied prospectively in 25 patients with 25 ICFNF. Fractures were divided in to three types (Type A, B, or C) based on the femoral head vascularity shown by dynamic curve patterns on MRI evaluation. Type A has preserved vascularity, Type B has some decrease in vascularity but still viable while Type C has significantly reduced vascularity. The DMRI was done Pre-Operatively and Post-operatively after 6 months after cancellous screw fixation. **RESULTS:** We compared The DMRI Pre- and postoperatively and found that the vascular status as evidenced by a type A curve remained vascular after surgery except in one case where it was reduced by one grade although this case united after 6 months. The complication rates in terms of nonunion and avascular necrosis were higher in type B or type C curve. **CONCLUSION:** DMRI is a reliable tool to evaluate vascularity of femoral heads and thus reduces the uncertainty of outcome of treatment of ICFNFs. DMRI can be a useful tool to formulate a treatment algorithm in management of ICFNF.

Date: 2011-09-09

Session: Trauma - Proximal Femur II

Time: 08:00 - 09:30

Room: Club E

Abstract no.: 30085

TREATMENT OF DISPLACED FEMORAL HEAD FRACTURES: RESULTS AND COMPLICATIONS

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UMHATEM "N.I.Pirogov", Sofia (BULGARIA)

Aim: To specify the indications for the correct choice of approach, to analyze the clinical results and complications. Material and Method: For a period of 9 years we treated 14 patients with displaced fractures of the femoral head. The fractures were distributed according to classification of Pipkin: Type I- 3, Type II- 5, Type IIIA- 1, Type IIIB-1 and Type IV-5. One patient had bilateral fractures of the femoral head. Smith-Peterson (distal part) approach was used for 6 fractures Pipkin I,II, and for fractures Pipkin III (primary hip arthroplasty) Hardinge approach, and for fractures Type Pipkin IV was chosen Kocher – Langebeck (4 cases) and 1 with “Flip osteotomy”. Results: All patients were followed up (2-8 years). From 14 patients with 15 fractures of the femoral head assessed by HHS, we obtained 8 excellent and good, 4 fair and 3 poor results. The distribution of the results according to the type of the fracture is as follows: Pipkin I – 2 excellent and 1 fair, Pipkin II- 2 excellent, 1 good, 1 fair and 1 poor, Pipkin III – 1 excellent, 1 fair and Pipkin IV- 1 excellent, 1 good, 1 fair and 2 poor. With iatrogenic temporary nerve dysfunction (n. ischiadicus) was 1 patient, 3 achieved avascular necrosis of the femoral head, Type I,II (Brooker) ectopic ossifications developed 3 patients and 1 with severe osteoarthritis. Conclusion: From modern principles of treatment of the displaced femoral head fracture we can expect better but still not excellent and good results.

Date: 2011-09-09

Session: Trauma - Proximal Femur II

Time: 08:00 - 09:30

Room: Club E

Abstract no.: 29187

THE EFFECT OF FRACTURE PATTERN AND IMPLANT TYPE ON STABILITY OF TYPE 31-A2 PROXIMAL FEMUR FRACTURES

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Introduction: Internal fixation of type 31-A2 proximal femoral fractures can be done with either a compression hip screw and side plate (CHSP) or a intramedullary hip screw (IMHS). There is an ongoing discussion as to which is the best implant for their fixation. The purpose of this study was to define the degree of stability of different 31-A2 fracture patterns and their influence on the different fixation constructs. Methods: Simple intertrochanteric fractures were made in 12 cadaver proximal femurs. Six fractures were fixed with a CHSP and 6 with an IMHS. Both implants were instrumented with strain gages at the lag screw - nail/plate interface to allow assessment of implant load bearing (ILB). The specimens were subjected to non-destructive loading after which 3 subsequent horizontal cuts in 1 cm increments were made across the posteromedial cortex. Loading was repeated after each cut. Results: After making the initial intertrochanteric fracture ILB was $52.2 \pm 19.4\%$ ($49.8 \pm 4.2\%$ for CHSP, $53.6 \pm 25.4\%$ for IMHS). ILB after the first 1cm cut increased to $83.4 \pm 26.9\%$ ($70.8 \pm 18.9\%$ for CHSP, 93.4 ± 29.9 for IMHS) - $p=0.0009$, and after the second cut increased to $90.0 \pm 20.6\%$ ($82.6 \pm 6.3\%$ for CHSP, 96.0 ± 26.9 for IMHS) - $p=0.209$. Conclusions: Type 31-A2 becomes increasingly unstable with increased posteromedial comminution (or lesser trochanter fragment size). This study supports the use of IMHS devices for the more unstable fractures.

Date: 2011-09-09

Session: Trauma - Proximal Femur II

Time: 08:00 - 09:30

Room: Club E

Abstract no.: 29195

EFFECT OF VARUS AND VALGUS ALIGNMENT ON IMPLANT LOADING AFTER PROXIMAL FEMUR FRACTURE FIXATION

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Introduction: Fixation of proximal femur (PF) fractures in varus has been shown to correlate with an increased rate of implant failure. This study examined the influence of varus and valgus alignment on implant loading. Methods: An unstable PF fracture model was made in 12 cadaver PFs. Six fractures were fixed with a compression hip screw and side plate (CHSP) and six with an intramedullary hip screw (IMHS). Both implants were instrumented with strain gages to allow assessment of implant load bearing (ILB). ILB was expressed as percent of the measured load at neutral, varus and valgus alignment. Results: ILB was 103±5% (IMHS-103±5%, CHSP-114±15) of neutral load in 5 degrees of varus (p=0.057), 130±26% (IMHS-111±2, CHSP-142±28) in 10 degrees of varus (p=0.009) and 144±41% (IMHS-110±7%, CHSP-164±40%) in 15 degrees of varus (p=.048). When loading the implants in valgus, ILB was 83±9% (IMHS-81±3%, CHSP-85±12%) of neutral load in 5 degrees of valgus (p=0.003), 69±15% (IMHS-74±9%, CHSP-64±19%) in 10 degrees of valgus and 51±17% (IMHS-61±10%, CHSP-43±19) in 15 degrees of valgus (p=0.0002). Conclusions: PF fractures reduced in varus lead to significantly increased load on the fixation implant. Reducing the fracture in valgus reduces the load on the implant. Compression hip screws seem to be more affected by varus/valgus malalignment than intramedullary hip screws.

Date: 2011-09-09

Session: Trauma - Proximal Femur II

Time: 08:00 - 09:30

Room: Club E

Abstract no.: 30017

A SYSTEMATIC EVALUATION OF 250 CASES OF FRACTURE PROXIMAL THIRD FEMUR STABILIZED WITH BI-AXIAL FIXATION (HIP SCREW WITH A DE-ROTATION SCREW)

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Purpose: Fractures of proximal third of femur are increasing in incidence due to a high incidence of osteoporosis and increase in life expectancy. Achieving a stable fixation with a satisfactory outcome is an orthopedic challenge. The biaxial implant is an indigenously developed implant in Pune, India which aids in achieving stability as well as dynamic compression. Methods: 250 patients from Deenanath Mangeshkar Hospital and Yogesh hospital, Pune were evaluated between January 2002 and December 2010 for the management of fracture proximal third femur. Patients' profiles were reviewed for surgical fixation. Surgeries were performed by a single orthopedic surgeon. The proximal third fracture femur was stabilized with biaxial fixation; diameter of screws being 9 mm (hip screw) and 6.5 mm (de-rotation screw). During fixation, augmentation was done with a tension band wiring. For osteoporotic cases, synthetic bone grafts were used. Results: 250 patients were included in the study. 56% of the patients were males (140) and 44% were female patients (110). The age of patients included in the study was above 65 years. The median follow up period was 4 years ranging from 2 months to 8 years. The cases were evaluated for stability and a periodical functional assessment was performed. Patients demonstrated a significant improvement in the functional parameters with an overall improvement in the quality of life. The complication rate (implant failure, implant breakage and proximal migration) was less than 2%. Conclusions: The biaxial implant appears to be effective in the management of proximal third fractures of femur.

Date: 2011-09-09

Session: Trauma - Proximal Femur II

Time: 08:00 - 09:30

Room: Club E

Abstract no.: 28523

INTERNATIONAL SURVEY OF TRAUMA AND ORTHOPAEDIC SURGEONS ON OPERATIVE MANAGEMENT OF EXTRACAPASULAR HIP FRACTURES

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BACKGROUND: The incidence of hip fractures is rising worldwide. There is controversy with regard to the surgical treatment of unstable proximal hip fractures. We sought to identify surgeons' preferences and decision making criteria when considering the use of an extramedullary implant or intramedullary implant for extracapsular hip fractures. **METHODS:** We used an ongoing cross-sectional survey design to examine surgeons' preferences in the treatment of extracapsular hip fractures (stable, unstable, reverse oblique and subtrochanteric fracture patterns). An electronic survey was emailed to trauma and orthopaedic surgeons worldwide. **RESULTS:** There were 177 respondents. The typical respondent was in Trauma & Orthopaedic practice for 13 years, supervised trainees/residents, and treated on average 80 hip fractures per year. Half the respondents were in academic practice. Most surgeons chose extramedullary implant for stable extracapsular hip fractures. For patients with unstable proximal hip fractures, 65% preferred intramedullary implant compared to 35% who preferred extramedullary implants. The majority preferred intramedullary implant for reverse oblique and subtrochanteric fracture patterns (84% and 93% respectively). Many surgeons agreed that fixation complications (62%) and re-operation (65%) rates were not higher with intramedullary implant compared to extramedullary implant. Surgeons also revealed variable preferences in their choice of implant. **CONCLUSIONS:** This survey reflects current practice and helps to clarify current opinion with regard to the operative treatment of these fractures. While surgeons prefer an extramedullary implant for stable fracture pattern, and intramedullary implant for reverse oblique and subtrochanteric fracture patterns, there is disparity in surgical treatment of patients with unstable extracapsular hip fractures.

Date: 2011-09-09

Session: Trauma - Proximal Femur II

Time: 08:00 - 09:30

Room: Club E

Abstract no.: 29843

**INCIDENCE OF HIP FRACTURE IN SOUTHEASTERN NORWAY:
A FOLLOW-UP STUDY**

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INTRODUCTION: Recent reports have suggested that the incidence of hip fracture has stopped rising, and some reports have even suggested a decrease. In a previous report, we found that age and gender specific incidence in southeastern Norway in the period 1998-2003 was comparable to that of other Scandinavian countries. In this study, we aimed to determine the incidence of hip fracture for the years 2008 – 2010 in order to ascertain any trends in the incidence of hip fracture. **METHODS AND MATERIAL:** We determined the number of fractures in the time period as well as the age and gender of each patient for the geographical area of Ostfold County (270,000 inhabitants). The number of patients at risk in each age bracket was extracted from public databases of Statistics Norway. Thus the age and gender specific incidence including 95 % confidence intervals was calculated. **RESULTS:** The incidence of hip fracture for men aged 50 – 74 and above 75 was 120/100,000 (100 – 141) and 1305 (1237-1372), respectively. For women 50 – 74 years, the incidence was 184/100,000 (158-209), and 2521/100,000 (2426 – 2615) for women older than 75 years. The incidence did not significantly differ from the previous time period in any of the four groups studied. **DISCUSSION:** In this study, we cannot confirm reports of decreasing incidence of hip fracture. Drugs to treat osteoporosis have been used during both time periods, but have apparently not yet caused a downturn in the incidence of hip fracture in Norway.

Date: 2011-09-09

Session: Trauma - Proximal Femur II

Time: 08:00 - 09:30

Room: Club E

Abstract no.: 28810

IMPLEMENTATION OF AN EVIDENCE BASED DEPARTMENTAL PROTOCOL FOR HIP HEMIARTHROPLASTY IMPROVES CLINICAL OUTCOME AND IS COST EFFECTIVE

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890,000 proximal femoral fractures occurred across Europe throughout 2000, costing the European health economy £21 billion (€ 32 billion). This is expected to rise to £51 billion (€ 76 billion) by 2050. It is vital European healthcare providers maximise their cost-effectiveness whilst continuously improving clinical outcome. Before March 2009, our orthopaedic unit used two prostheses to treat displaced femoral neck fractures: the uncemented Austin-Moore hemiarthroplasty and the cemented bipolar CPT prosthesis. No formally agreed departmental protocol on prosthesis use existed. This led to variation in patient care and was neither evidence-based nor cost effective. In March 2009, our department implemented an evidence-based protocol which used a cemented modular hemiarthroplasty (CMH) in all ambulant patients with a displaced intra-capsular femoral neck fracture. Aim: To measure the cost-effectiveness and clinical outcome after implementation of evidence based prosthesis selection after displaced intracapsular femoral neck fracture. Methods: We identified all patients who underwent hemiarthroplasty from March 2009 to March 2010 and recorded type of prosthesis used. Clinical outcomes measured included deep infection, dislocation, length of stay and overall mortality rates. This was then compared to data from the preceding two years. Results: In 2008/2009 209 hemiarthroplasties were performed costing £118 072 (€141 721). The Austin Moore (£104/€124) was used in 101 cases and the CPT (£996/€ 1195) was used in 108 cases. After protocol implementation, 212 hemiarthroplasties were performed costing £55 564 (€66 693). The Austin Moore was used in 41 cases and the cemented modular hemiarthroplasty (£300 (€360) per case) was used in 171 cases. All clinical outcomes measured duration of admission were favourable compared to published data. Conclusion: Rational use of an evidenced based protocol for cemented hemiarthroplasty led to a saving of over £62 500 (€ 75 028) per annum, produced favourable clinical outcomes, and reduced length of hospital admission.

Date: 2011-09-09

Session: Arthroplasty - Hemiarthroplasty

Time: 10:00 - 11:30

Room: Club E

Abstract no.: 28619

**A DISCUSSION: NON-CARDIAC SURGERY (DYNAMIC HIP SCREW: DHS)
IN SAME SITTING AS A CABG IN A PATIENT SUFFERING FROM ACUTE
MYOCARDIAL INFARCTION**

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As per the current guidelines in literature, any patient undergoing major cardiac surgery for acute myocardial infarction should not be subjected to any non-cardiac surgery for at least 4 weeks. This is due to the fact that during these 4 weeks after a cardiac procedure, there is high risk for morbidity or mortality from increased stress on the cardiorespiratory system. However, delaying surgical treatment in fractures of neck of femur, especially in displaced fractures, leads to much higher incidence of malunion, nonunion, avascular necrosis and thromboembolism. Conservative management is associated with much higher rates of morbidity and mortality as compared to operative management. Also a prolonged recumbent position is detrimental for the cardiorespiratory status of the patient. This lead us to take a 'calculated risk' by taking up a patient suffering from an intertrochanteric fracture with an acute myocardial infarction for Dynamic Hip Screw (DHS) immediately following a carotid artery bypass grafting procedure (CABG). We report a successful outcome in this scenario, and propose that such surgery for a hip fracture immediately following even a major cardiac procedure such as CABG offers no increased risks. It offers all the advantages of early surgery, which is in fact indicated in such a fracture. This case report aims at eliminating the common and long-held belief that any non-cardiac surgery following a major cardiac procedure should be put off for at least 4 weeks.

Date: 2011-09-09

Session: Arthroplasty - Hemiarthroplasty

Time: 10:00 - 11:30

Room: Club E

Abstract no.: 29111

OSTEOPOROTIC HIP FRACTURES SHOULD BE FIXED SURGICALLY IN THE VERY OLD

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Objective: We examine the demographics, mortality and outcome of osteoporotic hip fractures in extremely elderly patients comparing them to elderly patients. **Methodology:** This is a 1-year follow-up study comparing 87 consecutive nonagenarian (>90 years) hip fracture patients to 87 geriatric (>65 to >90 years) patients from 2007 to 2009. Demographic information pertaining to gender and co-morbidities is compared. Peri-operative details including length of hospitalisation, mortality at 6-months and 1-year post-surgery and ambulatory status were analysed. **Results:** The average age of our nonagenarian population was 93 years compared to our geriatric population of 78 years. There were more males in the geriatric population than nonagenarian population (31.0% compared to 17.2%). The average number of co-morbidities in the geriatric and nonagenarian patients was 1.46 and 1.86 respectively. Majority of nonagenarian patients had one co-morbidity (30.0%) compared to two in geriatric patients (21.9%). Length of hospitalisation, days for pre-operative optimization, post-surgery stay for geriatric and nonagenarian patients were similar at 16, 5 and 11 days respectively. Cox regression comparing survival of geriatric and nonagenarian populations at 6-months (90.7%, 90.6%) and 1-year (90.7%, 88.2%) showed no difference. **Conclusion:** Males are less represented in the nonagenarian than geriatric population for hip fractures because females live longer. Nonagenarian patients are healthier compared to geriatric patients resulting in no difference in length of stay and duration for pre-operative optimization. Active intervention for hip fractures should be based on physiological and not chronological age in the very elderly.

Date: 2011-09-09

Session: Arthroplasty - Hemiarthroplasty

Time: 10:00 - 11:30

Room: Club E

Abstract no.: 29495

**STRATEGIES TO IMPROVE THE MANAGEMENT OF HIP FRACTURES
WITHIN A LARGE TEACHING HOSPITAL**

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Introduction: The recently published British Orthopaedic Association Standards for Trauma (BOAST) state patients over the age of 60 years with hip fractures should have surgery performed within 48 hours of admission, unless there are clear reversible medical conditions. An audit of patients admitted to our institution with hip fractures in 2008 highlighted a significant problem in meeting these guidelines. Several changes were implemented, including a daily dedicated hip fracture trauma list, extra Saturday dedicated hip lists and the introduction of a management pathway. The purpose of this study therefore was to evaluate whether the implementation of the above changes led to an improvement in the management of these patients. Patients & Methods: Completed audit cycle of hip fracture patients over the age of 60 admitted to our unit over a 4 week period in November/December 2008 (24 patients) and November/December 2009 (26 patients). Results: Over the 4 week period in 2008, 46% of patients (11/24) were operated on within 48 hours of admission. Re-audit in November/December 2009 showed 77% of patients (20/26) were operated on within 48 hours of admission ($p=0.01$). Only 5% of patients (2/26) waited longer than 48 hours without a medical reason ($p=0.01$). Conclusion: Implementation of dedicated hip fracture trauma lists and a standardized hospital Fracture Neck of Femur Pathway have proved to be an effective means of meeting the BOAST guidelines and have significantly improved the management of hip fractures in the older person in our unit.

Date: 2011-09-09

Session: Arthroplasty - Hemiarthroplasty

Time: 10:00 - 11:30

Room: Club E

Abstract no.: 29287

MID-TERM OUTCOME OF HIP FRACTURE PATIENTS: A STUDY ON MORTALITY AND MORBIDITY

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Objective: A mid-term outcome study documenting mortality rates of hip-fracture patients and their quality of life (QOL) 5-years post-fracture. Methods: Data prospectively collected from 70 consecutive patients admitted to our hospital following either a cervical (neck) or trochanteric femoral fracture from February to May 2004. Pathological fractures were excluded. Patients' progress was reviewed 1-year and 5- years post-fracture. 5- year mortality was derived from hospital records, phone calls, home visits and letters to overseas patients. Mortality excess was calculated by control-matching our young –old patients against non-hip fracture patients. Functional status based on the EuroQOL was used to assess patients' quality of life. Results: The follow-up rate for the 70 patients described in this report is 100%. Survival rate at 5- years is 55.7% (95% CI: 44.1% to 67.3%). Mortality plateaus 1.5 year post-fracture as seen on the Kaplan-Meier curve. At 5-year follow-up, 52.8% of patients were ambulating well compared to 42.0% 1-year post-fracture. The average self-scoring system (EuroQOL) yielded an average of 70.4/100 five-year post- fracture, compared to 66.6/100 at 1-year follow-up. Conclusion: Hip fractures increase one's risk of dying especially one-year after traumatic fall. Although a minority achieve pre-fracture ambulatory status, survivors show improvement in ambulatory status and QOL scores at 5-year compared to 1-year post-fracture. Surveillance and aggressive rehabilitation to improve patient independence one-year post-fracture is crucial although primary prevention of osteoporotic hip fractures is still paramount in view of increased mortality.

Date: 2011-09-09

Session: Arthroplasty - Hemiarthroplasty

Time: 10:00 - 11:30

Room: Club E

Abstract no.: 29899

RISK FACTORS FOR REOPERATION AFTER HEMIARTHOPLASTY. ANALYSIS OF 21,346 PROCEDURES IN THE SWEDISH HIP ARTHROPLASTY REGISTER 2005-2009

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Elderly hip fractures patients are often given hemiarthroplasties, nevertheless these implants are rarely included in arthroplasty registers. In 2005 national hemiarthroplasty registration was established in the Swedish Hip Arthroplasty Register (SHAR). Now 96% of all hemiarthroplasties in Sweden are registered with surgical and patient details and re-operations. 21.346 hemiarthroplasties were analysed. Acute fracture as reason for surgery increased from 91.3 to 94.3 percent. Lubinus SP II and Exeter stems accounted for 68.3 percent of the implants. 743 patients (3,6%) underwent reoperations, mostly due to dislocation. The strongest risk factors for reoperation (Cox regression analysis) were hemiarthroplasty due to failed internal fixation (rr 2.1, 95%CI 1.7-2.7) and uncemented stem (2.0, CI 1.5-2.6). When only modern uncemented implants are analyzed there is increased risk of re-operation (1.8, CI 1.3-2.5) and particularly periprosthetic fracture (3.8, CI 2.0-7.1). Bipolar hemiarthroplasty heads also increased the risk, especially dislocation (1.4, CI 1.1-1.8). Anterolateral surgical approach (Gammer, Hardinge) decreased the risk of dislocation re-operation (0.63, CI 0,53-0.83). Other risk factors are male gender and age <75 years. Uncemented implants decreased from 10.4 to 3.0 percent in 2005-2009 and anterolateral approach increased from 46.7 to 55.9 percent. Important changes have been seen in implants and fixation. Results from SHAR have a large impact on the methods and implants chosen by Swedish orthopaedic surgeons as a tool for improving patient care.

Date: 2011-09-09

Session: Arthroplasty - Hemiarthroplasty

Time: 10:00 - 11:30

Room: Club E

Abstract no.: 27326

UNIPOLAR VERSUS BIPOLAR HEMIARTHROPLASTY FOR DISPLACED FEMORAL NECK FRACTURES IN THE ELDERLY: IS THERE A DIFFERENCE?

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Background: Hip hemiarthroplasties are commonly performed for displaced femoral neck fractures. Considerable differences of opinion exist regarding the choice between unipolar and bipolar designs. The main theoretical advantage of a bipolar over a unipolar prosthesis is the reduction of acetabular erosion due to movement taking place within the implant rather than at the acetabular implant interface. It is thus hypothesized that bipolar prostheses lead to better long term functional outcomes with less complications. Purposes To compare unipolar (Moore's) and bipolar hemiarthroplasty looking specifically for differences in (1) Pain and functional hip scores (2) Rates of acetabular erosion, component migration and revision surgery (3) Rates of postoperative morbidity. Patients and Methods: Inclusion criteria were (a) age more than or equal to 65 years, (b) displaced femoral neck fracture of non-pathologic origin, (c) normal cognitive function, (d) ambulatory with or without assistive devices prior to the fracture, and (e) treated with a primary prosthetic replacement. 193 patients were available for review; 118 in the Moore's group and 75 in the bipolar group. Postoperatively, patients were assessed with regards to pain, satisfaction, Modified Harris hip score and Oxford hip score. Standard anteroposterior pelvis and lateral hip radiographs were obtained at regular intervals. These were analysed specifically with regards to acetabular erosion and component migration. Results: No significant difference between a Moore's and a bipolar prosthesis regarding hip pain, functional hip scores, rates of acetabular erosion, component migration, revision surgery and complications rates.

Date: 2011-09-09

Session: Arthroplasty - Hemiarthroplasty

Time: 10:00 - 11:30

Room: Club E

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UNCEMENTED THOMPSON'S HEMIARTHROPLASTY IN ELDERLY PATIENTS WITH HIP FRACTURES; ARE THEY APPROPRIATE?

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Current evidence suggests that we should be moving away from Thompson's hemiarthroplasties for patients with intracapsular hip fractures. Furthermore, the use of cement when inserting these prostheses is controversial. This study aims to show the Inverness experience. We performed a retrospective review of all NHS Highland patients who underwent a hemiarthroplasty for an intracapsular neck of femur fracture over the last 15 years. Demographics and the use of cement were documented. Further analysis of this group was performed to identify any of these patients who required revision of their prosthesis. Patients requiring revision had their case-notes reviewed to identify the cause for further surgery. From 1996 until present 2221 patients from the Highland area had a hemiarthroplasty for an intracapsular neck of femur fracture. 1708 were female (77%) and 513 male (23%). The ages ranged from 28 years to 104 years (mean 80 years, median 81). 2180 of this group had their operations in Raigmore Hospital with the remaining 41 at various centres throughout Scotland. 623 (28%) had a cemented hemiarthroplasty, with the remaining 1578 (72%) having an uncemented Thompson's hemiarthroplasty. The revision rate for the cemented group was 2% (13 of 623 patients). In the uncemented group it was 0.4% (6 of 1578). Reasons from revision included dislocation, periprosthetic fracture, infection and pain. Current evidence from some joint registers regarding the use of Thompson's hemiarthroplasty in the elderly is discouraging. The use of bone cement in this group with multiple co-morbidities is not without its risks. Our data suggests that uncemented Thompson's hemiarthroplasties in low demand elderly patients with multiple co-morbidities can yield excellent results with less risk to the patients.

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Session: Arthroplasty - Hemiarthroplasty

Time: 10:00 - 11:30

Room: Club E

Abstract no.: 29906

MONOBLOCK HEMIARTHROPLASTIES FOR FEMORAL NECK FRACTURES: A PART OF ORTHOPAEDIC HISTORY?

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Monoblock implants are still used world-wide for femoral neck fractures. In 2005 national hemiarthroplasty registration was established in the Swedish Hip Arthroplasty Register (SHAR). Now 96% of all hemiarthroplasties in Sweden are registered with surgical and patient details together with re-operations. 20391 hemiarthroplasties performed due to hip fractures and through standard approaches (i.e. no mini-invasive surgery) 2005-2009 were analysed, resulting in 616 uncemented Austin-Moore implants, cemented 752 Thompson and 364 ETS Endo implants compared with various modular implants (n=18659). More elderly and demented patients were treated with Austin-Moore stems compared modular implant. The former group also had the highest mortality, 227 deceased after one year (37%). Austin-Moore implants had the highest reoperation rate (6.7%). Thompson®/ETS® led to 2.4% reoperations and modular implants to 3.5%. In a Cox regression analysis, the risk of reoperation was increased twice for the Austin-Moore prosthesis (2.0; CI 1.5-2.8) mainly due to dislocation and periprosthetic fracture. The use of Thompson/ETS prosthesis did not influence to risk of reoperation compared to modular implants. Uncemented Austin-Moore monoblock hemiarthroplasties have an increased risk of reoperations, due to periprosthetic fractures and dislocation, and should not be used in modern orthopaedic care. Cemented monoblock implants (Thompson, ETS Endo) have good results regarding reoperations when used in the oldest hip fracture patients. To give definite recommendations whether to use this implant type or not, patient reported outcomes including pain, function and health-related quality of life must be analysed as well.

Date: 2011-09-09

Session: Foot & Ankle - Miscellaneous III

Time: 10:00 - 11:30

Room: Club H

Abstract no.: 29941

ARTHRODESIS OF LOWER EXTREMITIES WITH BLOCKING INTRAMEDULLARY NAIL

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Aim: To evaluate the treatment results after arthrodesis of ankle and knee joints with intramedullary blocking nails. **Materials and methods:** Data of 23 patients (11 ankle, 12 knee joints), from 42 to 72 years old, who underwent the arthrodesis of knee and ankle joint with intramedullary blocking nails were analyzed. Arthrodesis of knee joint was done for the following conditions: 1. Post traumatic arthrosis of knee joint, in where the total knee replacement is contraindicated. 2. Supra condylar pseudoarthrosis in combination with fibrous ankylosis of knee joint. 3. Deep endoprosthesis infection of knee joint. In 2 cases, arthrodesis of knee joint and autologous bone graft is combined with intramedullary osteosynthesis of femur and with the same nail. Combination of ankle joint arthrosis and degenerative or post-traumatic lesions of subtalar joints were the indications for arthrodesis of ankle joint. **Summary:** At the present time, we have the follow-up for 3 years. Four patients are under observation with good radiologically confirmed formation of ankylosis. All the other patients who has more than 5 month follow-up had already formed ankylosis. According to the results, intramedullary blocking nail allows to get ankylosis of joint from 2-6 months. In some cases, IM nail allowed not only achieve bony ankylosis and also helpful in achieving union of bone lesions. Usage of IM nail gives the possibility to allow early weight bearing and high quality of life soon after the first day of surgery.

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Session: Foot & Ankle - Miscellaneous III

Time: 10:00 - 11:30

Room: Club H

Abstract no.: 29056

BIOMECHANICAL COMPARISON OF CYCLIC STABILITY AND LOAD TO FAILURE OF ACHILLES TENDON REPAIR WITH NINE DIFFERENT SUTURES

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Biomechanical studies investigating suture techniques for Achilles tendon repair used single load to failure tests in order to evaluate the maximal load capacity of the repaired construct. During early rehabilitation the repair is repetitively loaded such as exercise or daily living activities like walking. Cyclic loading seems to duplicate the physiological loading conditions more closely than single cycle failure tests. Aim of this study was to test nine sutures most commonly used Achilles tendon repair (Cuneo-Bunnell, Kessler-Tajima, Krackow-2, Krackow-4, Krackow-4 with two filaments, Krackow-6, Krackow-6 with two filaments, CLC and MGH). Following tenotomy fresh Bos Taurus tendons were sutured either with one of techniques with Ethibond#1. After repair, cyclic loading tests were performed with a uniaxial biomechanical testing machine Walter+Bai AG. The load to failure was $83,4 \pm 3,2$ N for Cuneo-Bunnell, $88,4 \pm 10,8$ N for Kessler-Tajima, $272,8 \pm 39,3$ N for Krackow-2, $298,4 \pm 17,4$ N for Krackow-4, $408,4 \pm 45,4$ N for Krackow-4 with two filaments, $292,2 \pm 15,5$ N for Krackow-6, $406,8 \pm 27,4$ N for Krackow-6 with two filaments, $383,8 \pm 28,6$ N for CLC and $401,8 \pm 41,2$ N for MGH. Cyclic stability was measured as elongation after 2500 cycle loading with 50N, 125N and 200N. The best suture of ruptured Achilles tendon is Krackow-4 with two filaments that showed best biomechanical properties.

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Session: Foot & Ankle - Miscellaneous III

Time: 10:00 - 11:30

Room: Club H

Abstract no.: 29399

RESULTS AND FUNCTIONAL OUTCOME OF TRAUMATIC SECONDARY ARTHROSIS OF THE ANKLE JOINT TREATED BY INTERNAL ARTHRODESIS

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Introduction: Secondary osteoarthritis of the ankle joint (SOAA) represents a common complication after ankle/tibial pilon fracture. Arthrodesis remains the gold standard including intramedullary nail (IMA) and screw fixation (SFA). The purpose was to evaluate results and functional outcome in patients with SOAA receiving IMA or SFA. Method: A prospective analysis was undertaken on a matched case-control-cohort of 32 patients. Outcomes consisted of complications and functional ability (walking distance, pain, AOFAS score). Results: 25 males and 7 females had a mean age of 52 years (range 33–77) and BMI of 29.9 (range 22.5–40.4). Primary injury was 10 tibial pilon and 22 ankle fractures. Time to arthrodesis averaged 11 years. 17 IMA and 15 SFA were performed. Six patients had normal walking distance and 12 had no-to-mild pain. AOFAS averaged 55.97 and was similar between treatment groups ($p=0.384$) and was inferior compared to normative ($t=16.559$, $p<0.001$). AOFAS was related to walking distance ($r=-0.642$) and pain ($r=-0.480$) with significance at $p<0.01$. Complications included 29 secondary osteoarthritis, 5 disturbed wound healing, 5 hardware loosening, 3 infections, 2 nonunions, and 2 malalignment. Healing disturbances were related to IMA ($\rho=-0.404$, $p=0.022$). Conclusion: Ankle joint osteoarthritis is a common sequelae after ankle or pilon fracture. Even after successful internal arthrodesis significant functional impairment remains. Nail and screw fixation techniques showed equal fusion rates and functional ability. However, nail fixation is prone to more complications.

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Session: Foot & Ankle - Miscellaneous III

Time: 10:00 - 11:30

Room: Club H

Abstract no.: 27368

TOTAL ANKLE REPLACEMENT – LONG-TERM SURVIVAL ANALYSIS

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Introduction: The purpose of this study was to assess the long term clinical and radiographic outcome of the Buechel-Pappas Total Ankle Replacement System with a mean follow up of 5.1 years (1-13 years). Methods and materials: A total of 30 primary total ankle arthroplasties in 29 patients were performed in our hospital between June, 1996 and June, 2009. 20 (69%) of the patients were males and 9 (31%) were females. The average age of the patients was 66.7 +/- 7.95 years. Patients were assessed clinically and radiologically at 3 month intervals for 1 year and annually subsequently. Post operative pain and function assessment was performed using AOFAS ankle and hind-foot score. Kaplan-Meier analysis, life expectancy calculation and Cox regression analysis were performed on the survival data to calculate the effect of age as a continuous variable on the hazard of failure of the prostheses. Results: 3 out of the 30 (10%) total ankle arthroplasties underwent reoperation at a mean of 12.9 months. The mean AOFAS score was 81. Cumulative survival function (95% confidence interval) at 23.3 months was 87.6% +/- 37.2%. Life expectancy of the prosthesis was approximately 10 years (99.87 – 138.94 months). Cox regression analysis revealed a hazard ratio of 0.80 (0.65 – 0.99) (p <0.05), showing a 20% relative decrease in the hazard of failure with each one-year increase in corresponding age. Our results are comparable in terms of survival of the total ankle arthroplasties.

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Session: Foot & Ankle - Miscellaneous III

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Room: Club H

Abstract no.: 30162

IS LAG SCREW FIXATION CRUCIAL IN LATERAL MALLEOLUS FRACTURE FIXATION?

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Displaced fractures of the lateral malleolus are usually treated by plating, with or without the use of a preliminary lag screw, and then a period of plaster immobilisation. The need for this lag screw is conventionally based upon the obliquity and the degree of comminution of the fracture. A non-comminuted oblique or spiral fracture is considered ideal for lag screw fixation. This study questions the need for this screw. A total of 200 consecutive ankle fractures that were operatively fixed over a 3 year period were reviewed. Fifty two fractures which were unsuitable for lag screw fixation were eliminated from the study. This left 95 fractures which were fixed with lag screw and plate, and 53 patients who had plate fixation alone. In most of the latter group, an easier technique was used, whereby a temporary K-wire held the fracture out to length; this was removed when plating was complete. Therefore 148 patients were available for this retrospective study. Follow-up ranged from 12 to 36 months. The success of fixation, complications, resultant mobility and patient satisfaction were accessed by radiographic findings and the clinic notes. X-rays showed that of the 95 patients with lag screws, 25 had screws that were misdirected and ineffectual. We found no appreciable difference between outcomes of the two groups. This study suggests that in practice, lag screw fixation as a supplement to fibular plating is an unnecessary intervention; the use of a temporary K wire is quicker and effective.

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Time: 10:00 - 11:30

Room: Club H

Abstract no.: 28385

INDICATION OF ARTHROSCOPIC DRILLING AND RETROGRADE CANCELLOUS BONE TRANSPLANTATION FOR THE TREATMENT OF OSTEOCHONDRAL LESIONS OF THE ANKLE ACCORDING TO SUBCHONDRAL BONE CONDITION

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We performed different surgical procedures; arthroscopic drilling (AD) and retrograde autologous cancellous bone plug transplantation from the patient's pelvis (RCT), according to MRI diagnosis for subchondral bone condition, and clarified the clinical and morphological results of AD and RCT. If the diameter of the subchondral lesion was lesser than 10 mm, AD was performed. If it was equal to or greater than 10 mm, RCT was performed. Between April 2006 and July 2008, there were 17 cases of Group AD and 15 cases of Group RC. AD was performed trans-malleolarly. In performing RCT, a cancellous bone plug of the ipsilateral iliac crest was harvested using a 6.0 mm OATS at the exposed iliac crest and was inserted to the subchondral lesion retrogradely. The AOFAS score at pre-operation and 2 years after the surgery, and ICRS visual repair assessment score with second-look ankle arthroscopy at 1 year after the surgery were evaluated. There were 17 cases of talar lesion in Group AD, and 13 cases of talar lesion and 2 cases of tibial lesion in Group RCT. Six cases had subchondral cyst in Group RCT. The mean AOFAS score was 57.8 at pre-operation and 94.4 at 2 years after surgery in group AD, and 59.2 at pre-operation and 95.2 at 2 years after surgery in group RC. In group RCT, the subchondral-lesion disappeared in 73.3%, and decreased in 26.7%. The mean ICRS score at 2nd look arthroscopy was 9.5 in Group AD and 10.3 in Group RCT. In Group RCT, all cases were categorized into nearly normal; comparing with 15 cases into nearly normal, 2 cases into abnormal in Group AD. In conclusion, we recommend using the different surgical procedures according to subchondral bone condition in treating OCL of the ankle.

Date: 2011-09-09

Session: Foot & Ankle - Miscellaneous III

Time: 10:00 - 11:30

Room: Club H

Abstract no.: 28686

OPEN REDUCTION AND INTERNAL FIXATION IN INTRAARTICULAR CALCANEAL FRACTURES: TECHNICAL PITFALLS, CONTROVERSIES AND SOLUTION TO THE PROBLEMS

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ORIF is the treatment of choice in the calcaneal fractures with posterior joint facet impression aggregated with step or gap more than 2-3 mm, decreasing Bohler angle to 0°, calcaneal broadening or shortening to 1/3. Eighty one patients with one hundred ten intraarticular calcaneal fractures were managed in Republic Scientific Practical Center of Traumatology and Orthopedics between March 2005 and July 2010. The mean age was 33,4±4,57. There were 66 men and 15 women. Joint depression type – 64, tongue type – 46. According to Sanders there were type1 – 5 cases, type 2A - 4 cases, 2B - 18 cases, 2C – 9 cases, 3AB - 31 cases, 3AC – 27 cases, 3BC – 10 cases, type 4- – 6 cases. ORIF using plates and screws through extended lateral approach was performed in 44 cases (39 patients), or 40%. Difficulties in obtaining appropriate access to the fracture fragments were noticed in 3 cases and connected with incision location too close to the lateral malleolus. Percentage of the imperfect open reduction run up to 22,7% (10 cases from 44). Analysis of the results disclosed the next main causes of the failed open reduction: attempt to reduce multifragmental fractures (4 cases), delay in surgery up to 14-16 day (5 cases), wrong steps order in performing reduction, underestimation the role of the key fragments (6 cases), disuse reduction devices, distractors (3 cases), inadequate intraoperative control quality of reduction (5 cases).

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Time: 10:00 - 11:30

Room: Club H

Abstract no.: 29092

HOW VALID ARE FOOT AND ANKLE OUTCOMES MEASURES AND INSTRUMENTS?

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Background: Clinicians wishing to use a scoring method for musculoskeletal outcomes are faced with a bewildering number of choices. Aims: To investigate if published foot and ankle outcomes measures have been validated for clinical use along the dimensions of content, construct and criterion. Methods: Using a previously collected database, 71 foot and ankle outcomes measures and instruments were identified and examined. Of the scoring systems examined, 42% were designed for the foot (30/71) and 58% for the ankle (41/71). Results: An outcome measure was deemed to be valid if a subsequent published study evaluated the instrument's content, construct and criterion validity. Although 63% of outcomes measures are validated (45/71), this is weighted in favor of foot instruments (27/30 foot, 18/41 ankle). Regarding instrument type, 44% of the outcomes measures evaluated are patient-reported (31/71) and 56% are clinician-based (40/71). While 90% of patient-reported outcomes are validated (28/31), just 42% of clinician-based outcomes are (17/40). Of the 45 validated outcomes measures, 7 are validated for content only (2 ankle, 5 foot). A further 7 outcomes scores (3 ankle, 4 foot) are validated for content only or for specific conditions (eg, the Foot and Ankle Disability Index (FADI) for acute lateral ankle sprains). Therefore, a total of 44% of all instruments examined are valid without caveats (31/71). Conclusions: It is advisable for clinicians wishing to use a published foot or ankle outcomes measure to investigate if it has been validated.

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Abstract no.: 28673

SAFETY PROFILE OF SURAL NERVE IN POSTEROLATERAL APPROACH TO THE ANKLE JOINT – MRI STUDY

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INTRODUCTION: The posterolateral approach to ankle joint is well suited for ORIF of posterior malleolar fractures. There are no major neurovascular structures endangering this approach other than the sural nerve. The sural nerve is often used as an autologous I nerve graft and provides sensation to lateral aspect of the foot. Hence every attempt must be made to protect the sural nerve. The aim of this paper is to measure the precise distance of the sural nerve from surrounding soft tissue structures. **METHODS:** This is a retrospective image review study including patients with MRI of ankle from January 09 - Nov 2010. We identified 78 MRI scans out of which 64 were deemed eligible for assessment. All measurements were made from Axial T1 slices. Measurements were made from the lateral aspect of the TA to the central of the sural nerve, central of sural nerve to posterior aspect of the peronei muscles and central of the sural nerve to the posterior aspect of fibula. Data were collected on a Microsoft Excel spreadsheet and the descriptive statistics calculated. **RESULTS:** The key findings of the paper is the safety window for the sural nerve from the lateral border of TA is 7mm, 1.3cm and 2cm at 3 cm above ankle joint, at the ankle joint and at the distal tip of fibula respectively. Similarly the safety window for the nerve from the posterior aspect of fibula is 2cm, 1.6cm, 1.6cm at 3cm above ankle, at the ankle joint and the distal tip of fibula respectively. **CONCLUSION:** Our study demonstrates the close relationship of the nerve in relation to tendoachilles, peronei and fibula in terms of exact measurements. The safety margins established in this study should enable the surgeon in preventing endangerment of the sural nerve encountered in this approach.