

Under the High Patronage of His Majesty King Mohammed VI

Fifth SICOT/SIROT Annual International Conference

ABSTRACT BOOK



29 August – 1 September 2007
Palais des Congrès
Marrakech, Morocco



Key to the abstract numbering system

SIC	= SICOT free paper presentations
SICIS	= SICOT invited speaker presentations
SICPS	= SICOT plenary speaker presentations
SIR	= SIROT free paper presentations
SIRIS	= SIROT invited speaker presentations
TM	= Trainees' Meeting free paper presentations
TMIS	= Trainees' Meeting invited speaker presentations
SM	= SMACOT free paper presentations
SMIS	= SMACOT invited speaker presentations
SRSIS	= SRS invited speaker presentations

The number after the letters indicates the session number, and the number after the hyphen corresponds to the order of appearance of presentations in the different sessions.

Posters

Posters will be displayed in the Royal Room during the whole duration of the meeting. They should be set up on Wednesday, 29 August 2007 from 10.00 to 16.00 and should be removed on Saturday afternoon after the Closing Ceremony.

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Session 01: Hip joint replacement (I)

FREE PAPERS (1)

Moderators: Laurent Sedel (France)
M'hamed Jirari (Morocco)

SIC01-01

METAL ON METAL SURFACE REPLACEMENT OF HIP

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INTRODUCTION: The first generation of Surface Replacements of Hip (1950-1975) was gradually abandoned because of high failure rate. With the development of better surface finish and materials there is renewed interest in metal on metal surface replacements. **OBJECT:** I would like to present our early experience with metal on metal hip resurfacing in a DGH environment using cementless v cemented prostheses. **MATERIAL & METHODS:** 133 consecutive resurfaced hips were performed between year 2000 & 2005 which form the basis of this review. The Acetabular component was uncemented porous coated in all patients. The femoral component was cementless in 22 hips and cemented in the remaining. There were 5 bilateral, 25 female. Mean age was 69 (33-67). Four patients had previous osteotomy. Patients were assessed using Charnley modification of MDP and SF36. Follow-up was 1-6 years. The results were statistically analyzed. **RESULTS:** On Charnley assessment the mean score (pain+Walking+Movements) rose from 7 pre-op to 15.7 at review. On SF36 the score rose from the mean of 27 pre-op to 74 post-op. 73% could play golf, swimming and some even tennis. Complications included one DVT, 6% heterotopic calcification grade 1 or 2. Three patients (2%) needed revision, one each due to infection, femoral neck fracture, acetabular loosening. **CONCLUSION:** Early results of hip resurfacing are encouraging in the younger age group (below 65) even in a DGH. The cementless femoral component is as successful as the cemented. There was significant improvement in all the scores of Charnley and SF36. There were no significant differences in the two Charnley groups.

SIC01-02

DOES THE POSTERIOR APPROACH FOR TOTAL HIP ARTHROPLASTY IMPLY MORE COMPLICATIONS?

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The optimum approach for Total Hip Arthroplasty (THA) is hotly debated. Many surgeons, especially the newly trained, have been wary of the posterior approach because of higher reported rates of dislocation. We analysed 137 patients after Primary THA during the initial three years of practice of a newly appointed consultant in UK. Data was gathered prospectively using a questionnaire, one before surgery and one each at 3 and 12 months after surgery. 4 patients died from causes unrelated to their arthroplasty (2.9%)

and 6 patients (4.3%) were lost to follow up. The patients were grouped into A, B and C depending on involvement of one hip, both hips and multiple joint diseases respectively. The patients were analysed for pain scores (1-6), function scores (1-6) and satisfaction levels (1-5). All complications during and after surgery were noted. The results were compared with the incidence reported in the literature for posterior and other approaches. The results were gratifying and were comparable with major series of THA. No patient had a dislocation and 122 patients (96%) were pain free or had minimal pain. 93 patients (73%) were walking without a stick while 34 patients (27%) carried a stick for extra safety. 5 patients (4%) had superficial infection, which settled with antibiotics and one patient (0.7%) had a deep infection requiring Revision hip surgery. We conclude that the posterior approach, already known to cause less blood loss and to allow optimum component positioning, is compatible with a low overall rate of early complications.

SIC01-03

IN VITRO INVESTIGATIONS OF THE PRIMARY STABILITY METAL PRESS-FIT CUPS IN THR DEPENDING ON THE INSERTION FORCE EXERTED

Andreas FRITSCHÉ

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In order for press-fit cups to obtain secondary stability by osteointegration, primary stability is of great importance. The aim was to examine how the insertion force influences the primary stability of press-fit cups. Two different surgeons implanted a press-fit cup (CL Metal Shell, Stryker GmbH & Co. KG) in artificial bone material (ROHACELL 110 IG, Gaugler & Lutz oHG). One surgeon applied an average force of 4.5 kN whilst the other applied an average force of 7.0 kN. Lever-out and pull-out tests were then carried out to determine the primary stability of the press-fit cup. Applying the lower insertion force approximately 9 strikes were needed to fit the cup whereas only 4 strikes were needed exerting the higher force. High insertion forces showed no positive effect on primary stability. In fact there seems to be a tendency of a reduction in primary stability. Average lever-out-moments of 17.1 Nm (+/-4.9 Nm) using low insertion forces and 15.1 Nm (+/-11.6 Nm) applying high forces were measured. Pull-out-tests showed great deviations and significantly lower pull-out-forces averaging 201 N (+152 N, -118 N) when exerting a high insertion force. By applying lower insertion forces an average pull-out-force of 298 N (+121 N, -79 N) was assessed. Cups inserted at higher forces tend to be implanted less accurately, i.e. tilted, which can result in lower primary stability. Further investigations considering cortical bone using composite bone substitute as well as machined insertion forces and measurements of the tilting angle will be carried out.

SIC01-04

EXPERIMENTAL INVESTIGATIONS CONCERNING THE PRIMARY STABILITY OF A METAL-BACKED PRESS-FIT ACETABULAR CUP DEPENDING ON THE INSERTION FORCE

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In order to obtain secondary stability by osseointegration, primary stability of total hip implants is of great importance. The aim was to examine how primary stability of metal-backed cups is influenced by the insertion force. Two different orthopaedic surgeons implanted a press-fit cup (TRIDENT PSL, Stryker Ltd, Limerick, Ireland) in artificial bone material (ROHACELL 110 IG, Gaugler & Lutz oHG, Aalen, Germany) simulating cancellous bone. One surgeon applied low average forces of 4.5 kN whilst the other

applied high average forces of 7.0 kN. Consequently lever-out and pull-out tests were carried out to determine the primary stability of the cup. Applying the lower insertion force approximately 9 strikes were needed to fit the cup whereas only 4 strikes were needed exerting the higher force. Average lever-out-moments of 17.1 Nm using low insertion forces and 15.1 Nm applying high forces were measured. When exerting a high insertion force pull-out-tests revealed great deviations and clearly lower pull-out-forces of about 201 N. By applying lower insertion forces an average pull-out-force of 298 N was assessed. High insertion forces showed no positive effect on primary cup stability. There seems to be a tendency of a reduction in primary stability. Cups inserted at higher forces tend to be implanted less accurate, i.e. more tilted, which can result in lower primary stability. Further investigations considering cortical bone by generating a composite bone substitute model, reproducible insertion by a testing machine and measurements of the tilting angles will be performed.

SIC01-05

BILATERAL SEQUENTIAL TOTAL HIP REPLACEMENT WITH SINGLE ANAESTHESIA

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PURPOSE: To compare bilateral sequential total hip replacement under a single anaesthetic to bilateral staged total hip arthroplasty for bilateral hip arthritis. **METHOD:** From a prospective hip arthroplasty database we have identified 27 patients with 54 arthroplasties performed during the same hospital admission a mean of 10.2 days apart. A further 25 patients, undergoing 50 arthroplasties had procedures performed under a single anaesthetic. The two groups were comparable with respect to age, sex, height, weight, diagnosis, follow-up and surgical approach. Four different prosthetic implants were used in these patients. Functional data was collected prospectively and radiographic data analysis performed by a blinded observer. **RESULTS:** The improvement of hip score at one year and at final follow-up did not differ significantly between the two groups. There was no difference in pain score, range of motion or functional outcome between the two groups. There was, however, a higher rate of postoperative dislocation, higher transfusion rate and increased length of stay in the short interval group as compared to the single anaesthetic group. There was no difference in radiologic outcome between the two groups. **CONCLUSION:** A short interval between hip arthroplasties may be detrimental due to increased rate of hip dislocation and the increased need for transfusion; furthermore there is a substantial increased length of stay in the short interval group. In patients with bilateral hip arthritis sequential procedures under a single anaesthetic may be preferable if general health status is appropriate.

SIC01-06

SHORT-TERM RESULTS IN A "ONE SHOT-TWO JOINTS" BILATERAL HIP ARTHROPLASTY

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From 1998-2004, 88 patients (176 hip joints) with bilateral osteoarthritis were treated by one shot-two joints procedure. 71 patients (142 hips) could be evaluated at least 2 years after surgery. We saw 13 complications. Those were: 4 fractures/loosening of surface replacement, 3 loosening of Mayo stems, 1 loosening of a cementless acetabular component, 1 dislocation of the PMMA-liner, 2 septic complications needing revisions. 94% of the patients who were evaluated would prefer a bilateral procedure again. Facing advantages versus disadvantages: one shot-two joints procedure can be recommended.

SIC01-07

HIP ARTHROPLASTY POST-OPERATIVE FOLLOW-UP. A TIME FOR REVIEW.

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INTRODUCTION: Hip arthroplasty represents a large consumer of resources in orthopaedic surgery. Although the need for follow up is universally accepted, there is much debate on the duration and frequency of outpatient visits. To date there is no evidence regarding the cost effectiveness of follow up. 90% of hip arthroplasty failures do so after 5 years. Joint replacement review is performed by a variety of personnel including orthopaedic surgeons, surgical care practitioners (SCPs) and extended scope practitioners (ESPs). **METHODS:** A questionnaire was sent out to orthopaedic surgeons working in the Sandwell and West Birmingham Hospitals Trust enquiring about their practice for following up patients who have had hip replacements. Information regarding the length of follow up, frequency of visits and the use of check radiographs was recorded. **RESULTS:** The mean length of follow-up was 28.8 months (12-60 months). The mean number of visits in the first year was 3.9 (3-4). The mean number of total visits was 6. (4-9). The mean number of check radiographs performed in the first year was 2. Mean total number of check radiographs performed was 4. The mean cost for each patient is 590 pounds (224-896 pounds). **DISCUSSION:** There is considerable variation in hip arthroplasty follow up with ensuing cost implications. Guidance is required for the appropriate review, which will allow early detection of complications in an efficient and cost effective manner. In our trust a protocol has been suggested for the follow up of hip arthroplasty by ESPs and SCPs.

*Moderators: Jean-Pierre Courpied (France)
Othman Benabdallah (Morocco)*

CONFERENCE

SICIS01-01

HIGHLY CROSS-LINKED POLYETHYLENE: FROM BENCH SIDE TO BED SIDE

Jean Pierre COURPIED

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The metal on polyethylene bearing couple remains some forty years after its introduction by Sir John Charnley the gold standard in total hip arthroplasty. The main reason for revision and failure using these bearings is usually related to high polyethylene wear and periprosthetic osteolysis, leading to implant loosening. Therefore, it seems clear that effort should be made to increase the wear resistance of ultra-high molecular weight polyethylene. One way of research, initiated in the late 1970's is the use of highly cross-linked material. Indeed, some authors have obtained increased wear resistance of highly cross-linked ultra-high molecular weight polyethylene through high dose of gamma radiation. Current methods of cross-linking include gamma- or electron-beam radiation at doses between 5 and 10.5 Mrad, followed by a post-irradiation thermal treatment to reduce or extinguish the number of free radicals in the material. A number of in-vitro studies have shown major improvements in the wear characteristics of these materials when compared to non-highly-cross-linked polyethylene. However, there is much ongoing

debate on the potentially reduced mechanical properties of highly cross-linked ultra-high molecular weight polyethylene. In this presentation, the current methods of cross-linking, the in vitro results, and the clinical outcome will be discussed based upon a literature review and the authors' experience with this alternative bearing.

FREE PAPERS (2)

SIC01-08

THE FIRST 200 DUROM METAL-ON-METAL HIP RESURFACINGS AT AN AVERAGE FOLLOW-UP OF 4 YEARS

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We report on the short to medium follow up of the first 200 Durom hip resurfacings. There were 189 patients (119 male and 70 female) with an average age at operation of 50 years (range 22.5–72.3). Eleven patients had bilateral resurfacings. Preoperative diagnoses included primary osteoarthritis in 94 cases (47%), slipped upper femoral epiphysis in 40 (20%), DDH in 35 (17.5%) and other diagnoses in 31 cases (15.5%). Patients were assessed clinically and radiologically at 3, 6, and 12 months and annually thereafter. Mean follow-up was 4 years (range 3–5.5). No patients were lost to follow-up. The average Harris Hip Score improved from 46 preoperatively to 94.4 postoperatively. There were no cases of neurovascular complications, dislocation, or femoral neck fracture. One femoral component was revised due to aseptic loosening at 4 years. There was one case of a late acute haematogenous infection that was successfully treated elsewhere by debridement and retention of the prosthesis. Radiologically all acetabular cups appear well fixed. Migration of the femoral component was observed in one case and stem demarcation in 4 cases (2%). All 5 patients maintained excellent function and had no pain. Pelvic osteolysis was observed in 2 cases. Neck remodelling changes were observed in 35 hips (17.5%). The excellent clinical and radiological short to medium term results, justify the use of the Durom hip resurfacing in young and active patients. Continued follow up is needed to confirm that these results are maintained in the long term.

SIC01-09

EARLY RESULTS OF THA WITH A NECK-PRESERVING STEM IN POSTTRAUMATIC HIP DEFORMITY

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INTRODUCTION: Patients with posttraumatic arthrosis of the hip are younger than those with primary hip-arthrosis. For these active patients with a high aseptic loosening rate, the collum femoris preserving hip stem (CFP, LINK, Germany) has been designed. Rationale is minimization of bone resection by retaining the femoral neck. **PATIENTS + METHODS:** From 2002 to 2005 we treated 73 consecutive patients with posttraumatic hip deformity. Age at hip implant was mean 48 (16.4-69.2) years, 47 patients were male. Pre- and postoperatively the Harris Hip score was determined. Surgical approach chosen was

dorso-lateral in all cases. Fixation was uncemented. The acetabular cup was implanted in press-fit technique. **RESULTS:** Implantation was possible in all cases. In one case it came to a perforation of the lateral corticalis in the area of the greater trochanter. This was seen on intraoperative X-ray, repositioning was possible again with a CFP-prosthesis. The other technical complication was an early luxation after 20 days, revision with change of the acetabular cup were required. General complications included 2 DVT, 1 deep wound infection and 1 haematoma requiring revision. Follow-up examination was at mean 13.4 (7-21) months. At this stage there were no further dislocations or loosening. The Harris-Hip score improved from mean 37.4 (6-71) points to 77.3 (54-94) points at follow-up. **CONCLUSION:** Early results of the CFP prosthesis for posttraumatic deformity of the hip are promising. The design is beneficial for the specific needs of the posttraumatic deformity. Early complication rates seem comparable to conventional implants.

SIC01-10

EVALUATION OF THE INFLUENCE OF THE CAPSULAR RECONSTRUCTION ON THE OCCURRENCE OF HETEROTOPIC OSSIFICATION AFTER TOTAL HIP ARTHROPLASTY

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PURPOSE: To evaluate the incidence of heterotopic ossification (HO) after total hip-replacement (THA) with capsular reconstruction through a postero-lateral approach. **METHODS:** A total of 45 patients (75±13 years) after THA with capsular reconstruction were reviewed. None of the patients received prophylactic treatment with nonsteroidal anti-inflammatory drugs (NSAIDs) because of medical reasons like kidney failure and cardiovascular diseases. Radiological images (examination after about one year) were graded according to the Brooker classification. Fisher's exact test was used for statistical analyses. **RESULTS:** Total incidence of radiodetectable HOs was 26.6%. We found in total 12 HO. Two clinical relevant Brooker III HO were observed for all patients furthermore we detected 7 Brooker I and 3 Brooker II HO. **CONCLUSION:** The incidence of 26.6% is comparable to reported findings in the literature with prophylactic NSAID-treatment. The capsular reconstruction seems to have a high impact on the occurrence of HO after THA of the hip.

SIC01-11

LONG-TERM RESULTS AFTER UNCEMENTED TOTAL HIP ARTHROPLASTY FOR THE TREATMENT OF DEVELOPMENTAL DYSPLASIA OF THE HIP

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Baltalimani Bone Disease Hospital, Istanbul (TURKEY)

OBJECTIVE: To evaluate restoring the hip and limb length in patients with osteoarthritis secondary to developmental dysplasia of the hip (DDH) using total hip arthroplasty (THA). **METHODS:** February 1996 to September 2001, 65 hips in 55 patients with advanced osteoarthritis secondary to DDH underwent the uncemented total hip arthroplasty. Average age 48.62 years. According to the Hartofilakidis classification, type I:20 hips, type II:27 hips, and type III:18 hips. All the acetabular cups were reconstructed at the original anatomic location. Structural autograft was used in seven hips to supplement acetabular coverage. We performed clinical and radiographic evaluation for each patient.

RESULTS: All the patients were followed up for 6-11 years. The Harris score average was 52.5(type I), 48.41(type II) and 45.28(type III) preoperatively. At the final follow-up Harris Score average was 89.65 for type I, 87.44 for type II, and 83.28 for type III. The difference between preoperative and postoperative scores are significant ($p=0.0001$). Preoperative slight limping (leg length difference $<1\text{cm}$) was found in 26 (47.27%) patients, moderate limping (1-3cm) in 8(14.55%) patients, and severe limping ($>3\text{cm}$) in 21(38.18%) patients. At their final follow-up 4(7.27%) had severe limping. All the patients limping status were improved and it was significant (McNemar's:0.0001). We have not found aseptic loosening and subsidence except in 6 hips. In 7 hips we used femoral head autograft for superior acetabular defect. We performed femoral shortening osteotomy for 2(3.07%) type III hips. **CONCLUSION:** In addition to standard procedure, structural bone autografting and medialization of the cup, and placing the acetabular component in the true acetabulum are important.

SIC01-12

A NINETEEN YEAR REVIEW OF HYDROXYAPATITE CERAMIC COATED HIP IMPLANTS: A CLINICAL AND HISTOLOGICAL EVALUATION

James M BUCHANAN, Peter LINSLEY

Sunderland Royal Hospital (UNITED KINGDOM)

AIMS: Will Hydroxyapatite Ceramic coated hip implants (HAC) survive more than ten years? **METHOD:** Fully coated Furlong HAC hip prostheses have been used since May 1988. There have been 2216 primary operations in 1806 patients. (4432 components).To obviate polythene wear, patients with a life expectancy of more than 20 years will receive ceramic/ceramic bearing surfaces (522 hips).Four hundred and seventy seven hips have been followed up for ten years or more with a maximum of 19 years. Harris Hip Score (HHS) is used for assessment. X-rays are taken regularly. Post mortem specimens are sectioned to study bone integration to the HAC. **RESULTS:** HHS demonstrates only 13% scoring less than 90. Only nineteen hips (0.84%) had a deterioration in HHS associated with the HA coated implant including twelve components with aseptic loosening (0.27%). Polyethylene wear has been noted in some acetabular liners. Five alumina ceramic components have failed. A newer Zirconia Toughened Alumina (ZTA) (BioloX Delta®) has been used since August 2005 with no failures. Histology shows early bony bonding (six weeks) to HAC. **CONCLUSIONS:** HAC hip prostheses provide a ten-year, pain free arthroplasty. No thigh pain has been noted. There is one case of polyethylene debris/granuloma disease. Younger patients should be fitted with ZTA ceramic bearing surfaces to obviate polythene debris disease. At a maximum follow-up of nineteen years the results are encouraging but longer term results are still awaited.

Plenary lecture

Moderator: Chadwick Smith (USA)

SICPS-01

Bone Substitutes

Lars LIDGREN

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The number of individuals over the age of 65 is expected to double between 1990 and 2020. In Europe by 2010, for the first time, there will be more people over 60 years of age than less than 20 and 2025 the elderly will represent one fourth of the population, 100 million people. Fragility fractures have doubled in the last decade and 40 % of all women over the age of 50 will suffer an osteoporotic fracture. There are today diagnostic procedures and preventive measures and medication for osteoporosis, but there will also be a need for bone repair. The global use of bone grafts has been calculated to be about 1,5 million and less than 15% being synthetic. The contributing factors for bone substitute incorporation and the development of synthetic grafting will be reviewed.

Session 01: Hip joint replacement (II)

Moderators: Brett Courtenay (Australia)
Ahmed Sabti (Morocco)

FREE PAPERS

SIC01-13

'METASUL HIP ARTHROPLASTY' - A BRITISH EXPERIENCE

Rajeshkumar KAKWANI, Graham BENKE

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INTRODUCTION: A prospective analysis of the intermediate term (6-12 year) results of the 'Metasul' hip arthroplasty. **METHOD:** The clinical and radiological findings of the consecutive patients who underwent the 'Metasul' hip arthroplasty by the senior author were recorded prospectively. The clinical evaluation was performed with the Charnley's modification of the Merle d'Aubigne scoring system as well as the Oxford Hip Scoring Sheet. All the patients operated from February 1995 till July 2000 were included in the study. Of the total of 99 arthroplasties, 5 patients died prior to the final review and 4 were lost to follow-up. The final study group: 90 Hip Arthroplasties in 77 patients. **RESULTS:** The results were analysed using the Charnley categories. Category 'A' patients achieved the best final results with the d'Aubigne score rising from 8.6 to 17.2 and Oxford scores of 5.7/60. Category 'B' patients had good results (Final Oxford score of 7.3/60, and d'Aubigne score of 16.9). Category 'C' patients had moderate results with the d'Aubigne score of 15.1 and Oxford score of 17.7/60. The survival was 96.97% with a 95% confidence limit. Three patients needed revision hip arthroplasty: aseptic acetabular loosening (1), infection (1) and massive osteolysis (1). **DISCUSSION:** The clinical results obtained with the use of the 'Metasul' articulation are comparable to those obtained by the metal-on-polyethylene articulation. The clinical success, the retrieval data of low wear from laboratory studies and the absence of clinical consequences of elevated serum Co ion levels, encourages the use of this alternate bearing surface.

SIC01-14

FEMORAL BONE REMODELING AFTER FEMORAL NECK PRESERVING COMPARED STRAIGHT STEM TOTAL HIP ARTHROPLASTY USING QUANTITATIVE COMPUTED TOMOGRAPHY IN-VIVO

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INTRODUCTION: This study was designed to analyze the load-transfer mechanism and stress pattern of femoral cortical and cancellous bone after implantation of a femoral neck preserving prosthesis and a tapered designed stem in vivo using computed tomography (CT) assisted osteodensitometry. **METHOD:** 30 hips with a femoral neck preserving stem

(C.F.P., Link, Germany) were compared to 26 hips with a tapered designed straight stem (Cerafit, Ceraver, France) using conventional sequential CT scans performed 10 days, 1 and 3 years postoperatively. Data was evaluated with a special software tool (CAPPapostOP, CAS-Innovations, Germany). Cancellous and cortical bone density (BD) (mgCaHA/ml) was measured. RESULTS: C.F.P. stem: No stress transfer at the collar of the prosthesis (cortical BD 3y: -22%, cancellous BD 3y: -57%), cortical (1y:-14%, 3y:-22%) and cancellous (1y:-25%, 3y:-30%) BD loss at the metaphysis, no BD loss at the diaphysis. Straight stem: metaphyseal cortical (1y:-16%, 3y:-25%) and cancellous (1y:-19%, 3y:-26%) BD loss. Mild cortical BD decrease was measured at the diaphysis (1y:-10%, 3y:-12%) and at the tip of the stem (1y:-5%, 3y:-6%). INTERPRETATION: The presented method is an excellent tool for a detailed measurement of stress shielding phenomena in vivo after total hip arthroplasty. The analyzed straight stem fixates distally while the C.F.P. prosthesis fixates more proximally. With the C.F.P. stem increased bone stock is preserved while the problem of progressive proximal BD decrease remains for both prosthesis. Further investigations will demonstrate the impact these factors have on the long term results of the implant.

SIC01-15

HYDROXYAPATITE HIP SURVEY, CERAMIC/CERAMIC BEARINGS

James M BUCHANAN

Sunderland Royal Hospital (UNITED KINGDOM)

AIMS: Osteolysis from polythene and cement debris contributes to loosening of total hip components. Will hydroxyapatite bonding coupled with ceramic bearings improve this? MATERIAL: Since 1988 Hydroxyapatite Ceramic Coated Hips (HAC) have been used in Sunderland, U.K. More than 2500 HAC hips have been inserted. There are 545 hips in 380 patients with ceramic/ceramic bearings. These hips are inserted into patients with a 20+ year life expectancy. All the patients are assessed using the Harris Hip Score before and after surgery. They are assessed annually. Post operative scores show 22 patients with Harris Hip Scores of less than 80, but in only 9 is this attributable to HAC hip surgery. DISCUSSION: These 545 HAC hips with ceramic bearings (1090 components) have been followed up for a maximum of 15 years. Since August 2005, the group has included 214 hips with Zirconia Toughened Alumina ZTA ceramic (Biolox Delta®). Fixation with HA is reliable with only one component failing from aseptic loosening. Five alumina components have broken but there are no fractures of the ZTA components. It is probable that third body inclusions between the modular alumina components led to their failure. There has been no periprosthetic osteolysis. CONCLUSIONS: Hydroxy Apatite bony bonding secures the implants. No cement or polyethylene is used which can contribute to osteolysis. Wear in ceramic bearings will be negligible. Alumina/alumina or, better, ZTA/ZTA hip arthroplasty should be considered where life expectancy is substantial.

SIC01-16

POST-OPERATIVE HAEMOGLOBIN ADVERSELY AFFECTS QUALITY OF LIFE IN PATIENTS OLDER THAN 65 YEARS POST PRIMARY TOTAL HIP REPLACEMENT

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BACKGROUND: Concerns with risks of blood transfusion, lack of evidence of benefit and possibility of adverse reaction associated with transfusion have led to a restrictive blood transfusion practice. Whether this adversely affects patient outcome after primary total hip replacement (THR) has not been determined. We examine the relationship between

post-operative haemoglobin and quality of life in patients older than 65 years after THR. METHODS: A prospective observational study of 87 patients undergoing elective primary THR over a 3-month period was conducted. Twelve hours pre-operatively, haemoglobin was measured and SF-36 and FACT-An health surveys were completed by study patients. Post-operative haemoglobin was measured on Day 1, 2 and 8, and prior to discharge. Follow-up SF-36 and FACT-An health survey was performed 2 months post-operatively. RESULTS: Complete data was available for 79 of 87 at 2 months. Positive correlations were observed between both SF-36 and FACT-An scores and day 8 haemoglobin ($r=0.4858$ and $r=0.4572$ respectively). Regression demonstrated improvement in SF-36 of 8.57 for every 1g/dl increase in Day 8 haemoglobin. Similarly, improvement in FACT-An was 2.9. There was no correlation between day 8 haemoglobin and absolute value of SF-36 or FACT-An. CONCLUSIONS: We found a significant positive correlation between post-operative haemoglobin levels on day 8 and changes in quality of life scores, with patients with lower haemoglobins consistently reporting less improvement in SF-36 and FACT-An scores than those with higher haemoglobins. Re-evaluation of restrictive transfusion practice in this patient population is warranted.

SIC01-17

RETROACETABULAR STRESS-SHIELDING IN TOTAL HIP ARTHROPLASTY

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Little is known about pelvic bone remodeling in total hip arthroplasty and its clinical relevance. A randomized clinical trial was performed to compare acetabular bone density changes in press-fit components with different elasticity modulus. Bone density changes were assessed using quantitative CT-assisted osteodensitometry. Twenty press-fit cups with alumina ceramic liner and 20 press-fit cups with highly-cross-linked polyethylene liner were included in the study. The non-operated contra lateral side was used as control. CT-scans were performed postoperatively and one year after the index operation. Marked cancellous bone density loss (up to -33.7%) was observed in all acetabular regions in both cup cohorts. In contrast, we found moderate cortical bone density changes; a slight increase (up to +6.1%) of cortical bone density was observed in the region above the cup, while cortical bone density decreased (up to -12.2%) in the region at the same level of the cup. Differences between PE and alumina group were statistically not significant. Unremarkable changes of bone density were observed around the non-operated site. In summary, we observed a decrease of periacetabular cancellous bone density after total hip arthroplasty suggesting stress transfer to the cortical bone. Stress-shielding with weakening of the periacetabular cancellous bone could be the facilitator of wear-related osteolytic changes.

SIC01-18

1-6 YEAR OUTCOME OF THE THRUST PLATE PROSTHESIS

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INTRODUCTION: When contemplating hip arthroplasty in younger patients, consideration of future revision is essential. The thrust plate prosthesis is a bone sparing implant, relying on proximal femoral metaphyseal fixation. This has the advantage of maintaining diaphyseal bone stock, and a theoretically easier conversion to a standard stemmed prosthesis. We present our clinical and radiological results using this prosthesis. METHODS: 44 prostheses in 36 patients with mixed primary pathology were evaluated. Clinical notes were reviewed to obtain demographic and clinical details. Patients were

contacted to assess outcome using the Oxford Hip Score (OHS) and SF-12 questionnaires. Radiological evaluation was undertaken to assess for loosening and changes in femoral-shaft angle. RESULTS: Mean follow up was 3.1 yrs (range 1.1-6.0). Average age at time of surgery was 50.7 yrs (range 18.9-65.2). OHS improved from 44.6 to 21.9. SF-12 scores improved from 27.21 to 38.55 (Physical), and 40.83 to 54.00 (Mental). Minor 'side-plate pain' was seen in 22.2% of patients, which was resolved with steroid injections. One patient developed a DVT. No other major complications were encountered. Radiological evaluation revealed loosening and collapse of one prosthesis (2.3%), for which the patient awaits revision surgery. Progressive bone resorption was commonly seen along the medial edge of the mandrel, but was not associated with loss of femoral shaft angle or implant loosening. DISCUSSION: We have demonstrated good outcomes using this prosthesis, with only one revision to date. The thrust plate prosthesis offers an excellent alternative to standard stemmed prostheses, and can be recommended as a suitable option in the young patient requiring arthroplasty.

SIC01-19

THE ARTHROSCOPIC MANAGEMENT OF FEMOROACETABULAR IMPINGEMENT

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Femoroacetabular Impingement (FAI) has recently been implicated in causing a spectrum of injury ranging from anterior hip pain, labral tears, chondral damage, and eventually perhaps to idiopathic arthritis of the hip. Three distinct types have been described: cam, pincer and mixed, with the mixed one being the commonest. Surgical treatment of FAI is focused towards providing an adequate clearance to alleviate femoral abutment against the acetabular rim. This is achieved by restoring a normal femoral head-neck offset and recessing the acetabular rim if necessary. The treatment of FAI has been achieved with reasonable success by the open surgical dislocation as described by the Swiss group. However, the protracted post-operative recovery coupled with the trauma sustained during the open procedure, have led to the development of an arthroscopic approach to this problem. The purpose of this presentation is to provide an up-to-date knowledge of the clinical and diagnostic aspects of FAI, to describe our arthroscopic technique in detail with its pitfalls and possible complications and to discuss the results and future of FAI.

SIC01-20

NAVIGATION FOR ARTHROSCOPIC CORRECTION OF THE FEMORAL OFFSET IN CAM-IMPINGEMENT OF THE HIP

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Detection of amount and localisation of bone resection to correct femoral offset in femoroacetabular cam impingement is a difficult task in arthroscopic technique. Navigation might improve orientation and thus the quality of offset correction. The purpose of this study was to determine and compare the precision of arthroscopic correction of the femoral offset as well as the early clinical outcome with and without navigation in a prospective, randomised study. All 44 surgical treatments were performed by one single surgeon. 24 cases were done without and 20 cases with CT fluoro based navigation. We determined the angle α according to Noetzi, range of motion, pain according to the Visual Analogue Scale and the Nonarthritic Hip Score (NAHS) pre- and 6 months postoperatively as well as operation time and complications and compared the two groups. In both groups there was a significant reduction of the angle α and a

corresponding improvement of flexion and internal rotation. Pain decreased and NAHS increased clearly in both groups too. Mean operation time was 10 minutes longer in the navigation group. No serious complications occurred. Although there was no primary statistical difference in the clinical parameters between the two groups, navigation was helpful for getting a better 3D orientation during surgery. This resulted in a more reliable and consistent abrasion procedure with less outliers in the postoperative NAHS scores and necessitated only 10 minutes additional operating time. In particular, less experienced surgeons may profit from navigation.

SIC01-21

CT-ASSISTED OSTEODENSITOMETRY AFTER T.O.P.-CUP IMPLANTATION - 1 AND 3 YEARS FOLLOW-UP

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INTRODUCTION: Regional bone loss after THA might contribute to risk of aseptic loosening. The degree of bone mineralisation is a decisive parameter of bone quality. We analysed the bone mineralisation 1 year and 3 years after implantation of press fit cups using computer tomography (CT)-assisted osteodensitometry in-vivo. **MATERIAL AND METHODS:** Prospective study 30 patients/30 cups, press fit cup (T.O.P. Trabecular Orientated Patter; Link, Hamburg, Germany) ceramic (BioloX forte)/PE (UHMWPE) pairing, CT examinations 2 weeks, 1 year and 3 years after implantation, analysis of cortical and cancellous bone density (BD) with CAPPa postOP software tool (CAS Innovations, Erlangen, Germany). **RESULTS:** Average cortical BD changes (1 year/3 years post-OP): cranial to the cup (n.s./-8%), ventral (-10%/-20%) and dorsal (-10%/-20%). Cancellous BD changes (1 year/3 years post-OP): cranial (-17%/-21%), ventral (-36%/-45%) and dorsal (-34%/-41%). **CONCLUSIONS:** We developed a standardized method with high accuracy and reproducibility for in-vivo assessment of acetabular cortical and cancellous strain-adapted remodeling after THA which is potentially more effective than DXA. Our results showed that there is no stress transfer from the metal backed T.O.P cup (stiff acetabular component) to cancellous bone (progressive BD decrease). Stress is transferred to cortical bone cranial to the cup (minimal decrease) which is the area of cup fixation.

SIC01-22

BILATERAL PERI-PROSTHETIC STRESS FRACTURES IN A JUVENILE CHRONIC ARTHRITIS PATIENT SECONDARY TO BILATERAL GENU VALGUM

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INTRODUCTION: Lateral insufficiency fractures following total hip replacements have been reported with the femoral stems positioned in varus, together with osteopenia of the lateral femoral cortex. Any abnormal alignment of the lower limbs, such as genu valgum, will alter the load distribution across the femoral cortices, and repetitive loading during walking will predispose the bones to stress fractures at any stress riser point, such as the tip of a femoral component. Bilateral femoral stress fractures post total hip replacements have not been previously described. **MATERIALS AND METHODS:** We present a 55 yr old lady, diagnosed with juvenile idiopathic arthritis aged 5 years, and had undergone bilateral total hip replacements at the age of 29 and 30 years and bilateral knee

replacements aged 37 and 42 years. The right hip required revision of the cup 15 years later. The knees were in valgus and the left knee was extremely stiff flexing to 5 degrees. She presented with bilateral thigh pain with plain radiographs confirming bilateral peri-prosthetic fractures of the femur at the tip of well-fixed femoral components. There had been no history of injury and her hips were functioning well up to this time. RESULTS: The patient required revision of both hips to long stem un-cemented components, bypassing the fractures, and revision of both knees to stemmed semi-constrained implants, thereby correcting the alignment of both lower limbs. Both fractures healed and the patient is currently pain free and mobile with walking aids.

SIC01-23

A NOVEL TECHNIQUE IN REDUCING BONE DEBRIS IN HIP RESURFACING PROCEDURES

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INTRODUCTION: As a result of the rapid increase in the number of hip resurfacing procedures performed, previously recognized complications have begun to recur; including, femoral neck fracture and heterotopic ossification. Hip resurfacing entails reaming of the femoral head to the appropriate size and significant bone debris produced, usually dispersed in the soft tissues. We advocate the use of a novel technique whereby the bone debris produced is collected and removed effectively. MATERIALS AND METHODS: A 60-ml plastic 'galli pot' is prepared by cutting the floor of the container, leaving behind a rim for collecting the bone debris. The container is placed over the femoral head and across the femoral neck. The femoral reamer is applied onto the femoral head with the container in-situ and reaming commenced. The bone debris produced is collected in the container, which is removed after completing the reaming process. RESULTS: This technique was used effectively on 30 patients undergoing hip resurfacing procedures using the Cormet hip (Corin Medical, Cirencester, UK) and the Birmingham Hip Resurfacing (Midland Medical Technologies, Birmingham, UK). The technique proved successful in collecting the bone debris produced and reducing bone debris in surrounding soft tissues. DISCUSSION: Heterotopic ossification (HO) post hip arthroplasty is a relatively common phenomenon with clinical significance in approximately 5% of all cases. Reducing bone debris has been shown to reduce the incidence of HO and a more favorable outcome. We propose this technique as a method to reduce bone debris in surrounding tissues whilst performing hip resurfacing procedures.

SIC01-24

THE PROXIMA HIP: A STEMLESS NECK PRESERVING IMPLANT WITH CIRCUMFERENTIAL PROXIMAL FIXATION

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Bone stock preservation is crucial when performing THR especially, but not only, in young patients. The aim of this implant is to save good bone stock for a potential revision procedure. In 1993, we began the development of a new femoral implant. The purpose of this stemless prosthesis is to give a physiologic load distribution in the proximal femur with a total proximal load transfer from the implant to the femoral bone. The main features are an almost complete absence of the diaphyseal portion of the stem, a well defined lateral flare with load transfer on the lateral column of the femur and a high femoral neck

cut which allows the preservation of most of the anterior, posterior and medial wall of the femoral neck allowing complete proximal circumferential bone in-growth. These innovations resulted in an extremely conservative implant both in terms of bone stock and soft tissues making it particularly indicated for minimally invasive surgery. This implant, which we began to implant in June 1995 as a custom made prosthesis, and later as a standard prosthesis. This prosthesis was, in the first years, recommended only for young and active patients before being extended with very large indications also to elderly ones. In this study, we present the rationale, the biomechanical studies, the surgical technique and the clinical results so far obtained with this implant in our first 280 cases.

Session 01: Hip joint replacement (III)

Moderators: Felix Gil-Orbezo (Mexico)
Tarik Fikry (Morocco)

FREE PAPERS

SIC01-25

CT-SCAN - DIAGNOSTIC AND THERAPEUTIC ALGORITHM IN ASEPTIC HIP REVISION

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INTRODUCTION: A thorough evaluation of local status and bone stock is mandatory before total hip revision. The aim of our study is to integrate the CT-scan in the diagnostic and therapeutic algorithm of aseptic loosening of total hip prosthesis. **MATERIAL AND METHODS:** 83 patients with aseptic loosening of total hip prosthesis underwent a preoperative CT-scan with a Spiral Somatom Siemens device. HiRes, Hip Spi and 3D (150 mas, 1 s rotational time) studies were performed. There are several methods to improve image quality and to reduce artefacts induced by the implant. **RESULTS:** CT-scan is an excellent method to assess bone stock, osteolysis around acetabular and femoral components and cement fractures invisible to the standard radiological examination. CT examination allows a classification of bone defects. Measurement of lesion volume, precise spatial localisation of bone defects and assessment of contiguity solutions lead to tomographic classification of osteolytic lesions based on the Gruen and AAOS d'Antonio classifications. **CONCLUSIONS:** The quality of CT-scan images greatly influence the preoperative planning. Exact assessment of bone stock and bone defects is a very important tool in the choice of one type of revision implant or another.

SIC01-26

STABILITY OF PLASMA SPRAY-COATED TI CEMENTLESS CUP WITH PERIOPERATIVE GAP FORMATION AT MEAN 12 YEARS FOLLOW-UP PERIOD

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PURPOSE: There is no report concerning long-term result of cup with perioperative gap formation between acetabulum. The purpose of this study was to evaluate stability of plasma spray-coated hemispherical Ti cementless cup with intraoperative gap formation. **METHOD:** We evaluated consecutive average 12 years (10-14) followed up cementless Mallory-Head type cups in 39 patients with subluxated osteoarthritis. Among them, 33 cases (85%) showed gap formation surrounding cup at initial postoperative radiograph. The mean patient's age was 57 (40-80) years old and mean weight was 52 (35-62) kg. All operations were performed by postero-lateral approach with 1-3 screw fixation of cup. We evaluated incidence of gap formation at three cup zones (Delee & Charnley). We also

assessed cup size and cup abduction angle. Furthermore, we measured radiolucent line surrounding cup and cup migration at latest follow-up period. RESULTS: Incidences of gap at each cup zone are 61% at Zone 1, 76% at Zone 2 and 48% at Zone 3, respectively. The mean cup size was 46 (42-52) mm and cup abduction angle was 46 (31-64) degrees. All gap in each cup vanished without radiolucent line and migration at latest follow-up period. CONCLUSION: Intraoperative gap formation of Mallory-Head type cementless cup disappeared and showed stable radiographic fixation at 12 years follow-up period.

SIC01-27

PAIN FOLLOWING HIP RESURFACING: SHOULD WE BE CLOSING THE CUP TO IMPROVE OUTCOME?

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To determine the effect of acetabular cup inclination angle on pain following hip resurfacing. 92 consecutive hips in 81 patients were resurfaced with the ASR prosthesis. The average age was 56.5 years (35-72). 33 were female hips. Harris Hip Scores (HHS) and UCLA activity scores were recorded pre-operatively and at last follow-up. Patient satisfaction was recorded. Acetabular cup inclination angle was measured. An acceptable angle for hip replacement is 45 degrees +/- 5 degrees. We therefore grouped cups into those above 50 degrees and those below. Average follow-up was 17.9 months (8-31). There were 39 hips with an angle less than 50 degrees (group A), and 53 greater than 50 (group B). Patients in each group were comparable for age, sex, follow-up and BMI. In group A, HHS improved from 53.4 to 98.7 and UCLA activity score improved from 4.2 to 7.5. All patients were extremely or very pleased. In group B HHS improved from 49.0 to 94.0 and UCLA activity score improved from 3.9 to 7.1. 48 of 53 patients were extremely or very pleased. At follow-up 37 of 39 (95%) of patients in group A had no pain. In group B, 35 of 53 had no pain (66%). This is a statistically significant difference when analysed with Fisher's exact test ($p < 0.05$). This study shows that an open acetabular cup may contribute to persisting pain and patient dissatisfaction following hip resurfacing.

SIC01-28

AUTOHEMOTRANSFUSION DURING PLANNED TOTAL REPLACEMENT OF HIP JOINT

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AIM: The objective of the study is to develop an optimal blood transfusion strategy to correct blood loss during total hip replacement. MATERIALS AND METHODS: 1140 autodonors' analyses of clinical observation, laboratory examination and results of functional control were analyzed. Preoperative autoblood collection of 450-500ml was performed 4-5 days before surgery. Autoerythrocyte mass and autoplasm were prepared from autoblood and were returned during the surgery in all 1140 patients. In 40 patients, intraoperational blood collection was performed using foreign and local cell savers and was returned immediately during surgery. In 35 patients, postoperative blood collection was performed in the first 6 hours after surgical intervention with the help of special systems for sampling and filtration of drained blood. In the control group with 350 patients who refused to be as autodonors before surgery had transfusion of blood components from other donors. The values of lab tests in the study group were

comparable with the results of the control group. At the same time, 2 delayed hematological reactions were observed in the control group. RESULTS: Intraoperative sampling and reinfusion of blood is advisable during a blood loss of more than 1 litre. Sampling of drained blood is mandatory to be performed in all patients. Reinfusion of obtained blood is expeditious when the drained blood is more than 300-400ml. Administration of autohemotransfusion allowed us to decrease the general necessity of donor's blood up to 90% and dismissed the use of donor's blood components during planned cementless replacement of hip joint.

SIC01-29

BLOOD LOSS IN PATIENTS HAVING PRIMARY TOTAL HIP ARTHROPLASTY THROUGH A SHORTENED TRANSGLUTEAL APPROACH IS LOW

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We measured prospectively the blood losses occurring in patients undergoing unilateral minimal invasive surgery total hip arthroplasty (MIS-THA). PATIENTS AND METHODS: 170 consecutive MIS-THA in 166 patients were performed without re-infusion of drained blood. Post traumatic osteoarthritis were excluded to MIS procedure. A set of laboratory records was collected in the preoperative period, at the postoperative days 2 (POD2) and 8 (POD 8). The total blood loss was calculated by Gross formula in using the Gilcher values to estimate the patient blood volume. RESULTS: On whole period the mean total loss was 1191ml, the mean red cells loss was 456ml and the fall in haemoglobin (Hb) was 3g. Mean Hb was 14.2g/dl on the day before the surgery, 12.6g/dL at the POD 2 and 11.3g/dl at the POD 8. The older the patient was, the less he lost blood. Despite a high variability of blood losses (2 to 37% of blood volumes) no blood transfusion was required. Fourteen patients (<10%) were found with Hb <10g (9.4g ± 0.4) at POD 8 but their anemia was non symptomatic. DISCUSSION: POD 8 is attractive to consider the blood loss including haematoma after THA as biological status allowing for postoperative recovery and rehabilitation. Primary THA via shortened transgluteal approach does not usually require blood transfusion if an erythrocyte induction is applied preoperatively on patients at risk of transfusion because Hb level <11.5g.

SIC01-30

TIME RELATED CHANGES IN BONE DENSITY AROUND TOTAL HIP ARTHROPLASTIES

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We prospectively studied changes in bone density (BMD) in a group A of 31 patients with cemented primary Biomet total hip arthroplasties and a group B of 32 patients with cementless primary Zweymuller total hip arthroplasties. BMD was measured using DEXA method preoperatively, postoperatively at 1, 6 and 12 months; we used the 7 Gruen regions for proximal femur and Wilkinson's 4 regions for periacetabular zone; BMD values at 1 month postop were taken as a reference point. The patients were also followed up clinically (Harris hip score) and radiographically for 3 years. In group A there is a significant change in G1 (0.87 at 6 months; 1.13 at 12 months) and G7 (0.85 and 0.95 respectively). There is an increase in all periacetabular 4 regions, mostly for R4 (1.15 and 1.26 respectively). In group B there is a significant change in G7 (0.84 and 0.84 respectively). There is an increase in all 4 periacetabular regions, more for R3 (1.13 and 1.23 respectively) and R4 (1.11 and 1.21 respectively). All patients had good or very good

clinical and radiographical results at 3 years, except 1 patient in group B who had an aseptic cup loosening not evident radiologically for 18 months, but with a significant BMD decrease at 6 months for R1 0.77. The pattern of BMD changes in our study could be taken as a normal standard for stable implants (valid for these 2 particular implants). Any change in this pattern could be an early sign of implant loosening. **KEY WORDS:** bone density, hip arthroplasty.

SIC01-31

USE OF BONE GRAFT FOR PROTRUSIO AND CENTRAL ACETABULAR DEFECTS: DO THEY WORK IN THE LONGER TERM?

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INTRODUCTION: The aim of the study was to whether the bone grafting techniques used affected the long term stability of the acetabular implant. **METHODOLOGY:** 41 patients treated with a cemented total hip replacement with pre-operative protrusio or central acetabular defects at surgery were identified. The severity of initial protrusio was determined on plain AP pelvis radiographs by measuring the distance of the medial acetabular wall from the ilio-ischial line. The postoperative and last follow-up X-rays were reviewed, the thickness of the medial wall and the centre-edge angle of the cup were measured. **RESULTS:** The most common indication was osteoarthritis (34 patients, 83%). The mean age at surgery was 64 years (range = 39-89 years) and 30 patients (73%) were determined to have an incompetent medial wall at surgery. The mean follow-up was 6.5 years (range = 1-22 years). The mean penetration of the medial wall was 6.5mm (range 0-18mm) with a CE angle of 69°. There were significant improvements in the medial wall thickness to a mean of 16mm, with a mean CE angle of 50° ($p < 0.0001$) post-operatively. This was maintained in the long term with no significant difference at final follow-up of either medial wall thickness ($p = 0.31$) or CE angle ($p = 0.71$). The medial wall showed radiographic signs of remodelling at final X-ray in 88% of patients. **CONCLUSION:** Bone grafting to the acetabulum is a satisfactory method of treatment for protrusio and central defects in the long term, without significant movement of the acetabular components.

SIC01-32

ARE INDICATIONS FOR HIP REVISION DIFFERENT IN DISTRICT GENERAL HOSPITALS?

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AIM: The main aim of the audit was to see if the indications for Revision Hip Arthroplasty at our District General Hospital were comparable to published studies, the national joint registry and the Swedish hip register. **METHODOLOGY:** 76 patients who had revision hip replacement were included in the study. Data was collected using a pre-designed data collection form and analysed using Microsoft Access and SPSS. **RESULTS:** 48% of patients were male and 52% female. The overall length of time from the primary hip replacement to the revision procedure ranged from 0.2 to 22.4 years, with an average of 9.9 years and Median of 10.7 years. The indications for revision were as follows: 66% Loosening; 17% Instability; 11% Periprosthetic Fracture; 4% Infection; 1% Proximal migration of acetabular cup and in 1% the indication was not recorded. Complications were recorded in 25% of cases, the most frequent being superficial wound infection and chest infection. Period of follow-up was from 2 months to 6.4 years, with an average of 2.1 years and Median of 1.5 years. 96% of patients had excellent to satisfactory results at

latest review. Data was compared using the chi-square test. No statistically significant difference was noted in the indications for revision hip surgery between our hospital and the published figures. CONCLUSIONS: Indications for revision hip arthroplasty within our Trust were found to be at a similar rate to the National Joint Register, Swedish Arthroplasty Register and two international studies [p values 0.06 to 0.84]

SIC01-33

INFLUENCE OF DRAINING SYSTEMS ON THE DEVELOPMENT OF POSTOPERATIVE SEROMA AFTER TOTAL HIP ARTHROPLASTY

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PURPOSE: To evaluate the correlation between postoperative seroma-size after total hip arthroplasty (THA) using a single-channel latex drainage-system (DS) and a four-channel silicon DS.**MATERIAL:** A prospective randomized study included 106 (48 male; 58 female, age 67 ± 11 years) patients receiving THA. Two groups of 53 patients treated with either a latex single-channel DS (Group-A) or a silicon four-channel DS (Group-B). Posterolateral surgical approach was used in all patients. All patients received a deep subfascial and a subcutaneous DS with identical suction systems. 61 patients had THA after osteoarthritis, 20 after femoral neck fracture; 5 after femoral head necrosis 20 had revision surgery. Subcutaneous DSs were withdrawn after 2.7 ± 1.1 days, subfascial DS after 3.7 ± 1.5 days. Patients were evaluated after 5 and 10 days after total removal of the DS with ultrasound; using a 7.5MHz linear device. Seroma Volume was calculated with the ellipsoid formula ($1/6 \times 3.14 \times \text{length} \times \text{depth} \times \text{width}$). Evaluation of 103 patients after 6-8 months postoperatively with Harris-Hip and Merlé d'Aubigné Score. Mann-Whitney-U-test was used for statistics. **RESULTS:** 66 patients showed ultrasound-detectable seroma. 8 Patients (3 Group-A, 5 Group-B) had revision surgery because of seroma. In 4 patients (Group-A) seroma emptied spontaneously. Mean seroma volumes 11.61 ± 18.36 ml (Group-A) and 16.73 ± 21.93 ml (Group-B). Difference of seroma volumes was not significant ($p < 0.5$). Harris Hip scores showed results of 85 ± 19 (Group-A) and 85.7 ± 17.4 (Group-B). Merlé d'Aubigné-Score showed values of 15.89 ± 3.3 (Group-A) vs. 16.02 ± 3.3 (Group-B). Both scores were not significantly different. ($p < 0.5$) **CONCLUSION:** Expensive four-channel DS do not lead to a reduction of postoperative seroma after THA.

SIC01-34

THE INFLUENCE OF THE RADIOGRAPHIC AND BIOMECHANICAL PARAMETERS ON THE WEAR OF POLYETHYLENE CUPS OF TOTAL HIP PROSTHESIS

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INTRODUCTION: The purpose of the work was to study the effect of radiographic and biomechanical parameters on the volume and the direction of the wear of polyethylene cups. **METHODS:** The study was performed on 80 patients with revision surgery due to loosening. On A/P X-ray of hips we used a simple three-dimensional mathematical model for the calculation of the extend and direction of the resultant hip joint force, and the extend and direction of activity of the contact hip joint stress. With the same patients we used the radiographic method of determining the wear of polyethylene cups in order to determine the volume and the direction of the wear of polyethylene cups. **RESULTS:** Radiographic and biomechanical parameters have a significant influence on the volume and the direction of the wear of polyethylene cups. The volume of the wear of

polyethylene cups is greater when the value of the resultant hip joint force and the contact hip joint stress is high. The direction of linear wear of polyethylene cups is in the direction of the contact hip joint stress activity. **CONCLUSION:** The cause of the lateral direction of the linear wear of polyethylene cups is the lateral direction of the hip joint stress activity.

SIC01-35

DISLOCATION FOLLOWING TOTAL HIP ARTHROPLASTY DOWN-UNDER

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While total hip arthroplasty (THA) is an effective surgical procedure for the management of hip fractures and degenerative joint disease, dislocation remains a difficult complication and a leading cause of revision surgery. The datasets of the Australian and New Zealand National Joint Replacement Registries were analyzed to determine the contemporary surgical management of recurrent THA dislocation. 120 870 primary THAs performed since 1999 were included in this study. Functional outcome was assessed using the Oxford Hip Score (OHS). In addition, 15,471 questionnaires returned at six months following primary THA in New Zealand patients were analyzed. 258 patients (1.6%) reported one or more dislocations and 58 (0.37%) underwent revision, giving a 1 to 4.5 dislocation to revision ratio in the first six months following primary THA. Dislocation was the most frequent reason for revision (28.6%) after mechanical loosening (29.5%). 570 patients in Australia and 307 patients in New Zealand underwent revision for dislocation. Exchange of cup or head/liner were the most frequent revision procedures. 37% of patients had their head size increased. During the follow-up period, 12% of patients underwent re-revision. The lowest rate of re-revision was seen in patients with both components revised (4.9%), and the highest rate in those whom the stem only was revised (14.6%). The mean OHS post revision for dislocation was 22.9, versus 23.4 for revision for other reasons and 19.0 following all primaries. Dislocation remains a significant cause of morbidity following THA, resulting in poorer functional outcome and high re-operation rates.

SIC01-36

HIP REVISION SURGERY: CEMENTED AND CEMENTLESS IMPACTION GRAFTING IN SEVERE FEMORAL BONE LOSS

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In hip revision surgery frequently a huge femoral bone loss is present. The bone loss reconstruction can be realized in several ways. One possible way is the "impaction grafting" technique. This procedure has been developed in England (Leeds) by Ling et al., and was utilized by the conventional technique only with cemented implants applied after the bone chip pressurization. In our experience this technique is very helpful in cases of osteolysis and in osteoporotic bone. The bone remodeling, in the long-term results is really amazing. In patients with severe proximal bone loss but good distal cortical bone we adopted this procedure impacting the bone chips around a cementless long-stem prosthesis utilising different kinds of implant. This technique is particularly utilized in younger patients. The distal fixation of the stem associated with the bone chips pressurization allows also in these cases a very good bone remodelling. We report the results of 217 cases (126 cementless-91 cemented) performed between 1990-2006 with a mean follow-up of 8.5 years.

Session 02: Adult hip disorders

Moderators: Jacques Caton (France)
Hassan Ismaili (Morocco)

CONFERENCE

SICIS02-01

PERIACETABULAR BONE REMODELING AFTER TOTAL HIP ARTHROPLASTY - THE ART AND SCIENCE AS OF 2007

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Periacetabular bone remodeling after total hip arthroplasty (THA) is a complex phenomenon, which depends on mechanical properties of the bone, the mode of fixation, implant geometry and stiffness, and patient activity level. Loss of acetabular bone density (BD) may compromise the long-term outcome of the implant. In contrast to proximal femur bone remodelling after THA, little is known about structural changes of bone around the cup. Quantitative Computed Tomography (qCT) is a relatively new technology used for assessment of bone structures with high resolution and reproducibility. In comparison to Dual-Energy X-ray Absorbiometry, qCT data analysis is three-dimensional, and allows assessment of cortical and cancellous bone structures separately. Recent qCT clinical trials showed that periacetabular cancellous BD loss is higher than cortical BD loss; BD changes are more pronounced in areas closer to the cup. Cortical BD changes are unremarkable in areas above the dome of the cup. In summary qCT shows a decrease of periacetabular cancellous BD after THA, suggesting stress transfer to the cortical bone. Stress-shielding with weakening of the periacetabular cancellous bone could be the facilitator of wear-related osteolytic changes. In conjunction with finite-elements analysis, qCT is useful to generate accurate patient-specific hip joint meshes to model implants and their effect on bone remodeling. This technology can be useful in predicting bone remodeling and the quality of implant fixation using prostheses with different design and/or biomaterials. In the future, this tool could be used for pre-clinical validation of new implants before their widespread introduction in the clinical practice.

FREE PAPERS

SIC02-01

PROXIMAL FEMUR OSTEOTOMY: LONG-TERM FOLLOW-UP

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INTRODUCTION: varisation - valgisation intertrochanteric osteotomy of the femur used to be the method of choice for the prevention and treatment of early mechanical osteoarthritis of the femur. Its use declined sharply with the introduction of total hip prostheses (THP). A precise osteotomy plan must be prepared before operation.

RESULTS: we have analysed 46 patients (40 females and 6 males) who underwent a varus (29) or valgus (17) osteotomy more than 12 years ago (12-25 years). The patients' average age at the time of the procedure was 36 years (range 22-54 years). At present 16 patients walk without difficulty and have no pains in the operated hip; none of them required further surgical therapy. The remaining 30 patients were provided with the THP 12 years (9 cases) or 12-20 years (21 cases) after osteotomy. Six patients received cementless and 24 cemented THPs. Intertrochanteric osteotomy remains even now a useful procedure in the treatment of mechanical osteoarthritis of the hip. It carries a good prognosis especially in patients under 40 years of age and with early stage of disease. Varisation osteotomy is suitable for patients with a rounded femoral head and a dysplastic but congruent acetabulum. Valgisation osteotomy can restore congruence to a joint surface with a deformed femoral head. **CONCLUSIONS:** Intertrochanteric osteotomy: 1. slows down or arrests the progress of arthrosis in the hip, 2. delays or eliminates the need for prosthetic replacement of the joint. So shall we perform osteotomy or wait and implant THP?

SIC02-02

SLOTTED ACETABULAR AUGMENTATION FOR THE TREATMENT OF RESIDUAL HIP DYSPLASIA IN ADULTS

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INTRODUCTION: Different pelvic osteotomies and various shelf procedures are used in operative treatment of hip dysplasia. Slotted acetabular augmentation is well established technique for treatment of children and adolescents with hip dysplasia. It has not been widely accepted for treating adults with hip dysplasia although good outcomes have been reported with other augmentation techniques in adults. **MATERIALS AND METHODS:** Since 1997, slotted acetabular augmentation has been used for the prevention of hip arthrosis in 14 dysplastic hips in 12 female patients. The median age at operation was 38.5 (17-42) years; the median follow-up period was 4 (1-8) years. Preoperatively and at follow-up, the patients were evaluated on the basis of radiographic, biomechanical and clinical data. **RESULTS:** The median centre-edge angle of Wiberg increased from 9 (1-26) degrees before the operation to 43 (31-55) degrees at the latest follow-up ($p < 0.001$). The median peak stress on the weight-bearing area of the hip, calculated mathematically, was reduced from 14.9 (6.3-28.1) MPa prior to the operation to 4.1 (3-6.1) MPa at the latest follow-up ($p < 0.001$); the median Harris Hip Score increased from 60 (45-98) points preoperatively to 93 (49-100) points at the follow-up ($p < 0.001$). **CONCLUSION:** In our series, the procedure has proved reliable and safe. Its advantages include symptomatic pain relief, adequate acetabular roof coverage and reduced peak stress on the weight bearing area of the hip. It can be used to postpone the development of hip arthrosis in adults with acetabular dysplasia.

SIC02-03

TOTAL HIP REPLACEMENT IN SEVERE CDH OR DISLOCATION OF THE HIP – COMPARISON OF MÜLLER CDH AND WAGNER CONE STEM

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Total hip replacement in severe CDH or even dislocation is a demanding procedure. One has to face the abnormal shape of the acetabulum as well as of the proximal femur. From 1991-2005 we treated 121 severe CDH, 55 with Müller CDH and 66 with Wagner Cone.

Mean follow-up was 6 years. The mean age was 49 years (21-74). 107 were female, 14 were male. In 6 patients a simultaneous bilateral procedure was done. The high rate of excellent and good results is surely influenced by the low age of patients. Both stems are highly adapted to the problems of CDH. Both types gave nearly the same results: Harris Hip Score was 85 in Müller CDH and 84 in Wagner Cone. One loosening of a Müller CDH 12 years after the operation and one cup dislocation 8 years after surgery.

SIC02-04

CORRELATION OF THE IMPINGEMENT TEST WITH ARTHROSCOPIC FINDINGS AT THE ACETABULAR RIM IN NON-DYSPLASTIC HIP

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AIM: The aim of this study was to determine if a correlation exists between the impingement test and the arthroscopic findings at the acetabular rim in non-dysplastic hips. PATIENTS AND METHODS: Sixty-two consecutive patients who were due to have an arthroscopy of the hip in our unit were prospectively recruited into the study. All the dysplastic hips were excluded from the study. One observer was involved in examining all the patients and another one in performing all the arthroscopies. The impingement test was considered positive if at 90 degrees of flexion, adduction and internal rotation, the patient complained of discomfort or pain. A tear of the acetabular labrum and chondral damage in the antero-superior margin of the acetabulum were considered as positive pathology at the acetabular rim. RESULTS: There were 40 males and 22 females in the study group. The impingement test was positive in 57 patients, strongly positive in 42 and weakly positive in 15. The arthroscopy revealed positive pathology in terms of an acetabular labrum tear and/or chondral damage at the acetabular rim in 55 patients. A negative test was recorded in 5 patients but there was positive rim pathology in two of these 5 patients. CONCLUSION: The impingement test correlates positively with the pathology at the acetabular rim; the sensitivity of the test for diagnosing acetabular rim pathology is 96.4% and the specificity is only 60% in non-dysplastic hips.

SIC02-05

EARLY EXPERIENCE IN HIP ARTHROSCOPY: IS IT WORTH DOING?

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Hip arthroscopy is a relatively new technique for diagnosis and treatment of otherwise undiagnosed hip pain. It is technically demanding but highly accurate, results being operator dependent. A prospective study covering all patients undergoing hip arthroscopy in the first two years of its introduction was conducted, all operations being conducted by the senior author. The results were analysed in terms of preoperative diagnosis and cause for undergoing arthroscopy, MRI results post operative diagnostic outcome of hip arthroscopy and Harris Hip score pre and post operative. Sensitivity and specificity of hip arthroscopy was calculated along with MRI. The significance of outcome was also determined besides identifying short and long term complications. The commonest indication for hip arthroscopy was undiagnosed hip pain (64.2%), followed by locking (21.4%). Washout being the commonest procedure performed (64.28%), no complication as to prolong hospital stay was noted and symptomatic relief was reported in 85.47%. Mean operating time was 1hr (60.1 min) MRI scan in this study was 66.6% whereas Arthroscopy was 100% sensitive and specific. There were no long term complications and in the short term only one out of fifteen patients had no symptomatic relief as compared

to other which is significant ($p < 0.01$) as reflected in the Hip scores. Thus, from our study we conclude that hip arthroscopy is an effective diagnostic tool with therapeutic potential and is definitely worth doing, when done by appropriately trained surgeons.

SIC02-06

GREATER TROCHANTERIC BURSTITIS AND SHOCK WAVE THERAPY

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Orthopaedic B Department Rambam Health Care Campus

INTRODUCTION: Extracorporeal Shock Wave Therapy (ESWT) has become a useful adjunct for the treatment of various musculo-skeletal inflammatory conditions. The of the study is prospective assessment of the efficacy of ESWT for the treatment of recalcitrant greater trochanteric bursitis (GTB). **MATERIAL AND METHODS:** Prospective evaluation and follow-up of fourteen patients with persistent GTB, two of them with bilateral problem. All patients failed to respond to conventional treatment with oral NSAID's, physiotherapy, US and more than one steroid injection to the greater trochanter region. All patients underwent complete physical examination. A Comprehensive VAS Score (grading from 0-10) which were obtained prior to therapy and at follow-up. ESWT was applied in six consecutive courses each of 1500 impulses of 0.32mj/mm² to the lateral side of the greater trochanter region. **RESULTS:** Mean age of 60.6 11.6 (mean SD) years (range 81 to 38 years). Mean duration of symptoms 14.2 8.1 months, up to 37 months. Mean VAS dropped from 7.9 0.9 to 1.6 0.8 ($p < 0.0001$). There were no side effects except minimal local discomfort during the session time. **CONCLUSION:** ESWT is an effective treatment for recalcitrant GTB, with minimal side effect.

SIC02-07

DISEASE-SPECIFIC EXPRESSION PATTERNS OF PROTEASES IN SYNOVIAL TISSUES

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To assess whether protease expression patterns can discriminate among the matrix degradation mechanisms in aseptic prosthesis loosening (APL), rheumatoid arthritis (RA) and osteoarthritis (OA), we examined the expressions of matrix metalloproteinase-1 and cathepsins B, D and L immunohistochemically in periprosthetic synovial-like interface tissues from 32 patients with failed prosthetic hips as well as hip synovial membranes from 29 patients with RA and 35 patients with primary OA. Numerical values calculated for the positivity of each protease were used to rank the staining patterns, and a multivariate analysis was carried out to examine the discriminant probabilities. As a result of stepwise linear discriminant analyses, the three groups were successfully discriminated with probabilities of 100%, 62.1% and 77.1%, respectively. Cathepsin L was significantly related to the discrimination of APL from RA and primary OA. Disease-specific protease activation pathways might exist, and cathepsin L can be a key enzyme for APL pathogenesis.

SIC02-08

THE RELATIONSHIP OF SCIATIC NERVE WITH THE POSTERIOR WALL OF ACETABULUM: A CADAVERIC STUDY

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INTRODUCTION: Although the incidence of post-operative nerve palsy after total hip replacement is low, it is an important complication for the patient. With the increasing popularity of minimally invasive hip surgery, it is important to study the relationship of the sciatic nerve to the posterior wall of acetabulum as well as to other structures in the posterior approach to the hip. **OBJECTIVE:** To increase awareness among orthopaedic surgeons using minimally invasive hip surgery of the proximity of the sciatic nerve to the surrounding structures. **RESULTS:** The study was conducted on 16 cadaver hips. The distance of the sciatic nerve from the posterior wall of acetabulum was a mean of 19.24mm (range 1.3-32.1mm). The sciatic nerve exited through the inferior border of piriformis muscle in 80 percent(12 cadavers). There was wide variation in the distance of sciatic nerve from the ischial tuberosity with mean of 12.8mm (range 5-36mm). The sciatic nerve was found to be closest to the inferior border of acetabulum. The sciatic was noted to be as wide as 25mm in 2 cadavers(13%). **CONCLUSION:** It is clear from this study that in minimally invasive hip surgery the margin of safety for the sciatic nerve is nearly always small. Even in subjects without evident disease of the pelvis or hip the relationship varies from individual to individual. There is an increased need to understand the relationship of sciatic nerve in minimally invasive total hip surgery and resurfacing hip, and particularly where the sciatic nerve is not formally explored or visualized.

SIC02-09

FACTORS INFLUENCING EARLY DISCHARGE AFTER TOTAL HIP REPLACEMENT - THE ROLE OF INCISION LENGTH

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INTRODUCTION: After primary THR, short post-operative hospital stay is desirable to reduce costs and post-operative morbidity. The role of minimal invasive THR in reducing inpatient stay is controversial. We studied 177 consecutive non-pre-selected patients (188 hips) undergoing primary uncemented THR to determine factors influencing early discharge. **PATIENTS AND METHODS:** All patients underwent THR by the senior author using a Trident/Accolade implant. As our surgical, anaesthetic and rehabilitation technique changed, we determined four groups of patients. Group I had conventional rehabilitation measures, anaesthetic and surgical technique. Group II had a fast track rehabilitation protocol. Additionally, in Group III general anaesthesia was supplemented with a lumbar plexus block, while surgery a minimally invasive technique was used. Group IV was similar to Group III but the surgical technique was conventional. Demographic data was collected. Incision length and the length of hospital stay were noted. **RESULTS:** The four groups were comparable regarding female-male ratio, patient age and BMI. Mean incision length (cms) was similar in Group I and II (13.9 and 13.5). It decreased to 10.9 in Group III, and was 15.0 in Group IV. Mean hospital stay was 6.5, 5.4, 4.1 and 4.2 days in the four groups respectively. **DISCUSSION:** Determining the importance of incision length on post-operative rehabilitation in a non-selected patient pool is crucial in the days when media involvement produces unrealistic expectations. In our study we have been able to show that using a modern rehabilitation protocol and anaesthetic technique can significantly reduce hospital stay, while incision length had no influence.

SIC02-10

THE ROLE OF ANAESTHESIA AND THE ANAESTHETIST IN REDUCING THE LENGTH OF STAY AFTER PRIMARY TOTAL HIP REPLACEMENT

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We wished to particularly study the influence of anaesthetic technique and the anaesthetist concerned on the length of hospital stay after primary total hip replacement (THR). We studied 121 consecutive THRs in 109 patients. All procedures in our study were performed by the same surgeon using the same posterolateral approach, the same prosthetic design and the same physiotherapy protocol for all patients. Patients received either general anaesthesia alone (50 THRs) or a combination of general and local anaesthesia (lumbar plexus block; 71 THRs) from three separate anaesthetists. The mean age at the time of operation was 66.5 years (33 to 88). The influence of anaesthetist, anaesthetic technique, age of the patient and BMI on length of stay after primary THR was assessed separately. Our analysis showed that the length of hospital stay was greatly influenced by the anaesthetic technique used, those patients who received a lumbar plexus block having a shorter median length of hospital stay (3 days) than those who received general anaesthesia alone (5 days; $p < 0.0001$). The age of the patient was also critical ($p = 0.003$) as was the anaesthetist concerned ($p = 0.01$). BMI was unimportant. For those surgeons who believe that a reduction in the length of hospital stay after primary THR is a worthwhile objective, we have one over-riding observation - the anaesthetic technique used is critical.

SIC02-11

TOTAL HIP REPLACEMENT IN SEVERE CONGENITAL HIP DEFORMITIES

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Normalization of the rotation centre, good abductor function, leg length adjustment and durable implant integration are surgical demands in defective hips such as neglected dislocation and proximal defects. These aims can only be achieved by wide soft tissue release and subtrochanteric shortening of the femur. Cementless implants and modular shafts (S-ROM, MRP) have to be at hand. The pedestal cup is apparently easier and safer as compared to small cups and acetabular grafts. We report on some 30 patients who underwent such surgery during the past 12 years. Their age ranged from 12 to 70 years.

SIC02-12

VARIABILITY OF THE WIBERG CE ANGLE WITHIN NORMAL RANGE DOES NOT PREDICT HIP OSTEOARTHRITIS IN THE OLD AGE

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The Wiberg center-edge (CE) angle is considered a reliable parameter for evaluation of hip dysplasia, but its value in evaluation of normal hips has not been established. We performed a retrospective study to ascertain whether variability of the CE angle predicted development of hip osteoarthritis of initially asymptomatic normal human hips. The study group included 48 adult hips (42 female hips) with at least 20 years old pelvic radiographs taken for extraarticular reasons. At that time the patients did not have any clinical or radiographic signs of hip disease. Values of the CE angle on past radiographs were compared to the present WOMAC score at the average follow-up of 29 years (range 20-41 years) and the average age of 68 years (range 43-84 years). Mean value of the initial

CE angle was 36 deg (range 24-56 deg) and mean value of the body mass index was 24.7 (range 17.8-39.3). At follow-up mean WOMAC score was 540mm (range 0-2100mm) and 22 hips (45.8%) were still asymptomatic. After adjusting for gender and age, neither the CE angle nor the body mass index predicted the final WOMAC score. When 22 asymptomatic hips at follow-up (WOMAC = 0mm) were compared to the other 26 hips (WOMAC > 0mm) there was no significant difference in the CE angle, age or the body mass index. We conclude that the Wiberg CE angle variability in normal hips cannot explain hip osteoarthritis prevalence in the sixth decade.

Session 03: Sports medicine (I)

CONFERENCES

*Moderators: Marko Pecina (Croatia)
Kacimi El-Hassan (Morocco)*

SICIS03-01

SOCCER AND SPINE INJURY, OMAN PERSPECTIVE

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A spine injury in Soccer is fortunately rare. Soccer being a contact sport, being played by maximum number of people around the world. Major injuries such as fracture and fracture dislocation are extremely rare. Usually these injuries result from a fall on the Occiput forcing Cervical Spine into hyper flexion. This injury can occur during encounter with opposition to gain or retain possession of ball during incorrect heading, overhead kick or hitting the goal post, mainly for the goalkeeper to save a goal! Sudden death after an injury may be due to injury to upper cervical spine. More frequently we see cases of sprained neck. Sprain of neck and back muscle are more common. Rarely an overload in compression may result in massive annular rupture in the median line, usually of L5-S1 segment, often leading to immediate cauda-equina syndrome. Over use injury in the form of "Stress Fracture" (Spondylolysis) and asymptomatic type becoming symptomatic is common in lumbar spine. Whether repeated heading has any deleterious effect on spine and brain is controversial. Prevention of this rare but sometimes serious injury is by proper pre-participation evaluation to rule out spinal instabilities and asymptomatic lysis. Proper discipline should be enforced among children regarding heading and fall. All goal posts should be made safer with extra cushion and more stability. This paper reviews spinal injuries in Oman (Khoula Hospital which is Tertiary Spinal Orthopaedic Department) for the last 5 years from 2000 to 2005.

SICIS03-02

FUTURE OF THE INJURIES CONDRALES (MACI ARTHROSCOPIC CASES)

Pedro GUILLEN
Clinica Cemtro (SPAIN)

Chondral and osteochondral injuries in knee and ankle are very frequent as sportive and laboral lesions; resides Osteocondritis Disecante. The technique that we expose suppose a good solution for large chondral lesions with subchondral bone affected. The regeneration of the joint surface, reduces pain and improves the range of movement for these joints; Moreover is inoffensive or harmless, so has many advantages compared to other more traditional techniques. In our group, we have 302 cases from 1996 to 2005; 152 of them are ACI (Autologus Chondrocytes Implantation) and 150 are MACI (Matrix Autologus Chondrocytes Implantation). ACI is on liquid system so needs periostio to be implanted, but in MACI, chondrocytes are impregnated at collagen membrane, so technique is now transformed at an easy technique. As always, techniques improve every day and now we are making MACI by Wireless Arthroscopy that needs a new and special

instrumental designed by as with WAD (wireless arthroscopic Device). All this supposes that this treatment can be performed by Hospital de Dia.

FREE PAPERS

*Moderators: Chadwick Smith (USA)
Marko Pecina (Croatia)*

SIC03-01

EPIDEMIOLOGY OF HAND AND WRIST INJURIES IN PROFESSIONAL RUGBY LEAGUE FOOTBALL

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OBJECTIVE: To study the nature of hand injuries and its distribution among the professional rugby league players **DESIGN:** Epidemiological study, retrospective cohort. **SETTING:** All hand injuries to professional rugby league players that were managed by an orthopaedic surgeon in his clinic. **PATIENTS:** Consecutive hand injuries in professional rugby players from three English super league teams over two seasons. **MAIN OUTCOME MEASUREMENTS:** Hand and wrist injuries that required specialist hand surgery intervention. **RESULTS:** There were 36 soft tissue injuries and 23 fractures, of which 27 needed operative treatment. Thumb was the most commonly injured digit and hand injuries were most common in the players playing in centre positions (25.4%) followed by prop forwards (22%) and second row forwards (18.6%). **CONCLUSIONS:** This study demonstrates that certain player positions are more vulnerable. Buddy strapping is occasionally worn by some players and may reduce the incidence of hand injuries, however this would need further investigations into epidemiology of hand injuries. Player education and early referral of serious injuries would improve the results of treatment and reduce complication.

SIC03-02

TREATMENT OF MIDSUBSTANCE ACL INJURIES IN SKELETALLY IMMATURE PATIENTS WITH OPEN PHYSES

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Private Orthopaedic Practice (SOUTH AFRICA)

PURPOSE: Evaluation of my personal results in young patients. The main objective of the study was to determine the best method of treatment for these adolescents with ACL injuries. **MATERIAL AND METHODS:** Results were collected retrospectively from my clinical notes since January 1999 to January 2005. I have treated 38 patients during this period. Criteria used to evaluate the knees of these patients: 1. Patient satisfaction. 2. Clinical examination. 3. Cybex evaluation. **RESULTS:** A review of the literature on this subject has also been done. My personal results at 4-6 months follow-up. Subjective results - 85.6% return to active sport participation at the same previous level. Objective results - 100% had stable knees on clinical examination. No one had any leg-length discrepancy or rotational or angular malalignment. **CONCLUSIONS:** The ruptured ACL in young adolescents should be reconstructed to prevent re-injury and decrease the incidence of traumatic degeneration in the ACL injured knee.

SIC03-03

TUNNEL WIDENING IN ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION USING A LOW SUSPENSORY FEMORAL FIXATION SYSTEM

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INTRODUCTION: After adopting a new low suspensory bio-absorbable femoral fixation technique for four bundle hamstring Anterior Crutiante Ligament (ACL) in conjunction with a rapid rehabilitation program, we observed at routine follow up that there was no evidence of femoral tunnel widening, as often observed with conventional high suspensory fixation systems. **METHOD:** We conducted a retrospective observational cohort study to test the hypothesis that the Rigid-Fix (Mitek) system of femoral fixation, a low suspensory technique, is less prone to tunnel widening than traditional suspensory techniques. 14 subjects were recruited at routine follow-up, and assessed by interview, clinical examination and scaled digital radiographs. **RESULTS:** Examination of the radiographs demonstrated only a 1.1mm (+/- 0.9mm) mean femoral tunnel widening, which represents a 12% increase in diameter (21% increase in area), and compares very favourably to the observed tunnel widening in high suspensory techniques, as cited in the literature. **CONCLUSIONS:** We conclude that the Rigid-Fix femoral ACL fixation system does not exhibit any evidence of clinically significant tunnel widening, even when used in conjunction with a rapid rehabilitation program. Systems of low suspension benefit from the advantage of not relying on interference fit which risks posterior cortical 'Blow Out'. A shorter graft working length within the tunnel lessens graft micro-movement, making early low biological fixation within the femoral tunnel more likely, and reduces the amount of tunnel widening. These micro-movements have been described as the 'Windscreen Wiper' and 'Bungee Cord' effects, and are well documented in traditional high suspensory fixation.

SIC03-04

STIFFNESS ON LIGAMENOUS ATTACHED SITES OF DISTAL FEMUR

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PURPOSE: When performing ligamentous surgery of knee, fixation devices for ligaments are used indiscriminately. We compared strength of ligamentous attached sites. Therefore, we expected reliable biomechanical data to use in ligamentous reconstruction or augmentation. **METHODS:** After measuring BMD, 10 cadaveric distal femurs were used to determine maximal pullout force for 5.0mm cannulated screw fixation of ACL, PCL, MCL and LCL attached sites. **RESULTS:** BMD averaged 0.958±0.302 g/cm². Average pullout strength of ACL, PCL, MCL and LCL group were 423.8±138.5 N, 513.4±163.9 N, 151.5±73.0 N, 179.0±36.0 N. There was no significant difference between ACL group and PCL group respectively. MCL group and LCL group weren't significantly different too. However, the maximal pullout strength of MCL, LCL group were significantly lower than that of ACL, PCL group (p<0.01). **CONCLUSION:** Because stiffness of MCL and LCL attached sites are lower than that of ACL, PCL attached sites, we may take into consideration fixation methods when performing ligamentous surgery of MCL and LCL.

SIC03-05

TWO YEAR RESULTS OF A.C.L RECONSTRUCTION WITH BIOABSORBABLE RIGIDFIX

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INTRODUCTION: To report the results of quadrupled hamstring tendon autograft anterior cruciate ligament reconstruction with bioabsorbable Rigidfix fixation To date, there has been very little published on clinical follow-up data on patients who have undergone quadrupled hamstring tendon autograft anterior cruciate ligament reconstruction with bioabsorbable fixation. There has been no published result with Rigidfix device used as a method of fixation at both femoral and tibial tunnels. **METHODS:** Retrospective review of 102 patients identified by review of Database as having undergone quadrupled hamstring tendon autograft anterior cruciate ligament reconstruction with bioabsorbable Rigidfix * fixation with an average of 2-year follow-up. **RESULTS:** Data were collected on 102 patients at an average 24 months after surgery. 79 patients returned for clinical evaluation (81% returns) 69 were males and 10 were females. There were two revisions. KT-2000 arthrometer mean side-to-side difference for manual maximum displacement was 1.75 mm (range, _4 to 5). The mean International Knee Documentation Committee knee score was good. More than 90% were satisfied with their result. **CONCLUSIONS:** Quadrupled hamstring tendon autograft anterior cruciate ligament reconstruction with bioabsorbable Rigidfix* fixation is comparable with other methods of anterior cruciate ligament reconstruction in terms of patient satisfaction, knee stability, and function.

SIC03-06

TRAUMATIC HEMARTHROSIS OF THE KNEE DURING SPORTS

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INTRODUCTION: The aim of this study is to register the causes of traumatic hemarthrosis of the knee in semi-professional athletes during sports and to evaluate the treatment. **MATERIAL & METHOD:** Between 2002 and 2004, we treated thirty-five (35) cases of traumatic hemarthrosis of the knee during sports in semi-professional athletes aged 16-38 years old (average: 25.3 yrs). In twenty (20) of them, hemarthrosis was located in the right knee, while in fifteen (15) in the left one. Twenty-three (23) were males and twelve (12) were females. Knee hemarthrosis occurred in soccer (11), mini-soccer (8), basketball (6), volleyball (5), jogging (2), karate (2) and tennis (1). Initial evaluation consisted of clinical examination, standard X-rays, MRI-scan (during the first 10 days, whenever X-rays were negative for fracture). Patients were followed up for 3-15 months. **RESULTS:** Hemarthrosis of the knee was due to meniscal tears (13), ACL tear (9), patella's fracture (4), patella's subluxation/dislocation (3), avulsion fracture of intra-condylar eminence (2), quadriceps rupture (2), impaction of femoral condyle (2). Nineteen (19) patients underwent knee arthroscopy, between the 18th–24th post-injury day. 742% of the injuries were treated operatively. In 90% of cases, the results of treatment were very good-excellent. **CONCLUSIONS:** Knee hemarthrosis during sports in semi-professional athletes was due to various causes. Accurate diagnosis and appropriate treatment was essential for the outcome.

SIC03-07

MANAGEMENT OF MULTI-LIGAMENT KNEE INJURIES

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The dislocated knee is a severe injury and results from violent trauma. Its results in disruption of 3 or more major ligaments and results in a poor functional outcome. Clinical

examination confirms multiple ligament injury, and vascular injuries need to be excluded. The current management is early surgical repair in the acute cases and reconstruction in the chronic ones. The ACL and/or PCL ligaments should be repaired along with the collateral ligaments to provide sufficient knee stability. We present our management of these cases and compare MRI and intra-operative findings.

SIC03-08

SKATEBOARD RELATED INJURIES IN NORTH WALES

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BACKGROUND: Skateboarding has been a popular sport among teenagers. Although a popular recreational activity it has attendant associated risks. The injury pattern has changed with the development of both skateboard tricks and the materials used for skateboard construction. We assess the epidemiology of skateboard related Orthopaedic injuries in a district hospital of North Wales. **MATERIALS & METHODS:** This was a retrospective study conducted over a 4-year period. All skateboard related injuries were identified from the database and data collated on age, sex, mechanism of injury, season when injury was sustained, type of injury, treatment needed and final outcome. **RESULTS:** 45 patients were seen by the Orthopaedic team for skateboard related injuries between 2003 and 2006. 80% patients were males and 77% were under the age of 15. There was a decreasing trend in the incidence of injuries in 2004 and 2005 but this has increased dramatically in 2006. 75% of injuries involved the upper limb with most injuries being fractures. Most injuries occurred during summer. 60% of injuries needed intervention like plasters, traction and manipulations. The distal radius was the commonest bone to be fractured. **CONCLUSION:** Skateboarding should be restricted to supervised skateboard parks, and skateboarders should be required to wear protective gear. These measures would reduce the number of skateboarders injured in motor vehicle collisions, reduce the personal injuries among skateboarders, and reduce the number of pedestrians injured in collisions with skateboarders.

SIC03-09

HIP ARTHROSCOPY IN THE ELITE ATHLETE

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AIM: The aim of this study was to assess the role of hip arthroscopy in the management of hip pain secondary to a sporting injury, in elite athletes. **PATIENTS AND METHODS:** It is a retrospective study of prospectively collected data. Thirty-one hip arthroscopies were performed on 27 elite athletes for hip pain secondary to injury. Of these 27 patients, one patient had arthroscopy on both his hips and three patients had an arthroscopy twice. All the patients were assessed pre-operatively with a thorough clinical examination, radiographs and MRI scans where appropriate. All operations were performed by the senior author and the patients were assessed at 6 weeks, 3 months, 6 months and a year following the operation. **RESULTS:** There were 25 males and 2 females with an average age of 38 years (Range: 18-58) in the study group. Sixty-five percent of the patients were professional football players followed by cricket and tennis. Two of the 27 patients demonstrated minimal acetabular dysplasia on their pre-operative radiographs. Of the 31 arthroscopies, a primary diagnosis of a labral tear was made in 20, a chondral flap and delamination in 5, early osteoarthritis in 4 and a ligamentum teres tear in 2. Along with the primary diagnosis of a labral tear, twelve of the 20 patients had a secondary diagnosis of chondral injury as well. There were no complications reported. **CONCLUSIONS:** Hip arthroscopy is a safe and effective method for early diagnosis and treatment of intra-articular disorders in elite athletes, and perhaps helps in earlier return to sport.

Session 03: Sports medicine (II)

CONFERENCES

*Moderators: Wichien Laohacharoensombat (Thailand)
Belkacem Chagar (Morocco)*

SICIS03-03

ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION WITH SEMITENDINOSUS - GRACILIS AUTOGRAFTS

Gonzalo VAZQUEZ - VELA

Hopital Angeles del Pedregal (SPAIN)

Semitendinosus-Gracilis autografts have become more popular for Anterior Cruciate Ligament Reconstruction because they avoid harvest-related injury to the quadriceps knee extensor mechanism and associated patellofemoral joint complications. The advantages of ST-G ACL Reconstruction are: 1 - Strong, stiff available autograft; 2 - Less pain post-op.; 3 - Minimal incision; 4 - Minimal donor site morbidity. Other advantages are that: It doesn't require femoral incision, the strength is more than 1430 N.; Fixation is excellent even in cases of a broken posterior femoral cortex and are easier for revision. Disadvantages of endobutton: it's non bioabsorbable, it doesn't have direct union to the graft, fixation is far from the joint surface windshield effect. The fixation is on the femoral lateral cortex. To avoid the windshield effect the femoral tunnels have to be less than 50mm; 20mm of the graft must be inside the bone and the tunnel measurement has to be exact. We have used guides for the tunnels. In the post-op. no brace is necessary with early mobilization and full weight bearing. From 1998 to 2004 (3-7 years) 85 cases with satisfactory results in more than 90% of the cases. In summary, it's a safe and strong technique with a minimum of failures and complications.

SICIS03-04

SURGICAL TREATMENT FOR SPONDYLOLYSIS IN YOUNG ATHLETES

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PURPOSE: To evaluate the outcome of surgical repair of pars interarticularis defect by segmental wire fixation in young athletes with lumbar spondylolysis. **CONCLUSION:** We recommend this technique in cases of lumbar spondylolysis in athletes who hope to resume their sports activities. **SUMMARY OF METHODS / RESULTS:** Between 1996 and 2006, 46 athletes (9 women and 37 men) with lumbar spondylolysis were treated surgically using this technique. The first series consisting of 23 athletes (6 women and 17 men) were evaluated for study. They were actively engaged in sports such as baseball, tennis, and golf. Twenty-two athletes had one level of spondylolysis and one athlete had two levels. The level of spondylolysis was L4 in 2 athletes and L5 in 22. The average follow-up period was 4.4 years (range, 1.0 to 9.2). Surgical outcomes were evaluated by radiographic examination, the Japanese Orthopaedic Association score, preoperative and postoperative sports activity levels and intensities, and the presence of complications. Bony fusion at the site of spondylolysis was obtained in all cases, and the Japanese

Orthopaedic Association score was increased significantly after surgery (preop., 21.4±3.9; postop., maximum 27.7±1.0; recovery rate, 80.4%). All of the patients returned to their sports activities, although at varying degrees. No severe complications were noted. This method of treatment is effective for multiple level lumbar spondylolysis.

FREE PAPERS

*Moderators: Andrzej Bohatyrewicz (Poland)
 Abderrazak Hefti (Morocco)*

SIC03-10

INFLUENCE OF EXERCISE ON OXIDANT STRESS PRODUCTS IN INDIAN LONG DISTANCE RUNNERS

Mandeep DHILLON
 PGIMER (INDIA)

BACKGROUND: The influence of exercise on free radical chemistry is not well understood. It is yet to be confirmed whether adequate biochemical defense system exists in our bodies to protect us from oxy-centered radicals, generated by exercise. The aim of our study was to check the exercise induced oxidative stress products in Indian long distance runners. **METHODS:** Thirty trained long distance runners undergoing exhaustive endurance training were compared with control group of 30 sedentary workers. Serum malondialdehyde (MDA), uric acid, superoxide dismutase (SOD), catalase, vitamin E and vitamin C and their susceptibility to oxidative stress was assessed. **RESULTS:** Exhaustive exercise resulted in higher levels ($P<0.05$) of serum MDA, vitamin E, vitamin C, higher levels of ($P<0.001$) SOD activity, but less significant ($P<0.01$) higher levels of uric acid, significantly ($P<0.05$) lower levels of catalase in long distance runners, when compared with control groups of sedentary workers. **CONCLUSION:** We conclude that young long distance runners undergoing endurance training are not protected from reactive oxidative species formation during exercise. Thus, to combat the deleterious effects of free radicals, anti-oxidant supplementation is recommended.

SIC03-11

MOTOCROSS INJURIES - THE SPECTRUM, EPIDEMIOLOGY AND SOCIO-ECONOMIC IMPACT

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OBJECTIVE: To describe the spectrum, mechanism, epidemiology and socio-economic impact of motocross injuries. **METHODS:** Motocross injuries treated in Doncaster Royal Infirmary between August 2004 and August 2006 were included. Total 141 patients' case notes were analysed retrospectively. A questionnaire was sent out to all patients. **RESULTS:** Sex: Females 10(7%), Males 131(93%). Age: Range 7-50 years; Mean age 19.8 years; 61(43%) patients were less than 16 yrs old. 70(50%) were school going. The years of experience ranged from 1-35 years with 55% having <5 years of experience. 73% injuries occurred in a race event while 27% in a practice event. Most common mode of injury was slipping and coming off the bike 53%, followed by missed jump 21% and collision 11%. Most common location on the track was a bend 53%, followed by jumps 15%. The spectrum of injuries ranged from head and neck 18, multiple injuries 18, back 13, upper limb 77, lower limb 34. 2/3rd(96) were fractures with the most common being

Clavicle fracture 16, fractures of the distal radius 11, Tibia and Fibula 8, Humerus 6, Shoulder dislocations 6, Acetabular fractures 5, Femoral shaft 2. Remaining 1/3rd(47) were soft tissue and ligamentous injuries. 17 patients were operated upon. 203 in-patient bed days were consumed. 3220 work/school days were lost. 7% patients had residual disability after the treatment. CONCLUSION: Motocross in its current form is quite a dangerous sport associated with a significant morbidity of the participants and high utilisation of public health resources.

SIC03-12

OPEN RECONSTRUCTION OF POSTEROLATERAL CORNER (PLC) INSTABILITY COMBINED WITH ARTHROSCOPIC-ASSISTED ACL AND/OR PCL RECONSTRUCTION

Andreas PANAGOPOULOS, Louw VAN NIEKERK, Prashant PATIL, Ioannis TRIANTAFYLLOPOULOS

Sports Medicine Center, Friarage Hospital (UNITED KINGDOM)

PURPOSE: To present the outcome of combined open reconstruction of posterolateral (PCL) corner instability associated with ACL and/or PCL deficiency. **MATERIAL-METHODS:** During 2003-2005, 16 patients underwent open reconstruction of PLC deficiency and arthroscopic-assisted ACL and/or PCL reconstruction. There were 13 male and 3 female (average age 29 years). ACL deficiency was present in 13 patients and combined ACL and PCL instability in 3. The PLC was reconstructed with a 2-tailed Achilles tendon allograft. The PCL was fixed with tibialis anterior allograft and the ACL with ipsilateral or contralateral patellar tendon or hamstrings autograft. In PCL deficient knees the ACL reconstruction was performed 4-6 months after the combined PLC and PCL reconstruction. One stage PLC and ACL reconstruction was performed in all the other cases. **RESULTS:** The mean follow-up period was 18 months (8-24). The IKDC-2000 and Lysholm scores were improved from 50.3 and 61.7 pre-operatively to 66.7 and 81.5 respectively. The average Tegner scale was 8 pre-injury, 2.9 prior to surgery and 5.3 at the final follow-up. Complications included 2 ACL revisions, 1 partial-failed PCL reconstruction, 1 septic arthritis and 1 patellar fracture of the contralateral leg after ACL graft harvesting. Decreased range of motion and persistent mechanical symptoms were significantly improved after 2nd -look arthroscopy in five patients. **CONCLUSIONS:** From our early results we conclude that combined PLC and ACL/PCL reconstruction can restore functional knee stability. Important factors for successful outcome include recognition and understanding of the injury, meticulous surgical technique and deliberate rehabilitation program.

SIC03-13

TWO-BUNDLE ACL RECONSTRUCTION WITH 6-STRAND HAMSTRING TENDON: 2-FEMORAL & 1-TIBIAL TUNNEL TECHNIQUE

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INTRODUCTION: One bundle (AMB) reconstruction alone remains 15% rotational instability. The purpose of this study is to evaluate the results of two-bundle reconstruction of ACL. **MATERIALS:** 60 patients included 50 men and 10 women, aged from 18 to 34 years old (average: 22), involved 35 left and 25 right knees recruited this study. Preoperative side-to-side difference by KT-2000 ranged from 5 to 12mm (average: 6.7mm), all cases had positive pivot shift (grade I: 15, II: 25, III: 20). **METHOD:** Hamstring tendons including gracillis and semitendinosus were harvested, one-half semitendinosus and gracillis tendon were folded into 4 strands as AMB, the other half semitendinosus

was folded as PLB. The grafts were looped with EndoButton-CL at femoral site, tibial site was sutured with 5# Ethibond. An 8-to 9-mm AMB femoral tunnel was made at 11 o'clock position, 6-to7-mm PLB femoral tunnel was at 09:30 o'clock position. One 11-to 12-mm tibial tunnel was made at central footprint. PLB was inserted first from tibial tunnel into femoral tunnel, then AMB followed. Tibial site fixed with a 9x30mm bioscrew at knee full extension position, then sutures tied over the tibial cortical screw with washer. RESULTS: Average FU 1.5 year, postoperative side-to-side difference was range from +1 to -1, no case beyond 3mm. No case had positive pivot shift. Five patients had soft tissue interposition between EndoButton and cortex at PLB femoral site. 95% of patients had a satisfactory result. CONCLUSION: Two-bundle ACL reconstruction provided a good postoperative rotational stability.

SIC03-14

LONG TERM RESULTS OF ARTHROSCOPIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION WITH QUADRICEPS TENDON AUTOGRAFT

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OBJECTIVE: To evaluate the long-term results of ipsilateral quadriceps tendon autograft with patellar bone plug (QTPB) for arthroscopically assisted ACL reconstruction to unilateral torn. METHODS: We evaluated prospectively 54 patients. Patients were monitored for an average of fifty-two months and examined before surgery, 12 months after surgery and final follow-up. Clinical findings, activity level, functional status, arthrometric and isokinetic dynamometric terms were evaluated. RESULTS: 50 patients could return to the same condition or improved to a better condition than the one before sports activity injury (Tegner activity score). Preoperative Lysholm score average was 47.3 and improved 97.6 at the first year follow-up. According to the IKDC; 45 (83.3%) patients were graded A, and average Knee Injury and Osteoarthritis Outcome Scores (KOOS) was 94.4%. 7 patients had worse Single Leg Hop Test, 12% distance deficit measured. According to KT-1000 measurements average 2.4mm laxity determined that compared with the contralateral knee laxity. No patients reported symptoms of giving-way. Peak extension torque (60°/second) was 80.73% at 12 months and improved 94.86% at their last examination compared with contralateral side. There was not any recurring case. CONCLUSION: Patellar tendon and Hamstring tendon grafts are more popular. According to our study the advantages of the QTPB graft are the following: the graft is larger and stronger, morbidity of harvest technique and donor site are minimal, rather quick return to sports activities. Long term results of muscle strength, extension torque are better than the patellar tendon graft results and flexion torque are better than the hamstring tendon graft results compared with the literature.

SIC03-15

QUADRICEPS FREE TENDON AS A FIRST LINE GRAFT FOR ACL DEFICIENCY - MID TERM RESULTS

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INTRODUCTION: Established standard implants for ACL reconstruction remain the patellar BTB and hamstring grafts. Quadriceps tendon with patellar bone block is mainly used for revision procedures. Aim of this study was to determine the results of a bone free tendon as a first line transplant for ACL reconstruction. MATERIAL + METHODS:

From 2004 to 2005, 63 patients with an ACL deficiency were treated with an ipsilateral quadriceps graft. Fixation was with polylactid pins. Follow-up period was mean 17 months (11-30). Preoperative Tegner- and Lysholm Score as well as the IKDC form were evaluated. These tests were repeated at follow-up together with KT-1000 measurement. Study setup was prospective, study hospitals were a University hospital, a Level 1 Trauma centre and a District General Hospital. RESULTS: In all cases the graft was sufficient for transplantation. In two female patients fixation with crosspins was not possible due to a small tibial head. In one case a hyperaesthesia in the area of the femoral crosspins developed, there was no case of DVT in this series. In 5 cases an extension deficit of 5° was seen at follow up. The Tegner- and Lysholm-Score results were comparable with reported results of hamstring and BTB grafts. CONCLUSION: The free quadriceps tendon has shown to be a transplant that can be used in the first line treatment of ACL deficiency. There is a high primary stability. There was no patellar morbidity and the medial structures of the knee are not weakened.

Session 04: Hip trauma (I)

Moderators: *Ian Leslie (UK)*
Mohammed Lemseffer (Morocco)

Thursday, 30 August 2007
Fes 1 Room

CONFERENCE

SICIS04-01

DISPLACED FEMORAL NECK FRACTURES IN ADULTS

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The aging population has led to a substantial increase in the number of femoral neck fractures; it is predicted by 2030 this number will double today's current rate. Displaced femoral neck fracture pose a substantial threat to the wellbeing of the patient. Fifty percent of these patients will have a decrease in their level of independence; mortality rates are reported between 6% and 30% following fracture. It is recognized that the best treatment for valgus impacted femoral neck fractures is simple surgical stabilization to allow rapid mobilization and prevent secondary displacement of the fracture. Patients with displaced femoral neck fractures are usually treated operatively; the high rate of non-union in patients without surgical treatment due to lack of access to appropriate surgical facilities is often poor. Surgical intervention may range from simple excision of the femoral head through to total hip replacement. Initial studies on the outcome of femoral neck fractures focused on the fracture pattern rather than on the patient leading to highly variable outcomes and lack of consensus on the best surgical approach to the problem. Later studies in which patients have been stratified according to health status, mental status, physical fitness and pre-fracture activity has led to a better understanding of what treatment is most appropriate for a specific patient. Rather than focus on the fracture, our attention is now more appropriately directly to the patient. Patients under 65 in good general health may be treated with internal fixation with a reasonable chance of satisfactory outcome. For patients over 65, with poor bone stock, below average general health, cognitive impairment or diminished physical activity cemented hemi-arthroplasty is the preferable treatment. Total hip replacement may offer the best long term outcome with higher hip scores and lower rates of re-operation; this is offset by a slightly higher complication rate as compared to internal fixation. The ideal treatment for this patient population is yet to be defined; it may be that the most appropriate surgical procedure is determined by patient factors rather than fracture factors.

FREE PAPERS

SIC04-01

RESULTS IN SURGICAL TREATMENT OF DISPLACED ACETABULAR FRACTURES

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There is wide agreement in the treatment of displaced acetabular fractures (DAF) that anatomic reduction is mandatory prerequisite for good functional results. The purpose of

this study is to assess the rate of anatomic reduction and the results in the surgical treatment of DAF. MATERIAL AND METHODS: Between 1990 and 2004, 205 patients (124 male and 81 female) with DAF were treated operatively. Single operative approach (Kocher-Langenbeck, ilioinguinal or extended ileofemoral) was used in 194, combined approach in the remaining 11 cases. Sixty-eight (38%) were elementary and 137 (67%) complex fractures, of which 51 (25%) both column fractures. Age, sex, mechanism of injury and type of fracture was analyzed. RESULTS: Postoperative reduction was anatomic in 123 (60%), satisfactory in 66 (34%) and nonanatomic in 16 (8%). The rate of reduction was related to the fracture type, choice of surgical approach and the interval between the injury and surgery. After a 2-year follow-up, according to the D'Aubigne Postel scoring system the functional results were excellent in 78 (38%), good in 70 (34%), fair in 33 (16%) and poor in 24 (12%). The radiographic joint status was evaluated according to Heeg (Heeg I-145, Heeg II-32, Heeg III-12, Heeg IV-16). COMPLICATIONS: severe coxarthrosis leading to arthroplasty in 16 (8%), avascular femoral head necrosis in 12 (6%), heterotopic ossification in 18 (9%). CONCLUSION: Acetabular surgery can lead to excellent and good functional results if appropriate approach is chosen and anatomical reduction is achieved. There is direct correlation between excellent/good clinical and radiographic results and anatomic intraoperative reduction.

SIC04-02

THE INTRAOPERATIVE MEASUREMENT OF THE FEMUR HEAD CIRCULATION AT NECK FRACTURE

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The reposed and stabilized femur neck fracture healing depends of the femur head circulation. The femoral head blood supply after neck fracture is unknown. The target of our study was to elaborate an easy and safe method to reveal the femur head circulation after the neck fracture. The idea was as follows: after the reposition of the fracture under fluoroscopy a hole is drilled into the femur head. An osteoscope is inserted into this hole near the proximal end of this hole. The hole is rinsed by physiological solution, and if the blood supply is sufficient the bleeding appears at the end of the hole. After animal experimentations, this method was applied in 44 cases of human femur neck fracture. The patients have Garden III or IV types of neck fracture. The measurement procedures were performed after the reposition before screws fixation. Four groups were established. - No bleeding. - Minimal circulation: The difference between the systolic and head pressure is higher then 60 hg mm. - Average circulation: The difference is lower then 60 hg mm. - Excellent circulation: The difference is lower then 30 hg mm. Our opinion is as follows: this is a suitable method to determine the circulation in the femur head in cases of neck fracture, and it is applicable for visualizing other intraosseal blood circulation disturbances. On the basis of this measurement, it is decided whether prosthesis implantation or screw fixation is performed.

SIC04-03

FEMORAL SHORTENING AFTER SURGICAL TREATMENT OF PER- AND INTERTROCHANTERIC FRACTURES IN YOUNGER PATIENTS

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INTRODUCTION: In geriatric patients femoral shortening is a well known clinical finding after surgical treatment of trochanteric fractures, whereas in younger patients it is expected to be a rare complication. The purpose of this study was to determine incidence and degree of femoral shortening in patients younger than 65 years of age after fixation of different types of trochanteric fractures. We additionally compared the results of two different implants, which were used for operative treatment. **MATERIAL/METHODS:** 95 patients, younger than 65 years of age, were evaluated for femoral shortening after surgical treatment of trochanteric fractures. Two different implants (dynamic hip screw and gamma nail) were used for operative treatment, mainly depending on type and stability of the fracture. Femoral shortening was determined by standardized lower extremity radiographs. **RESULTS:** 57 patients were treated by gamma nail, 38 by dynamic hip screw. Femoral shortening was seen in 46 patients (48%) with a mean value of 11mm. Fracture type and implant had a significant influence on the shortening: Femoral shortening was found to be more severe in patients with unstable fractures, and in unstable fracture types the shortening was significantly larger, if patients were treated by dynamic hip screw. **CONCLUSION:** Femoral shortening following surgery of trochanteric fractures was a common clinical finding in non-geriatric patients. The degree of the shortening was rather low and depended mainly on the fracture type. Comparing the two different implants used for operative treatment, gamma nail was more successful in preventing limb length discrepancy in unstable fracture types.

SIC04-04

A FOLLOW-UP ON PATIENTS WITH A PROXIMAL FEMORAL FRACTURE TREATED BY A PROXIMAL FEMORAL NAIL (PFN) 1 TO 5 YEARS POST OPERATION, AND A COMPARISON TO PATIENTS TREATED BY A DYNAMIC HIP SCREW

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About half of the hip fractures are pertrochanteric. Accepted treatments include usage of extramedullary or intramedullary fixation devices. There are current controversies over which method is preponderant. The goal of our work is to evaluate the functional recovery of our patients treated by PFN 1-5 years postoperatively, compared to our patients treated by DHS. **METHODS:** From 241 patients treated by PFN from 1999 until 2003, we located 62 whose age was above 70 and who were still alive. These patients filled questionnaires including the Lower Extremity Measurement form, from which we evaluated their functional ability and compared it to an alike group treated by DHS. It is imperative to mention that the two groups of patients have different fracture features, those treated by DHS had sustained stable fractures, whereas those treated by PFN had sustained unstable fractures. **RESULTS:** No statistically significant differences were found between the two groups in aspects of mortality, magnitude of pains, daily functioning impact, and functional recovery to prefracture status. We found statistically significant differences regarding specific activities: kneeling, rising from kneeling position, sitting, and climbing stairs, which our PFN patients found easier to execute. **CONCLUSIONS:** Though we expected worse results for the PFN patients group, who had inflicted more severe and unstable fractures, we did not find any parameter for which the results of the PFN group were significantly worse. On the contrary, for some specific activities, including climbing stairs and kneeling, the results were significantly in favor of the PFN operation.

SIC04-05**AUGMENTATION AND LAG SCREW SLIDING IN UNSTABLE HIP FRACTURES**

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The purpose of this paper is to study the effects of augmentation with regards to lag screw sliding until bone union in unstable hip fractures. Augmentation has been used in beta-TCP in fracture sites. All cases have used the adjustable sliding hip screw (AS hip screw), which has an adjustable mechanism from 125 degrees to 145 degrees, and has the advantage of fixation of the lag screw in the correct position of the femoral head. The AS hip screw has been used in 297 cases of hip fractures since March 1997 to August 2005, including 119 cases of unstable type fractures. The average follow-up is 208 days. (3month~36month). Evans type1 group 3: 71cases, type1 group 4: 37 cases, type2: 11 cases. Mean age is 82.7 years old. The average operation time is 61 min and the average hospital stay is 63 days. The average TAD (tip apex distance) is 15.7mm (SD 13.2mm), with no significant differences between each type of fractures. We compared the amount of lag screw sliding until bone union with both augmentation and non-augmentation cases. With regards to unstable hip fractures, there were 58 augmentation cases and 61 non-augmentation cases. There were no significant differences with regards to augmentation and non augmentation in Evans type1 group3, but the augmentation cases had shorter lag screw sliding in Evans type1 group4 and type2 fractures. ($P<0.01$). We recommended the augmentation of the fractures site using the beta-TCP Evans type1 group4 ($P<0.01$) and type2 fractures.

SIC04-06**IS PROXIMAL FEMORAL NAIL AN IDEAL IMPLANT FOR ALL TROCHANTERIC FRACTURES?**

Yogesh SALPHALE, Wasudeo GADEGONE

Shushrusha Multispeciality Hospital (INDIA)

INTRODUCTION: Achieving a stable fixation in pertrochanteric fracture and early mobilization is a challenge. We present a prospective study of 100 cases of PFN treated at our Institute. **MATERIAL AND METHODS:** We carried out a prospective analysis of the data of 100 consecutive patients who had a pertrochanteric, intertrochanteric, high sub trochanteric & combination of fractures between December 2002 and December 2005 treated with a Proximal Femoral Nail at our institute. In 86 patients we achieved close to anatomic reduction of the fracture fragments. Surgery was carried out under IITV, closed reduction of the fracture done and nail implanted. Locking it distally in a static or dynamic mode. In 14 patients we had to resort to limited open reduction. **RESULTS:** Postoperative radiographs showed a near anatomical fracture reduction in 88% of patients. The patients were followed up at an average of 12 months. The fracture consolidated in 4.5 months. 12 patients developed complications and 6 were lost to follow-up after eight months. **DISCUSSION:** The PFN, inserted in a minimally invasive manner is biomechanically stronger. The stress generated is negligible by being close to the weight bearing axis. It also acts as a buttress in preventing the medialisation of the shaft. We have found the PFN to have superior results in A3 fractures where impaction does not occur. **CONCLUSION:** PFN features the advantages of high rotational stability of the head-neck fragment and an unreamed implantation technique.

SIC04-07**RANDOMISED CONTROLLED TRIAL OF CEMENTED VERSUS UNCEMENTED HEMIARTHROPLASTY FOR DISPLACED INTRACAPSULAR FRACTURES**

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Two of the commonest types of hemiarthroplasty used for the treatment of a displaced intracapsular fracture are the uncemented Austin Moore Prosthesis and cemented Thompson hemiarthroplasty. To determine if any difference in outcome exists between these implants, we undertook a prospective randomised controlled trial of 400 patients with a displaced intracapsular hip fracture. All operations were performed or supervised by one orthopaedic surgeon and all by a standard anterolateral approach. Patients were followed by a nurse blinded to the type of prosthesis to assess residual pain and mobility. The average age of the patients was 83 years and 23% were male. 73% came from their own home with the remainder from institutional care. There was no statistically significant difference in mortality between groups. Pain scores were less for those treated by a cemented prosthesis ($p < 0.00001$). Mobility change was also less for those treated with a cemented implant ($p = 0.002$). No difference was found in hospital stay, implant related complications, re-operations or post-operative medical complications between the two groups. One case of non-fatal intraoperative cardiac arrest occurred in the cemented group. In summary a cemented Thompson Hemiarthroplasty causes less pain and less deterioration in mobility compared to the uncemented Austin Moore hemiarthroplasty, without any increase in complications. The continued use of an uncemented Austin Moore cannot be recommended.

SIC04-08**POSTOPERATIVE OUTCOMES AND HOSPITAL LENGTH OF STAY IN 2756 PATIENTS WITH HIP FRACTURES: A COMPARISON OF OPERATIVE AND NON-OPERATIVE MANAGEMENT**

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BACKGROUND: Hip fractures in the elderly are associated with considerable risk of morbidity and mortality. There are a limited number of studies that have compared the clinical outcomes following operative and non-operative treatment in patients with hip fractures. The purpose of this study was to compare the different post-operative outcomes in hip fracture patients who are either treated with surgery or non-surgical treatment. **METHODS:** A retrospective study was conducted on 2756 hip fracture patients who had been admitted over a 6-year time period. Patient bio-data, complications, ambulatory status at discharge and hospital length of stay were collated. **RESULTS:** There were 2029 (73.6%) of patients who underwent surgical intervention; the remaining 727 (26.4%) refused surgical intervention. The overall complication rate in the operated cohort was 6.6% as opposed to 12.5% in the non-operative cohort ($p < 0.001$). The mean length of stay (LOS) in the operated and non-operative cohort was 15.7 days and 22.4 days respectively ($p < 0.001$). **CONCLUSION:** Operative management of hip fractures in the elderly is associated with a decreased complication rate with more optimal ambulatory status and a reduced hospital LOS.

SIC04-09**PROXIMAL FEMORAL FRACTURES IN THE ELDERLY: CAN WE PREDICT LENGTH OF STAY?**

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AIMS: We have attempted to demonstrate the correlations between pre-operative and intra-operative factors and the length of hospital stay following fractures of the proximal femur. **PATIENTS AND METHODS:** Case notes of 87 patients admitted to the Leicester Trauma Unit between January 2005 and March 2005 with fractures of the proximal femur were prospectively reviewed. Standard multiple regression analysis was employed to determine whether the length of hospital stay was influenced by patient age, serum urea on admission, time to surgery and length of surgery. **RESULTS:** Sixty-four patients were female (74%) and 23 were male (26%), with a mean age of 82.2 years (range 53-104). The majority of injuries (69%) were intracapsular with only 31% being extracapsular. The mean length of hospital stay was 20.6 days (range 4 to 91, SD 2.0). Our results explained 14% of the total variance in the length of hospital stay, with the most significant factor being the time to surgery (mean 2.93 days, range 0 to 14, SD 0.47; $p= 0.009$). For one day delay in surgery the hospital stay increased by 1.16 days (Pearson correlation = 0.287). There was very little correlation between patient age, serum urea on admission, length of surgery and length of hospital stay. **DISCUSSION:** Delay in surgery leads to an increase in length of hospital stay following fractures of the proximal femur. This reinforces the findings of previous investigators. Therefore economic strategies aimed at reducing the length of acute hospital stay should aim to expedite surgery in these patients.

Session 04: Hip trauma (II)

Moderators: Prabodh Mukundrai Desai (India)
Mohammed Missoum (Morocco)

FREE PAPERS

SIC04-10

MINIMAL INVASIVE ANTERIOR APPROACH IN THE TREATMENT OF FEMORAL NECK FRACTURES IN THE ELDERLY - A FEASIBILITY STUDY

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In elective total hip arthroplasty minimal access gains increasing popularity. Aim of this study was to determine the feasibility and early results of this technique. PATIENTS/METHODS: Study setup was prospective. Firstly the three surgeons performing the surgery underwent training in centres facilitating these techniques. Then 8 cadaver operations were performed. Between 1.2006 and 7.2006 we treated 24 patients with a fractured femoral neck using a minimal invasive approach with a partial or total hip arthroplasty. 17 patients were female, mean age was 78 years (52-94 years). In 11 cases a hemiendoprosthesis was implanted. Follow-up (3 to 6 months) was solely via GP contact and postal questionnaire. The Barthel Life Index and chair rising test (timed up & go) were sought as well as medical and social data. RESULTS: Regarding theatre time there was a clear learning curve. As complications we saw 3 haematoma requiring revision, one of these and a further case developed a deep wound infection, both requiring revision of the prosthesis. One patient died in the late postoperative period of congestive cardiac failure. At follow-up, all further patients were alive. In 21 cases the previous social status had been regained. The mean Barthel index was 74 points, the timed up and go time was mean 24 seconds. CONCLUSION: There is a significant learning curve regarding this novel technique. Nevertheless first results implicate a possible positive result in the postoperative phase and postoperative social status. There is now approval by the local ethics committee for a randomised study.

SIC04-11

LONG TERM RESULTS OF REVISION SURGERY FOR FAILED INTERNAL FIXATION OF TROCHANTERIC FRACTURES

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The purpose of the current study was to evaluate the results and complications of hip arthroplasty and revision internal fixation procedures for treatment of failed internal fixation of trochanteric fractures. MATERIALS AND METHODS: Between 1992 and 2003, thirty patients were revised for failed internal fixation of trochanteric fractures. Revision internal fixation was used in 18 of them (group A), with a mean age of 55 years (average 45-60). Twelve were females and 6 males. Hip arthroplasty was used in 12 patients (group B) with a mean age of 60 years (average 60-65). Eight were females and 4 males. RESULTS: Patients were followed up for a mean of 8 years (range, 4 to 15 years). In group A, 13 patients had mild pain, were able to walk unsupported and regained the

usual daily activities. Another 3 had frequent hip pain, walked with support with one cane and changed their daily activity and work. The last 2 patients had marked hip pain and disability and their treatment plan were changed to hip arthroplasty. In group B, the results were satisfactory in 9 of them. 3 patients were in need of a second stage revision with special stems for failed primary hip arthroplasty. **CONCLUSIONS:** In properly selected patients and techniques revision of failed internal fixation of trochanteric fractures can provide a high rate of union and good clinical results with a low rate of complications. The long term results of revision internal fixation are superior to hip arthroplasty.

SIC04-12

FLUOROSCOPIC NAVIGATED PERCUTANEOUS SCREW-OSTEOSYNTHESIS OF ACETABULAR FRACTURES: AN ANALYSIS OF THE FIRST 12 CASES

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INTRODUCTION: Current gold standard of operatively treated acetabular fractures is open reduction and internal fixation. In this prospective study we evaluate the practicability, precision and first results of percutaneous screw-osteosynthesis of acetabular fractures, using a navigation system to reduce radiation exposure, screw misplacement and approach-associated risks. **METHODS:** Between June 2004–December 2006, 69 patients (26-79 years) with acetabular fractures were treated and in 12 cases (one with a bilateral acetabular fracture) a navigated cannulated screw-osteosynthesis was performed. The trocar of the guide-wire was navigated, based on 2D-Fluoroscopic images (Traumasoftware 2.5, Fa.Brainlab). A.p. roentgenograms and CT scans were taken, pre- and postoperatively. **RESULTS:** The 13 percutaneous navigated acetabular fractures were classified in 8 elementary and 5 associated ref. to Judet and Letournel. The operations were performed at the $3. \pm 2$ day after injury by a mean operation-time of 190 ± 139 min. The different number of screws (up to five per fracture) and a combined operation-technique of open plate- and percutaneous screw-osteosynthesis (magic screw) in 3 cases could account for this wide range of operation time. The mean X-ray exposure time was $1,33 \pm 0,28$ min / screw. Of the 28 navigated screws no misplacement was seen. In the follow-up examinations (current rate 83%, 0,5 – max. 2,5 years) so far no complications like wound infections, deep venous thrombosis, neurological injuries and implant failures were observed. **CONCLUSION:** Our first experiences with this novel approach are promising and serious advances of fluoroscopic-navigated percutaneous screw-osteosynthesis of well selected acetabular fractures can be expected, but larger studies and long time results are necessary.

SIC04-13

THE COMPARISON OF THE CABLE FIXATION OF LESSER TROCHANTER IN THE TREATMENT OF KYLE-GUSTILO TYPE III UNSTABLE INTERTROCHANTER FRACTURES

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To evaluate the availability of cable fixation of lesser trochanter in the treatment of unstable intertrochanter fractures using sliding compressive hip screw (CHS) on clinical and radiologic results related to osteoporosis. 54 cases of Kyle-Gustilo type III unstable intertrochanter fractures grouped by 1 (30 cases CHS) and 2 (24 cases additional cable)

were compared in regarding to sliding distance of lag screw, bony unions, weight bearing time, and the loss of fixations related to the osteoporosis after at least 1 year follow up retrospectively with statistical analysis between January 1999 to January 2005. Average sliding distances of lag screw were 15.27 and 12.13mm ($p=0.0453$) and bony unions in 14.63 and 13.71 weeks ($p=0.4623$) and average weight bearing time was 3.03 and 2.83 weeks ($p=0.1697$) in group 1 and 2 respectively. Early weight bearing was done for group 2 with Singh index greater than grade IV ($p=0.0291$) and the loss of fixation was 5 cases in each group ($p=0.9688$) increasing significantly in relation to osteoporosis ($p<0.05$). Additional cable fixation of lesser trochanter for mild osteoporotic patients in unstable intertrochanter fractures is recommendable for preventing excessive sliding of lag screws and making early ambulation possible, but not effective for severe osteoporotic patients.

SIC04-14

TOTAL HIP REPLACEMENT IN POSTTRAUMATIC COXARTHROSIS FOLLOWING ACETABULAR FRACTURES

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INTRODUCTION: Total joint replacement after acetabular fracture goes along with a higher complication rate but amazingly good function in most cases. A problem is bone loss, muscular weakness and soft tissue-management. **AIMS:** We wanted to compare our early functional results and complications with the literature. **MATERIAL AND METHODS:** From 9.1999 to 12.2006, 45 patients, mostly men with a mean age of 56 years had a hip-replacement due to secondary arthrosis after acetabular fracture. Follow-up was up to 6 years. Evaluation was founded on Harris-Hip-Score, complications, radiologic situation and operative management. **RESULTS:** 9 patients received cemented, 30 press-fit acetabular components, 6 needed Burch-Schneider cages. 42 had cemented or cementless bicontact-s stems, 3 Metha short stems. 10 patients underwent acetabular reconstruction with the bone impaction grafting technique. There was one new sciatic nerve irritation, 2 girdle-stone situations, one due to instability, one due to infection. There was an increase in HHS from preoperatively 35 to 91 after operation. **CONCLUSION:** Although THA carried out after acetabular fracture is technically demanding, the results are amazingly good. However, results should be compared with revision-surgery.

SIC04-15

PATHOLOGICAL FRACTURES AND FAILED FIXATION OF PROXIMAL FEMUR - ASSESSMENT OF OUTCOMES OF LIMB SALVAGE USING MODULAR TUMOUR PROSTHETIC RECONSTRUCTION

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AIM: To assess the clinical and functional outcomes following modular tumour prosthesis reconstruction of proximal femur in 100 consecutive patients. Modular tumour prosthetic replacement is useful especially in the region of proximal femur due to the frequent occurrence of metastasis and pathological fractures and failed fixation. 100 consecutive patients who underwent modular tumour prosthetic reconstruction of the proximal femur using METS prosthesis [Stanmore Implants Worldwide] from 2001 to 2006 were studied. The patient, tumour and treatment factors in relation to local control, implant survival and overall survival were analysed. There were 51 male and 49 female patients. The

indications were metastasis 65 [20 renal ca, 15 breast ca, 10 ca bronchus and 20 others], primary bone tumours 30 and other indications 5. 46 patients presented with pathological fracture and 19 presented with failed fixation and 35 patients were at high risk of developing fracture. The mean follow-up was 24.6 months [range 12-60]. 5 patients had revision surgery [4 had conversion of unipolar head to THR, 1 had revision to total femur]. There were 6 dislocations [5 closed reduction and 1 open reduction]. 5 patients had amputations for local recurrence and infections. The implant survival was 90% with revision or amputation as end point. The implant was in situ for a mean period of 18.3 months [range 0-60 months]. We conclude that METS modular tumour prosthesis for proximal femur provides versatility, low implant related complications and acceptable function for patients with metastatic tumours with pathological fractures and failed fixations of proximal femur.

SIC04-16

SHORT TROCHANTERIC ANTEGRADE NAIL (T.A.N.) - A NEW SOLUTION FOR DISPLACED SUBCAPITAL FRACTURES OF THE FEMUR

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Patients sustaining intracapsular displaced hip fracture who are considered to be 'young' (active patients less than 70 years old) are generally treated by anatomical reduction and internal fixation. Older patients are usually treated by hemiarthroplasty. We treated our active patients with displaced intracapsular hip fracture regardless of age by close reduction and internal fixation with Short Trochanteric Antegrade intramedullary Nail (T.A.N.). 19 patients, 20 cases, mean age 72.5 (range 26-93), sustained a subcapital fracture of the femur, garden III and IV, and were treated by close reduction and internal fixation with the T.A.N. (Smith & Nephew). The patients were not allowed to bear weight on the operated leg for 4 weeks, followed by partial weight bearing for another 4 weeks. Full weight bearing was initiated 8-10 weeks following the operation. Patients were evaluated in our clinic 1, 2, 6 & 12 months after the operation. Two of the patients died within two months after the operation. All patients returned to walk on their feet. The patients were scored by modified lower extremity questionnaire with mean results 4.36 (scale of 1 to 5, 1 poor and 5 excellent). There were no cases of implant failure. No cases of infections. One patient had a cut-out of the implant 2 months after the surgery, treated by conversion to T.H.R. In our 6-12 months follow-up there were no cases of avascular necrosis. Closed reduction and internal fixation with Trochanteric Antegrade Nail is a good alternative for hemiarthroplasty in the older active patient with displaced subcapital hip fracture.

SIC04-17

SURGICAL TREATMENT OF TROCHANTERIC MAL-NON-UNION BY OPEN REDUCTION AND SUBTROCHANTERIC VALGUS OSTEOTOMY

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INTRODUCTION: Nonunion of intertrochanteric fractures is uncommon, but gives rise to severe disability. Nonunion is usually preceded by failure of fixation, with drifting of the fracture into a varus position and external rotation leading to mal-nonunion, which presents the difficulty of mal-position, shortening and nonunion. **PATIENTS AND METHODS:** Fifteen patients with trochanteric mal-nonunion were treated at the authors' institution between 1998 and 2004. They were 9 men and 6 women. Age ranged between

26 to 72 years (average 49 years). Six patients were not treated before (four fractures were missed and two were neglected) and nine presented after failed internal fixation. A diagnosis of trochanteric nonunion was made if there was radiological evidence of a fracture line without callus or with callus, which did not bridge the fracture site, and with mobility of the fragments in stress X-ray views. In trochanteric nonunion after failed internal fixation, it was manifested by loss of fracture reduction, bending of the fixation device, varus collapse of the fracture, or pulling of the screws from the shaft. All patients underwent an aggressive treatment protocol consisting of the following surgical steps: (1) Direct fracture exposure and excision of the fibrous nonunion between the fracture fragments, (2) Open fracture reduction, (3) Subtrochanteric valgus osteotomy, and (4) The use of DHS plate for internal fixation. RESULTS: Follow-up varied from 9 to 48 months. Fracture union was achieved and the subtrochanteric osteotomy was healed in all patients. Time to union ranged between 12 to 20 weeks (average 14 weeks).

SIC04-18

INTERTROCHANTERIC VALGUS OSTEOTOMY IN FAILED FEMORAL NECK OR PROXIMAL FEMUR FRACTURES

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METHODS: Between 2000 and 2006, 17 patients with failed osteosynthesis for proximal femur fractures were treated with intertrochanteric valgus osteotomy. 14 patients were male (82.4%) with a mean age of 45.1 years, the mean age of the 3 (17.6%) female patients was 43.3 years. Follow-up ranged from 6 to 61 months. RESULTS: Primary diagnosis was pertroch. femoral fractures in 23.5% and femoral neck fractures in 76.5%. 70.6% had high-impact and 29.4% low-impact trauma. 73.3% of the injured were operated within the first 6 hours, 93.3% within 12h and all within 24 Stunden. PFN (17.6%), DHS (17.6%), screw fixation (47.1%), condylar plate (5.9%) and in 11.8% primary intertrochanteric valgus osteotomy with 130° angle plate were used. The main indication for secondary valgus osteotomy was in 64.7% non-union, partial femoral head necrosis in 17.6% and fracture geometry in 11.8%. Mean operation-time was 112 min, mean estimated blood-loss was 866ml, more than ¾ had retransfusion (76.5%) combined with the use of a cell-saver. Complications appeared in 41.1%: 11.8% femoral head necrosis, 11.8% dislocation of the implant and 5.9% infections. Revision-surgery was necessary in 3 (17.6%) patients, another 3 later underwent THR. 70.5% fractures showed normal consolidation, 2 showed normal fracture union since operation. 11.8% had a non-union, 50% of them infect-pseudarthrosis. CONCLUSION: Intertrochanteric valgus osteotomy is a good salvage procedure for non-unions in proximal femur fractures to preserve the original joint. However patients should be younger than 50-55 years. Older patients may be more satisfied with total joint replacement.

SIC04-19

COSTS OF CARE AFTER HOSPITAL DISCHARGE AMONG POSTMENOPAUSAL WOMEN WITH AN INTERTROCHANTERIC HIP FRACTURE

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OBJECTIVES: To identify potential predictors of medical care costs during the 1-year

period after hospital discharge, and to examine the impact of the type of surgical procedure among women with an intertrochanteric hip fracture. PARTICIPANTS AND METHODS: The design was a 1-year prospective cohort study reflecting day-to-day clinical practice. Sixty-two women 50 years or older with an intertrochanteric hip fracture were enrolled on a consecutive basis. Three groups were defined by the time of surgical repair: sliding hip screw fixation, intramedullary nail fixation, and prosthetic replacement. Direct costs of medical care were documented during the 1-year period after hospital discharge. Multivariable analyses were done to explore potential predictors of costs. RESULTS: There were no significant differences between the three groups for prefracture residence, type and number of comorbidities, and mean age at the time of the injury (80.8 years, 80.6 years, and 81.3 years, respectively). The mean direct costs of medical care during the 1-year period after hospital discharge amounted to €12,046 after sliding hip screw fixation, €18,859 after intramedullary nail fixation, and €42,767 after prosthetic replacement surgery (ANOVA among the three groups, $P=0.001$). A multivariable model identified living in an institution at the time of the injury ($P=0.026$) and prosthetic replacement surgery ($P<0.001$) as the two significant determinants of increased medical costs. CONCLUSION: Among postmenopausal women with an intertrochanteric hip fracture living in an institution at the time of the injury and treatment with prosthetic replacement surgery are strong predictors of increased direct costs of medical care after hospital discharge.

SIC04-20

SURVIVAL, FUNCTIONAL OUTCOME, AND COSTS OF CARE AMONG POSTMENOPAUSAL WOMEN WITH AN INTERTROCHANTERIC HIP FRACTURE

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OBJECTIVES: To examine the impact of the type of surgical procedure on survival, functional outcome, and costs of care during the one-year period after hospital discharge among postmenopausal women who sustained an intertrochanteric hip fracture. METHODS: The design was a one-year prospective cohort study reflecting day-to-day clinical practice. Eighty-two women were enrolled on a consecutive basis. Three groups were defined by the time of surgery: sliding hip screw fixation, intramedullary nail fixation, and prosthetic replacement. RESULTS: There were no significant differences between the three groups for prefracture residence, type and number of comorbidities, and mean age at the time of the injury (80.8 years, 80.6 years, and 81.3 years, respectively). Survival differed significantly ($P=0.003$), with one-year mortality rates of 20%, 27%, and 66%, respectively. No differences were found between the treatment groups for functional outcome at one year. The mean direct costs of medical care amounted to 12,046 EURO, 18,859 EURO, and 42,767 EURO, respectively ($P=0.001$). CONCLUSION: Among postmenopausal women with an intertrochanteric hip fracture mortality and direct costs of medical care for patients treated with primary prosthetic replacement are higher than that for patients treated with sliding hip screw or intramedullary nail fixation. Functional outcome was not significantly different. Most importantly, our findings underscore the need to perform an adequately powered, randomized trial to address the critically important question whether differences in outcome for the three groups are the result of the different treatment regimens given or related to, as yet unknown, baseline characteristics of the patients.

Session: SICOT/Scoliosis Research Society – Spine (I)

Moderators: Kamal Ibrahim (USA)
George Thompson (USA)

CONFERENCES

SRSIS-01

HOW DO I MANAGE ROUTINE ADOLESCENT CASES, DECISION MAKING, THORACIC PEDICLE SCREWS, VERTEBRAL ROTATION?

Kamal IBRAHIM

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Decision for surgery depends on: curve magnitude and patient's maturity. - Curves > 40' in growing child. - Progressive curves > 50' post menarche or in adulthood. SURGICAL GOALS: - Curve correction; - Levelled shoulders;- Coronal balance;- Sagittal balance;- Hump improvement. PLANNING:- Pedicle screws in thoracic and lumbar spine, transverse process hooks at the cephalad end of the fusion to claw with subsequent screws.- Monoaxial screws on the concave side and polyaxial on the convex side.- Proximal level of fusion will influence shoulders level: o Preoperative levelled shoulders or left is lower's extend fusion to one level proximal of the cephalad end vertebra. o Higher left shoulder (Type V curve) fuse upper left curve extend to T2 or T1. - Distal extension of the fusion will determine coronal balance; fuse to lowest mobile lumbar vertebra on side bending X-ray. - Transverse plane correction (hump correction): spine translation with pedicle screws and direct vertebral rotation of the apical vertebrae. - Sagittal correction: achieved by the proper bending the rods for thoracic kyphosis and lumbar lordosis. - Postop protocol: 5 days in hosp., back to school in 2 weeks, no brace, back to full sports in 4 months. RESULTS: Review of 115 cases, which were performed between 2000 and 2004: - Average correction thoracic curve 72%, lumbar curve 79%.- Coronal balance average 1.2 mm.- Shoulders levelled within an average of .8 mm. CONCLUSION: This plan and execution in the surgical management of idiopathic scoliosis rendered good results with high patient satisfaction. This plan can be used with any segmental instrumentation.

SRSIS-02

MY MANAGEMENT FOR SPONDYLOLISTHESIS

John P. DORMANS

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Spondylolisthesis in children is usually either ischemic or congenital. Patients usually present with low back pain, occasionally with deformity or even neurologic signs. Diagnosis is best made by history, physical examination, and plain radiographs. Advanced imaging studies may also be helpful. Most spondylolisthesis can be managed conservatively. For high grade spondylolisthesis, surgery is recommended. Bilateral, lateral fusion has remained the gold standard. For high degrees of spondylolisthesis (Grade 3, 4, and 5) aggressive surgical techniques are evolving. The key question is whether these are safe. Advanced spinal cord monitoring, wide decompression, sacroplasty, and anterior column support are features of surgical treatment for high grade spondylolisthesis would improve safety and outcomes.

SRSIS-03

TOTAL POSTERIOR VERTEBRECTOMY FOR HEMI-VERTEBRA, HOW I DO IT?

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THE PROBLEM: The growth of congenital hemivertebra in thoraco-lumbar, lumbar, and lumbo-sacral spine is prone to cause progression of the scoliosis, and coronal and sagittal imbalance. **THE SOLUTION:** either - Combined anterior and posterior fusion (long fusion and instrumentation in lumbar spine); - Combined anterior and posterior excision in one or two settings (two approaches); - Posterior hemi-vertebrectomy (total correction and short fusion in one procedure). **TECHNIQUE OF THE PROCEDURE:** - Routine posterior approach, Pedicle screws inserted in the adjacent vertebrae. - Rod is bent for appropriate sagittal alignment and inserted on the contralateral side. - All posterior elements of the hemivertebra and the transverse process are excised. - The lateral aspect of the pedicle is exposed subperiosteally. The same plane is followed to expose the lateral and anterior aspect of the vertebral body. - The cancellus bone of the body is curetted through the pedicle. - Dura is protected, posterior wall of the body is excised under direct vision followed by anterior and lateral cortex. - Epsilateral rod is inserted and the wedge is closed by compressing the screws. - Decortication, grafting and closure. - Bivalved brace for three months. **ADVANTAGE OF THIS TECHNIQUE:** - Simpler procedure; - Bone on bone contact, better fusion; - Stable closed wedge osteotomy, require short fusion and instrumentation. **RESULTS:** To date 12 cases (five cases were reported to SRS meeting 2001) - One case at T8 others are in thoracolumbar and lumbar area. - Preoperative scoliosis average was 43 follow up 11°; 2 years follow up, average loss of correction is less than 5; No pseudoarthrosis, nor intra or post operative major complications. **CONCLUSION:** This technique of hemivertebra excision offers the advantage of being an easier and safe one stage procedure. It guarantees union, and short fusion and instrumentation.

SRSIS-04

HOW I MANAGE SEVERE COMPLEX DEFORMITY: CONGENITAL AND IDIOPATHIC

John P. DORMANS

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Treatment for children with severe complex congenital and idiopathic scoliosis is evolving. Understanding the natural history of these conditions is key. The author will present his experience in managing these children. Recent technical advances include growing rod instrumentation, VEPTR, and definitive correction and infusion using an array of new techniques. Pedicle screw de-rotation techniques have revolutionized the treatment of scoliosis. Addressing patients with rigid and severe deformity surgically require advanced spinal cord monitoring. The use of osteotomies and vertebral column resection is also evolving.

Session: SICOT/Scoliosis Research Society – Spine (II)

CONFERENCES (1)

Moderators: Kamal Ibrahim (USA)
George Thompson (USA)

SRSIS-05

HOW DO I MANAGE FLAT BACK SYNDROME?

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Normal sagittal alignment of the spine: - Normal thoracic kyphosis range 20-50 degrees; - Normal lumbar lordosis range 20-65 degrees;- Most of the lordosis occur between L3 and S1;- Sagittal vertical axis from center of C7 body should fall through S1 body. Flat back syndrome is a rigid loss of lumbar lordosis with sagittal axis anterior to L5-S1, associated with significant back pain and poor posture. Etiology: - Iatrogenic 2ry to distraction instruments in lumbar spine (Harrington system, most common) or fusion in malalignment. - Pseudoarthrosis with loss of lumbar lordosis or decompensation beyond a fusion segment. - Degenerative spondylosis. Prevention: proper evaluation of the global sagittal alignment, proper rod bending for lumbar instrumentation, pedicle screws, proper positioning on the table, adequate extension of the fusion and instrumentation. Surgical correction: - Preoperative planning to restore a vertical axis which intersect posterior end of S1. - Lumbar Osteotomies: at the site of maximal deformity. o Smith Peterson osteotomy: limited correction but safer. o Pedicle subtraction osteotomy (partial vertebral decancellation, egg shell procedure) three-column posterior wedge osteotomy: technically demanding but achieves significant correction and no pseudoarthrosis.o Combination osteotomies of the above: utilized in severe deformity, either multiple Smith Peterson or pedicle subtraction at one level and Smith Peterson at another level. o Vertebral column resection: for severe rigid sagittal and coronal deformities and imbalance. - Expected results: average correction 16-30 degrees, standing and walking straight without bend knees, marked improvement of pain, but complication rate range from 20% to 60%. CONCLUSION: flat back syndrome is a preventable condition. With the current knowledge and modern instrumentation with pedicle screws fixation, iatrogenic flat back should no longer occur.

SRSIS-06

AVOIDING NEUROLOGIC COMPLICATIONS IN SPINAL DEFORMITY SURGERY; MONITORING UPDATE 2007

John P. DORMANS

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Avoiding neurologic complications in spinal deformity surgery is perhaps the most important area in our field. As more powerful techniques for deformity correction evolve, safety is a primary concern. The author will present his experience in the Philadelphia region through a series of multi-institutional prospective studies analyzing the sensitivity and specificity of multimodality monitoring, including the use of transcranial motor evoked potential monitoring. Further, the monitoring during pedicle screw correction scoliosis

surgery will be discussed, including the use of the intraoperative O-arm CT scanner for verifying position of pedicle screws.

CONFERENCES (2)

*Moderators: John C.Y. Leong (Hong Kong)
Tieman Coulibaly (Mali)*

SRSIS-07

SAGITTAL BALANCE (SB) AND SURGICAL SPINAL DISORDERS

Jean Marc VITAL

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1. The assessment of SB. DUVAL-BEAUPERE described pelvic incidence (PI), an angle that determines the subject's type of pelvis. PI does not vary with position. It determines spinal curves: a large PI leads to large cervical, thoracic and lumbar curves and vice versa. Depending on the angle of pelvic tilt (PT), the pelvis is positioned in retroversion or anteversion. For an average PI (52°), the PT is normally equal to 12°; this angle increases when there is retroversion of the pelvis, and decreases when there is anteversion of the pelvis. The retroversion is observed in cases of anterior imbalance. The sagittal list in T9 (SL in T9) situates the centre of the T9 vertebra (centre of gravity of the trunk) with regard to the femoral heads (FH). This angle is normally 11° and varies little by decreasing, even reaching negative values in severe anterior imbalance. ITOI described the femoro-tibial angle (FTA), which is 0° when knees are completely extended. Patients with anterior imbalance have to bend their knees and render this angle positive to displace the trunk posteriorly to maintain vertical alignment of the external auditory canals (EAC) and the FH. The overall SB can assess by studying the EAC/FH axis which is generally vertical. Patients analyzed in their natural position fall into three categories in terms of balance: - Ideal balance with the EAC aligned on a vertical line with the FH: the PT and SL in T9 are normal for the patient's PI. - Compensated balance for which the EAC are still aligned vertical to the FH, but thanks to pelvic retroversion and, in some cases, flexion of the knees. - Anterior imbalance: in spite of retroversion and flexion of the knees, the EAC lie anterior to the FH. 2. This assessment is applied to osteoarthritic kyphosis, dysplastic spondylolisthesis and postoperative flat back.

SRSIS-08

APPLICATION OF SURFACE ELECTROMYOGRAPHY IN LOW BACK PAIN ASSESSMENT

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Low back pain is known to be associated with muscle dysfunction. This study aims to assess the use of Surface electromyography (SEMG) in differentiating normal from LBP patients, and monitoring the progress of rehabilitation. Paraspinal muscle activities at L3 to L5 levels bilaterally were measured from 100 healthy subjects and 54 LBP patients in upright standing, straight sitting, and flexion-extension. SEMG signals were differentially amplified, filtered and digitized. Temporal and spectral information of the SEMG was revealed by the waveform and median frequency (MF) respectively. Data was analyzed with Student T-test. Under straight sitting and standing, LBP patients showed flat SEMG waveform similar to those from the normal. However, the MF of LBP patients were

significantly higher ($p < 0.01$). During flexion-extension, the flexion-relaxation waveform commonly seen in the healthy subjects was absent in most of the LBP patients (fig.1). The MF in LBP patients were significantly higher ($p < 0.01$) in all 3 phases of flexion-extension. The SEMG before and after rehabilitation were compared in 14 LBP patients. There was a significant decrease ($p < 0.01$) in MF in static sitting and standing after rehabilitation. When maintaining a trunk-flexed posture following flexion there was relatively silent activity which indicated restoration of the normal pattern. In conclusion, SEMG was able to differentiate normal from LBP patients, and to provide valuable information on the progress and effectiveness of rehabilitation.

Session 05: Spine degenerative

Moderators: *Abdullah Al-Othman (Saudi Arabia)*
Katsuji Shimizu (Japan)

CONFERENCES

SICIS05-01

USEFUL SURGICAL APPROACHES FOR DIFFICULT SPINAL SITUATIONS

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Cervicothoracic junction is difficult to approach surgically. We described a UNILATERAL OR BILATERAL MANUBRIOTOMY. Midline longitudinal incision from the manubrial notch to 3cm caudad to the manubriosternal angle. The manubrium is osteotomized, with the transverse limb exiting at the second intercostal space. An 8cm wide exposure to the spine is possible, between the major blood vessels. Rigid angular kyphosis causing spinal cord compression. Conventional anterolateral approach is difficult in the upper thoracic region because there the cone-shaped chest cavity is very narrow; and in the lower lumbar spine the big vessels bowstring anterior to the internal kyphus. We described a DIRECT INTERNAL KYPHECTOMY, allowing safe decompression under direct vision. Through a paraspinal curved longitudinal incision, several ribs are exposed, and the posterior two inches of three are removed, preserving the intercostal vessels. The vessels lead to the pedicles, bunched together because of the kyphosis. Pedicle removal exposes the internal kyphus directly. Removal is by high-speed burr. EN BLOC SPONDYLECTOMY for tumours. Tomita et al described a circumferential approach to the spine through a posterior incision. The posterior approach is conventional. The vertebral body is approached by extra-periosteal finger dissection following an extra-pleural plane. Both pedicles are cut, and the neural arch is removed. Unilateral preliminary stabilization of two or three levels above and below the affected vertebra by pedicle screws. The freed vertebral body is rotated out from its anterior position to emerge through the posterior incision. For recurrent tumours adhering to prevertebral structures, a combined anterior approach is needed.

FREE PAPERS

SIC05-01

THE CORRELATION OF PROVOCATIVE DISCOGRAPHY WITH A VALIDATED RADIOLOGICAL CLASSIFICATION IN THE ASSESSMENT OF THE LUMBAR DISC DEGENERATION

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The aim of our study is to correlate provocative discography with a validated MRI classification (Pfirman) in the identification of the affected levels in discogenic back pain. 102 consecutive patients meeting inclusion criteria were evaluated prospectively. Provocative discographies were performed in all cases as a routine investigation to

identify painful levels prior to fusion or disc replacement surgery. The severity of degenerative disc disease was graded radiologically using Pfirrmann's classification. Among each of the five Pfirrmann grades, the percentage of positive discographies was calculated. Significance and correlation then were investigated using the Chi-squared and Spearman's correlation tests. We found that all discs showing Pfirrmann grade IV and V disease were painful on discography. Statistical analysis showed a high correlation between the severity of degenerative disc disease on MRI scan and the result of the provocative discography ($\chi^2 = 32.96$, $P < 0.001$ and correlation coefficient = 0.756). We conclude that the higher the grade of segmental degenerative disc disease, the more likely it will be painful on discography.

SIC05-02

STUDY OF OUTCOME PARAMETERS IN DISTRACTION LAMINOPLASTY FOR LUMBAR CANAL STENOSIS

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STUDY DESIGN: Prospective randomised double blind controlled study. **SUMMARY OF BACKGROUND DATA:** Development of posterior element preserving surgery like distraction laminoplasty has gained popularity recently. However, prospective outcome analysis of this procedure and also comparison between distraction laminoplasty and conventional laminectomy as regards outcome and patient satisfaction has been lacking in literature. **AIMS:** To evaluate and compare outcome parameters and patient satisfaction rates in distraction laminoplasty with conventional laminectomy. **MATERIALS AND METHODS:** Consecutive cases of lumbar canal stenosis operated between 1999 and 2001 were included in the study group. Random allocation of cases into two groups - Group A patients underwent laminectomy (N=50) and group B patients were subjected to distraction laminoplasty (N=50). Patients were evaluated by an independent observer on the basis of a questionnaire. A modified Oswestry disability index (ODI) was used to assess the pre and post operative functional outcome. Visual analogue scores (VAS) were used to quantify pre and post operative back and leg pain. The precise intra-operative reasons for conversion of the distraction laminoplasty to laminectomy were also noted. **RESULTS:** The improvement in the ODI in Group B was statistically significant. The improvement in the back pain VAS in group B was clinically significant ($p=0.018$). The improvement correlates significantly with improvement in percentage disability Scores and Patient Satisfaction Scores. **CONCLUSION:** In the present series the early results of distraction laminoplasty were significantly better than conventional laminectomy patients in terms of relief of back pain and improvement in disability index.

SIC05-03

PERCUTANEOUS INTERBODY CAGES FOR FUSION

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Our technique percutaneous for plates placement was described in Buenos Aires. We present a new surgical technique for cages and report the preliminary results of the procedure. **CLINICAL MATERIAL AND METHODS:** 29 patients with degenerative painful DDD underwent percutaneous ELIF during 28 months. **SURGICAL TECHNIQUE:** Under neuroleptanalgesia, with local anaesthesia, with a mobile 'C' arm, the Europa* system is made of a set of sequential dilators increasing progressively in internal diameters until 13.2mm, depending of the height of the inter-vertebral space, is used, owing the choose

of a cage with specific design. Its final positioning is allowed by making a quarter rotation of it, offering by its special design, 2mm more distraction of the disc space. Same procedure is repeated on the opposite side. Patients are allowed to stand up the day following surgery, without need for bracing, the exit being authorized on the third or fourth day. RESULTS: all the patients experienced immediate pain relief, most of them being able to point it intra-operatively. At the last follow-up examination, the improvement of the clinical symptoms was maintained in all the patients except four who had to be reoperated by the same procedure two times, by open procedure two other times. Mean VAS scoring of the first 29 patients was 7.2 before surgery and 2.1 after. DISCUSSION: This ELIF technique minimizes surgical aggression, especially in old impaired patients. CONCLUSION: We have proposed a new technique for ELIF surgery, using percutaneous setting of cages without the need for facetectomy.

SIC05-04

GEOMETRICAL DIMENSIONS AND MORPHOLOGICAL STUDY OF THE LUMBAR SPINAL CANAL, IN NORMAL EGYPTIAN POPULATION

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Information on the precise dimensions of the lumbar vertebrae is essential, for the spinal surgery, and instrumentation. OBJECTIVES: Measurement of lumbar spine canal dimensions in Egyptian population. PATIENT & METHOD: This study was carried out on 300 patients. 162 men and 138 women were studied. CT was done and the mid-sagittal diameter, inter-pedicular distance, and lateral recess were measured to determine the normal values of these measurements in normal Egyptian populations. RESULTS: At L3 it was the narrowest level. The range of the mid-sagittal diameter at all levels was 11.07-26.07mm and the mean values had an hourglass shape. The range of the inter-pedicular distance at all levels was 17.00-43.41mm. In all cases at all levels the range of depth of lateral recess was 4-14mm and the mean was 6.7mm L5 had the narrowest lateral recess. The incidence of the trefoil shape of the canal at L5 was 20%. There were a small group of subjects, 3.3%, whose the measurement of their mid-sagittal diameter (MSD) can be said to be statistically stenotic (bony stenosis). Trefoils canals were seen mainly in the lower lumbar vertebrae mainly at fifth lumbar vertebra followed by the fourth lumbar vertebra. CONCLUSION: These data from a large number of CT scans, coupled with accurate measurement, provide the bases for anatomical studies and clinical research, and for sensible rational implants development for a restricted inventory to promote a solution in the vast majority of cases.

SIC05-05

TREATMENT OF INTERVERTEBRAL DISC DEGENERATION BY AUTOLOGOUS STEM CELLS – A PORCINE STUDY

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INTRODUCTION: Intervertebral disc degeneration (IDD) is a common cause of low back pain. IDD is a chronic process with changes in morphology, composition, and function. Early in IDD there is a loss of notochordal cells and later a change in phenotype. METHODS: 10 Göttingen minipigs were included. IDD was induced by scalpel incision to the left anterolateral annulus fibrosus. Autologous bone marrow derived mesenchymal stem cells were harvested, expanded, stained with membrane fluorescent dye (PKH-26, Sigma Aldrich), and injected via a percutaneous route 12 weeks post-operatively. Levels

were randomized for cell injection and degenerative control. MRI was performed every 6 weeks. Confocal laser microscopy was performed to visualize PKH-26 stained stem cells. Quantitative real time RT-PCR, Safranin-O staining, μ CT, and perfusion weighted MRI will be performed. RESULTS: At 12 weeks there were no difference between levels randomized to cell injection and degenerate control in nucleus area, fractional anisotropy, or ADC value (8.820 vs. 7.853mm², 0.705 vs. 0.680 x103mm²/s, and 0.537 vs. 0.570 respectively). After 24 weeks there were statistical difference in nucleus area and ADC value in favour of cell injection (6.738 vs. 8.068mm², and 0.691 vs. 0.812 x103mm²/s). Fluorescent stem cells were found in clusters in levels treated with cell injection but not in control levels. DISCUSSION: Autologous stem cell treatment is able to stop progression but not normalize nucleus area. However, this study provides no information about pain. Further evaluation will focus on endplate function (μ CT, perfusion MRI, and real time RT-PCR including TNF- α).

SIC05-06

CERVIFIX® SYSTEM FOR POSTERIOR CERVICAL SPINE STABILISATION: INDICATIONS AND CLINICAL OUTCOMES

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INTRODUCTION: Posterior Cervical arthrodesis and stabilization with lateral mass plates is a biomechanically sound construct in multiple planes of motion. Lateral mass screws are commonly used for posterior fixation of the cervical spine to treat traumatic and degenerative conditions. In this paper we reviewed 87 patients over a five-year period. OBJECTIVE: To assess the efficacy of CerviFix® modular screw & rod system (Synthes, USA). DESIGN: A 5-year retrospective review of patients with 2-year follow up. SUBJECTS: Patients who underwent posterior cervical stabilisation. OUTCOME MEASURES: Surgical Complications, Instrumentation failure, Kaplan-Meier Analysis. RESULTS: 87 patients in total with mean age 53.2 years (18-88 years). Indications for surgery included congenital deformity (9 patients), trauma (32), Inflammatory disorders (25), primary and secondary neoplasia (3 and 9 respectively), degenerative deformity (7) and revision of previous laminectomy (2). There was one related to surgery. 19 patients developed surgical complications. There were 11 instrumentation failures (12.6%), occurring early in the post-operative period (5.7%), at 6 months (3.4%) and at 1 year follow up (4.5%). 7 cases required further surgery. 3 neurological complications and a single vascular injury that was managed conservatively. The remaining patients developed wound complications. CONCLUSIONS: This is the largest study for posterior cervical fixation using the CerviFix® system to date. Incidence of instrumentation failure has not been emphasised in the literature previously.

SIC05-07

CLINICAL RESULT OF OPEN DOOR LAMINOPLASTY FOR CERVICAL SPINAL MYELOPATHY

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INTRODUCTION: The open door laminoplasty we performed was a simple procedure involving only the H shaped spinous process graft on the open side. The aim of this study was to investigate the clinical results and complications of this procedure for cervical spondylotic myelopathy (CSM). METHODS: From 1995 to 2004, 148 patients (92 males, 56 females, average age 62.4 years) with CSM were treated with open door laminoplasty.

Results and complications after at least six months were noted. The mean duration of the follow-ups was 3.1 years. Clinical results were evaluated with Japan Orthopaedics Association (JOA) scores. ROM at C2-7 were measured both pre- and post-operation with functional radiographs. The compression forces of laminae were measured in 7 cases. RESULTS: The average JOA score was improved from 8.5 to 13.3. Average ROM decreased from 39.8 to 23.8 degrees. Displacements of bone graft that revealed by computer tomography were shown 7 laminae (1.4%) in 507 laminae. Transient motor paralysis in the upper extremities was found in five patients (3.4%). Average compression force of lamina was 5.9N. CONCLUSIONS: Open door laminoplasty involving spinous process graft only on the open side is effective in the treatment of cervical spondylotic myelopathy, a relatively simple procedure and at low cost. Displacement of bone graft, however, did not influence clinical results. Although a neck collar was used for 2 months following the operation in the past, immobilizing the neck is no longer necessary.

Session 06: Spine trauma

Moderators: Miguel Oqueli Colindres (El Salvador)
Moradh El Yacoubi (Morocco)

FREE PAPERS

SIC06-01

HANGMAN'S FRACTURE - DILEMMAS!

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This retrospective study from 1996 to 2005 was done in Khoula Hospital, Muscat. 70 cases were treated during this period. Majority of cases were due to RTI. One case of diving injury and then one case of football injury, camel related accidents (two cases). Male to female ratio was 60:10. Age incidence ranges from 17-70 years. The majority of the cases were under 30 years. Luckily, neurology was present in only one case. Associated injury was present in more than 50% of the cases. All cases had X-ray and CT Scan. Patients with neurology and Type IIA and III had MRI Scan. Majority of the cases were Type I followed by Type II. 5 cases Type IIA and one case of Type III. All cases were put on skull traction (if no head injury) followed by Philadelphia collar/halo vest. One case of Type III fracture had surgical intervention in the form of posterior wiring and fusion after reducing the facet joint. All cases united, there was no case of post treatment neurological worsening. All the isolated cases without neurology have gone to their previous work, all cases had good range of neck movements. In one case, halo was removed as the patient could not tolerate it. Two cases had pin loosening, one case had hysterical attack during application of halo. We conclude that from our experience and review of literature which shows union rate of 98.5%, non operative treatment should be the initial treatment of choice for Hangman fracture.

SIC06-02

ANTERIOR SCREW FIXATION OF ODONTOID FRACTURES COMPARING YOUNGER AND ELDERLY PATIENTS

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INTRODUCTION: Anterior screw fixation has become an accomplished treatment option for the management of odontoid fractures. The purpose of this study was to determine functional and radiographic results after anterior screw fixation of type II odontoid fractures, with the particular interest to compare the outcome between younger and elderly patients. **MATERIAL/METHODS:** We reviewed clinical and radiographic records of 110 patients with an average age of 54 years at the time of surgery after anterior screw fixation of odontoid fractures. To compare functional and radiographic results between non-geriatric and geriatric patients, they were divided by age into two groups: Group A included patients aged 65 years or less, group contained patients older than 65. **RESULTS:** 95 patients had returned to their pre-injury activity level and were satisfied with their treatment. The Smiley-Webster scale showed an overall outcome score of 1.42

with similar results in both groups. Bony fusion was achieved in 102 patients, failures of reduction or fixation occurred in twelve patients. We had a non-union rate of 4% in younger individuals and a significantly higher rate of 12% in geriatric patients. Re-operation due to non-union or technical failures was necessary in eight patients. CONCLUSION: We had encouraging results using anterior screw fixation for surgical treatment of odontoid fractures and favour this method as preferred management strategy for stabilization of these fractures. Comparing between age groups, we had similar results on cervical spine function. With regards to fracture healing as well as morbidity and mortality, younger patients had a superior outcome.

SIC06-03

RECONSTRUCTIVE MICROSURGICAL OPERATIONS IN SPINAL CORD INJURY

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New reconstructive microsurgical operations on injured spinal cord (SC) have been introduced into clinical practice. Purposes for elaboration of those operations were the following: restoration of volumetric integrity of the injured SC by inserting the autografts consisting of vessels and fragments of peripheral nerves between the injured ends of SC as well as administration of embryonic neural stem cells into the graft with restoration of liquor flow by autovenous plasty. Technique was used in 54 patients at late period of complicated spine injury in presence of increasing myelopathic syndrome. Neural stem cells (NSC) were administrated intraoperatively to 19 patients-volunteers. Postoperative follow up was from 1 to 2 years with performance of clinical-, MRT-, CT-, and electrophysiologic examinations (ENMG) in dynamics. Early positive dynamics is related to neurotrophic effect of liquor flow which promotes supply of nutrients and trophic factors (neurotrophic factors, angiogenesis and growth factors) to the neurons of spinal cord and brain, optimization of their environment. Grafting of the defect zone with maintenance of spinal cord frame, in some cases abatement of the ischemia, may play an important role. Combination of these sanogenetic components not only activates the neurons but starts up the processes of spinal cord function compensation (segmental, suprasegmental and intersegmental). Analysis of long term results was performed by international H. Frankel scale. Early promising results of elaborated operations using combined vascular-neural autografts in patients with spinal cord injury showed the efficacy of new surgical techniques.

SIC06-04

LATERAL CERVICAL SPINE RADIOGRAPHS & THE SWIMMER'S VIEW IN TRAUMA PATIENTS - IS THERE ANY USE?

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BACKGROUND: Lateral cervical spine radiograph is the gold standard initial radiographic assessment in the trauma patient. Visualising the cervical spine from C1 to C7/T1 junction is of utmost importance to avoid neurological deficit due to missed cervical spine injuries. Swimmer's views are used for visualising the C7/T1 junction in inadequate lateral cervical spine radiographs. How adequate are lateral cervical spine radiographs in a trauma situation where the patient is triply immobilised on a spinal board? How good are Swimmers views in this situation? MATERIALS & METHODS: This study was done in 2

parts. 51 consecutive trauma patients were included in the first part of the study. Initial lateral cervical spine radiographs of all these patients were evaluated by a single observer. The criteria for adequacy were visualisation of the entire cervical spine from C1 to C7/T1 junction and the soft tissue shadow. Additional views were taken when the lateral cervical spine views were inadequate. 100 Swimmer's view radiographs randomly selected over a 2-year period in trauma patients were included for the next part of the study. All the patients had inadequate lateral cervical spine radiographs. The radiographs were assessed with regards to their adequacy by a single observer. The criteria for adequacy were adequate visualisation of the C7 body, C7/T1 junction and the soft tissue shadow. RESULTS: The lateral cervical spine views were adequate in only 23%. 77% radiographs were inadequate. C1 to C7/T1 was not visualised in 79.9%. Poor exposure accounted for 23%. All patients with inadequate radiographs had a Swimmer's view. 23% of patients with inadequate lateral cervical spine & Swimmer's view had CT evaluation of the cervical spine. Only 55% of the radiographs were adequate. None of the inadequate radiographs provided adequate visualisation of the C7 body and the C7/T1 junction. In 19% radiographs the soft tissue shadow was unclear. Poor exposure accounted for 53% of the inadequacies while overlapping bones accounted for the rest. CONCLUSION: Visualisation of the entire cervical spine (C1 - C7/T1 junction) is critical in the trauma patient. Our study shows that the lateral cervical spine radiograph alone is inadequate. Half of the Swimmer_views were inadequate. We recommend assessing all trauma patients with the standard lateral cervical spine radiograph and an additional Swimmer's view. A CT evaluation of the cervical spine would be recommended if both these views are inadequate.

SIC06-05

BRACHIAL PLEXUS INJURIES - DIAGNOSIS, TREATMENT AND NEUROTIZATION (A SERIES OF 45 CASES)

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PURPOSE: To demonstrate that brachial plexus injuries, if treated properly, can give satisfactory results. METHODS: Of 45 patients, 40 involved the C5-C6 nerve roots, 3 involved the C5-C6-C7, and 2 cases with total paralysis. All patients had exploration of the brachial plexus with insertion of nerve grafting from the nerve roots to the peripheral nerves. Two patients had neurotization, namely using five intercostal nerves, and through nerve grafting neurotization was performed. SUMMARY: Excellent 25%; Good 48%; Fair 37%. CONCLUSION: If the operation is not delayed for more than three months, a very devastating condition can be improved markedly.

SIC06-06

PREDICTORS OF RECOVERY AFTER AO-TYPE A FRACTURES OF THE DORSOLUMBAR SPINE

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BACKGROUND: Several factors correlate with outcome after spinal fractures. However, which factors determine a patient_recovery to the pre-trauma level? The influence of numerous factors on recovery, on time lost from work and on satisfaction with outcome were analyzed for the first time by regression analysis. METHODS: In 48 conservatively and 33 surgically treated patients the pre-trauma versus 12 months of follow-up differences of back pain (VASP), Oswestry disability index (ODI) and a global outcome

score (GOS) were prospectively recorded. RESULTS: Surgery group: patients with pre-existing back disease recovered 20% better on the VASP. Smoking was associated with 33% more pain, with 21% less GOS-recovery and with 17% less satisfaction. Return to work was delayed 4.5 weeks for a 1-level decrease of education level and for each lost degree of sagittal index on radiographs. Conservative group: back-patients recovered 50% better on the VASP but were 21% less satisfied. Patients with an A3-fracture (vs. A1), smokers and patients who have insurance recuperated respectively 17%, 13% and 9% less on the ODI. Smoking was associated with 11% less satisfaction and 21% less recovery on the GOS. For patients with insurance the latter was 15%. (All p-values <0,05). CONCLUSION: Surprisingly, smoking and insurance are the strongest negative predictors for recovery. Pre-existing low-back patients return better to their pre-trauma back pain level, but are less satisfied. Education level has a dramatic influence on the time lost from work in operated patients. The radiographic severity of the fracture is less important.

SIC06-07

MIS-TLIF WITH SEXTANT

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From October 2005, 60 patients have been treated by TLIF(transforaminal lumbar interbody fusion) with SEXTANT (Medtronic Sofamor Danek). In this paper, the surgical procedures and the experience of 60 patients are reported. Skin incision was made 40mm lateral from the midline in the length of 30mm. Tubular retractor of 22mm or 26mm width was placed just above the facet joint complex. After the total facetectomy, intrvertebral disc was removed from the triangle space. Decompression on the opposite side was performed by over the top technique with the assistance of METRx(Medtronic) endoscope. And then graft bone and the interbody cage were inserted. After the cage insertion, tubular retractor was removed and the pedicle screw fixation with SEXTANT was performed percutaneously. Patients were permitted to walk within 24 hours after surgery. Operation time, blood loss, post-operative pain and D-dimer were compared with the conventional PLIF(posterior lumbar interbody fusion). The post-operative muscle damage was evaluated by STIR image of MRI. Operation time was not different from the open PLIF. Blood loss, post-operative pain and D-dimer were less in the MIS-TLIF. STIR image of MRI also showed the less invasion of the MIS-TLIF.

SIC06-08

PEDICLE FLAVUM TUNNEL DISSECTING - A NOVEL POSTERIOR DECOMPRESSION TECHNIQUE FOR TREATMENT OSSIFIED LIGAMENTUM FLAVUM OF THORACIC SPONDYLOTIC MYELOPATHY

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To describe the configuration of pedicle-ossified ligament flavum tunnel (PFT) and to evaluate the posterior decompression by dissecting pedicle flavum tunnel (PFT) for treatment of thoracic spondylotic myelopathy. METHODS: 74 patients were diagnosed as thoracic OLF. The CT virtual endoscopy(CTVE) and multiplanar co-localization were applied to explore the configuration of OLF and PFT. The laminar shelling decompression technique was modified by PFT dissecting in all cases. The JOA lower limb motor function standard and sphincter function standard were used to evaluate the ability of lower limb motion and sphincter function respectively. RESULTS: OLF shaped like a barrow, the end of the barrow and the hand-shaft of the barrow were the roof of the upper

PFT and the lower PFT respectively; the two sides wall of PFT were OLF and pedicle alternatively; the exit of the PFT was connecting with intervertebral formamen; the entrance of the PFT was in the spinal canal. The width of the lower PFT was $1.9\pm 0.93\text{mm}$. Once the spinal canal was opened, the PFT could be observed and there were no dura in it. The mean follow up duration was 12.5 m (3-24m). Compared with the pre-operation, postoperative JOA sphincter function score (2.559 ± 0.493) and motor function score (3.716 ± 0.702), both differences were significant ($P<0.01$). Motor function recovery rate was 89.66%, excellent and good rate was 95.9%. CONCLUSION: Dissecting the roof of PFT was a relative safe and convenient way by which the OLF was be isolated or floated and finally the OLF was be removed.

SIC06-09

ACUTE SPINAL CORD INJURY IN EQUESTRIAN SPORTS

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OVERVIEW: This study is a comparison of Harris Hip Score(HHS), before and one year after cementless total hip replacement. All patients admitted for primary total hip arthroplasty, between March 2002 and March 2005 in Sina Hospital, without knee or contralateral hip comorbidity and willing to participate in the study, were candidates for total hip replacement with Versis cementless prosthesis. Standard Harris Hip Score was measured just before and after surgery and one year past procedure. Patients who refused to cooperate or didn't return for follow-up were excluded. 28 remaining cases included 16(57.1%) men and 12(49.9%) women from 44-49 years of age (mean 57.1 years old). Mean HHS before surgery was 31.7 ± 9.2 (range 22-60) which improved to 87.9 ± 11.2 (range 74-69) one year after intervention.

SIC06-10

NEW TREATMENT FOR LUMBAR TRANSVERSE PROCESS FRACTURE

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STUDY DESIGN: A retrospective clinical trial. OBJECTIVE: To evaluate the efficacy of local lidocaine injection in patients with lumbar transverse process fracture. BACKGROUND: Lumbar transverse process fracture is a common trauma by fall or sports-related injury. Regular treatment consists only of medication and lumbar orthosis. Although this trauma is thought to be minor, the pain is severe and lasts long. The fracture sometimes results in prolonged sick-leave. No other effective treatment has been introduced. METHODS: Five cases without any other fracture or organ injury were enrolled. The patients were injected with 3ml of lidocaine to the lesion directly under fluoroscopy, after the diagnosis was confirmed. The patients were recommended to wear lumbar orthosis and oral analgesia was prescribed. The pain was measured by visual analogue scale (VAS) before and after injection, as well as, the next day, one and three weeks after the procedure. The sick-leave period was also counted. RESULTS: Mean VAS was 9 at presentation, decreased 0 after injection. The score was 4 on the following day. One week later, the score was 3, and 0.5 at three weeks. The mean duration of sick-leave was 0 day. In this study, we had a manual-labor worker, who went back to work the next day. The others were clerks and students. All of them were also able to work the next day. No infection or complication was present. CONCLUSIONS: This new and

simple technique releases the patients from severe pain and decreases the sick-leave period.

SIC06-11

RESULTS OF SURGICAL TREATMENT OF SACRAL FRACTURES

Osama FAROUK

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BACKGROUND: Sacral fractures have been treated conservatively in the past. When they are part of type-C pelvic fractures, they are often displaced, unstable and take long time to unite with chronic pain, instability, mal-union, and leg length discrepancy. They are sometimes associated with neurological affection. Surgical treatment has gained acceptance in last years to prevent complications and improve outcome.**AIM OF STUDY:** to evaluate the results of surgical treatment of sacral fractures.**STUDY DESIGN:** prospective case series clinical study.**PATIENTS' DATA:** Fourteen patients with sacral fractures were included. Inclusion criteria: Displaced sacral fractures in adults. The sacral injury should be part of type-C fracture pelvis. Exclusion criteria: sacral fractures that are not type-C pelvic fractures. **METHODS:** Pre-operative assessment: Clinical and radiological. CT scan was done in all patients. Associated sacral roots injury was reported in four patients, lumbosacral plexus injury was reported once. Internal fixation using iliosacral lag screws was done in all patients. Closed reduction and percutaneous fixation was done in 11 patients, while open reduction, decompression of sacral roots and screw fixation in three patients. Clinical and radiological assessment of fracture union and functional outcome was done till full weight bearing.**RESULTS:** Union of the fracture was achieved in all patients with good and excellent functional score. Loss of reduction with vertical migration of the fracture occurred in two patients. Neurological recovery occurred in the four patients with sacral root injury, while the patient with lumbosacral plexus injury did not recover. Infection occurred once after open reduction.

SIC06-12

NEUROTROPHIC CLINICAL EFFECT AFTER TRANSPLANTATION OF VASCULAR-NEURAL AUTOGRAFTS AND RESTORATION OF LIQUOR CIRCULATION IN ZONE OF SPINAL CORD INJURY

Sergey RUSSKIKH, Georgiy STEPANOV, Zurab NATSVLISHVILI, Aleksandr KRUPATKIN, Dmitriy KARPENKO

Central Institute of Traumatology and Orthopaedics (RUSSIAN FEDERATION)

The purpose of the work was to study clinical and pathogenetic aspects of early neurologic dynamics after 54 reconstructive microsurgical operations on spinal cord with substitution of the defect by vascular-neural autografts and autovenous plasty of dura mater with restoration of liquor circulation spinal cord frame. This provides for neurotrophic effect of the restored liquorodynamics owing to the supply of nutrients and trophic factors to nerve cells. We examined 54 patients before surgery and after operation at terms up to 2 years. The peculiarity of early postoperative period (first month after operation) was the presence of positive dynamics in neuro-psychic status (marked diminution of astenic syndrome), motor functions (reduction and even disappearance of lower extremities spasticity, occurrence of muscular twitching or elements of motion in some muscular groups), sensory system (appearance of sensation, dysesthesias) and especially in vegetative syndromes (activation of perspiration, improvement of pelvic functions, improvement of vegetovascular responses and vascularization of tissues distally to the

injury level) and trophism (bedsore healing).LDF data showed activation of the function of sympathetic vasomotor fibers (diminution of the markedness and area of plantar surface hyperthermia as compared with preoperative data, activation of neurogenic sympathetic rhythms of cutaneous blood flow), in some cases trophic sensory peptidergic fibers were activated (activation of blood flow rhythms of peptidergic nature by LDF data) and indices of liquor were improved. In some cases spinal vessels patency increased.

**Thursday, 30 August 2007
Fes 2 Room**

Session: SIROT 01 – Bone healing

Moderators: Se-Il Suk (Korea)
Dariush Gouran Savadkoobi (Iran)

FREE PAPERS

SIR01-01

A NOVEL FIBRINOGEN HYDROGEL FOR NEW BONE REGENERATION

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The aim of the current study is to investigate bone regeneration in a 7-mm critical size tibial defect using a novel fibrinogen-based hydrogel ingrowth matrix. The use of PEG-fibrinogen hydrogels for bone regeneration has the potential of being superior to conventional fibrin-based materials by offering additional levels of control over the structural and biodegradation characteristics of the matrix, while retaining most of the inherent biofunctionality of the fibrinogen molecule. PEG-fibrinogen hydrogels with different levels of proteolytic resistance based on PEG and fibrinogen composition were designed for slow, intermediate, and fast biodegradation kinetics. Hydrogels were implanted into a segmental tibial defect in the rat without additional osteoinductive factors with the rationale that ingrowth matrix will displace the normal fibrin clot but sustain a similar healing effect in the defect site for a longer duration. Histological and X-ray results confirm that the extent and distribution of new bone formation in the defect after 5 weeks is strongly correlated with erosion pattern of the implanted material. Animals implanted with the intermediate-degrading PEG-fibrinogen materials displayed osseous bone formation, compared to nonunions in the fast-degrading treatments and untreated control groups. These data support the hypothesis that the resilience of the PEG-fibrinogen matrix can be synchronized with the optimal healing characteristics of a critical size tissue defect and that the consequent sustained release of fibrinogen fragments may facilitate the osteogenic response in the injury site. The PEGylated fibrinogen matrix may therefore be a highly efficacious tool for promoting healing of critical size defects in nonunion fractures.

SIR01-02

THE EFFECT OF LOCAL ADMINISTRATION OF PHENYTOIN ON FRACTURE HEALING: AN EXPERIMENTAL STUDY

Mandeep Singh DHILLON, Manoj MATHEW, Sameer AGGARWAL
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The antiepileptic drug Phenytoin (Diphenylhydantoin) has a beneficial effect on wound healing; its effect on fracture healing, however is still unclear. To evaluate any potential benefits of phenytoin on fracture healing, a prospective study was undertaken combining histology, histomorphometry and radiology, to analyse effects of locally administered Phenytoin. 24 Wistar strain rats (age, sex, weight matched) were assigned into two groups. In study group, phenytoin 20 mg/kg was administered through a 24 gauge needle directly on fracture site every 72 hours, while in the control group an equivalent volume of

normal saline was administered at similar intervals. At 28 days radiographic and histological analysis was done; scoring did not show any statistical difference between the control and test animals. Histomorphometric analysis of the callus however, showed that the total periosteal callus on either side of the central bridging callus was mineralised to a greater extent in the phenytoin group as compared to the control group ($p=0.011$). We concluded that phenytoin does have an influence in fracture healing, albeit small, which is primarily on the hard callus region. The hard callus region is the high oxygen tension region and the first region to differentiate. Effect of phenytoin is probably exerted at the early mesenchymal differentiation stage. However our preliminary work shows that the effect is small and it is not justifiable at this stage to advocate the use of phenytoin clinically to augment fracture healing.

SIR01-03

OSTEOGENIC ACTIVITY OF SHMSP IN DIAPHYSEAL SEGMENTAL DEFECTS

Mir SADAT-ALI, Ibrahim AL-HABDAN

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OBJECTIVES: This study was to evaluate the ability of Sadat-Habdan Mesenchymal Stimulating Peptide (SHMSP) in the healing of the segmental defects of the rabbits ulnae. **METHODOLOGY:** A two-centimeter osteo-periosteal defect in the mid-shaft of the right ulna was created in 30 skeletally mature male white New Zealand rabbits. The animals were divided into three groups. In group I the ulnar defect was filled with SHMSP, 5 milligrams per Kilogram body weight, group II had SHMSP with 100 milligrams of Type I bovine collagen as a carrier and group III was the control group. At 8 and 12 weeks five animals from each were sacrificed and the healing of the defects were evaluated by plain radiographs, bone mineral density, bone mineral content, microCT, mechanical testing and histopathology. **RESULTS:** At 8 weeks, healing of the defects in the group A was superior than the groups B and C. At 12 weeks the picture was better than at 8 weeks. The radiological assessment in group I was 3.2 as compared to 1.0 in the control group. Mechanical testing showed that 8 weeks torque to failure in group I was 293.53 Nmm versus 131.40 in group III. Histologically the healing in the study group was by osteoid compared to cartilage in the control group. **CONCLUSIONS:** This study highlights the potential of SHMSP in the healing of the segmental defects of rabbits ulnae. Further studies are needed particularly in larger animals followed by pharmacokinetics, toxicology studies before human trials can be conducted.

SIR01-04

BISPHOSPHONATE RESCUE FOR REGENERATE INSUFFICIENCY IN DISTRACTION OSTEOGENESIS - A CASE SERIES

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The Children's Hospital at Westmead (AUSTRALIA)

Distraction osteogenesis can be complicated by inadequate regenerate formation resulting in regenerate failure or fracture. Experimental evidence has demonstrated that bisphosphonates may mediate improved local limb BMD and regenerate strength in animal models. Seven patients who had undergone limb lengthening with an Ilizarov device were found to have regenerate insufficiency. Poor regenerate quality led to consideration for intervention. With informed consent patients received a therapeutic regime of intravenous pamidronate (3 cases) or zoledronic acid (4 cases). The mean age was 13.8 years (SD = 3.6) with a minimum follow-up of 4 months postfixator removal. The sites of regenerate insufficiency were proximal tibia (6) and distal femur (1). Mean time interval in the fixator before bisphosphonate treatment was 170 (124-252) days with an

average length increase of 4.8cm. At time of intravenous bisphosphonate treatment, DXA measurements demonstrated a reduced BMD in the bone adjacent to the lengthening site to a mean 62.1% (SD = 12.6) of the non-operated side. Mean healing index was high at 79.6 (64.4 to 108.0) days/cm, reflecting the observed regenerate insufficiency. No significant systemic complications were encountered. Six of the patient's fixators were removed without requirement for other intervention, demonstrating a rapid and sustained improvement in local BMD increasing to mean 85.6% (SD=13.3) of the normal side. One case did not respond and required anabolic intervention to achieve union. The majority of failed regenerate cases can be treated successfully with anti-catabolic bisphosphonate therapy. Only one case required anabolic therapy. These minimally Complete Manuscript (full text, references, and figure legends) invasive approaches may lessen the need for surgery in a group where significant surgical re-intervention could otherwise be required.

SIR01-05

PROTEOMIC STUDY TO DETERMINE PROTEIN PROFILE OF BLOOD PLASMA IN PATIENTS WITH ANKLE FRACTURES TO DETERMINE IF THERE IS ANY PARTICULAR PROTEIN PROFILE ASSOCIATED WITH FRACTURE HEALING

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BACKGROUND: The study of the human plasma proteome has been an area of interest because of the potential for identifying disease biomarkers. Fracture healing is monitored mainly by physical and serial radiologic examinations and it is difficult sometimes to predict the nature and period of healing. In this study we looked at the plasma proteomic profile of the serum depleted of the high abundance proteins (namely Albumin and IgG) taken during the course of treatment of 21 patients who had ankle fractures. **OBJECTIVE:** The purpose of this study was to correlate serial changes in the plasma proteome with the process of fracture healing in humans with ankle fractures and assess its potential in identifying a marker for fracture healing. **MATERIALS AND METHODS:** 21 patients with isolated ankle fractures were recruited prospectively. Peripheral blood samples were collected over a period of 4 months. 12 healthy, age matched, non-fracture volunteers also donated blood. Plasma was isolated and loaded onto 2 dimensional polyacrylamide gels for isolation by isoelectric point in the first dimension and molecular mass in the second dimension. **RESULTS:** Clinically and radiologically all 21 patients had complete healing by four months and were discharged from care. Data of the comparison of the plasma proteome between non-fracture controls and the time frames in fracture healing was analysed using the Phoretix 2D software. More than 500 protein spots were identified in both the control and patient group. Three spots were found to be statistically significant and were further analysed by mass spectrometry.

SIR01-06

ANALYSIS OF DELAYED FRACTURE HEALING FOLLOWING UNREAMED TIBIAL NAILING

Khaled Hamed SALEM
Rehamed Hachenburg (GERMANY)

To determine the variables affecting healing of tibial fractures treated by unreamed nailing, 158 patients with 160 tibial shaft fractures fixed using the AO Unreamed Tibial Nail (UTN®) were retrospectively reviewed. There were 105 men and 53 women (mean age 39.5 years). Fractures were classified into 78 AO type A fractures, 65 type B fractures, and 17 type C fractures. Fracture comminution was classified using Winquist

criteria. There were 115 closed and 45 open fractures. Two-thirds of the fractures were caused by high-energy trauma. Fracture union occurred after a mean time of 24.3 weeks. There were 20 cases of delayed union and 16 non-unions, all united by the end of treatment. There were remarkably few soft tissue complications. Fatigue failure of the locking screws continues to be a major problem. The most important variables affecting fracture healing were the mechanism of trauma, fracture gap, and the time to dynamization. With a 10% significance level, the variables associated with a higher risk of delayed or non-union were the degree of comminution, fracture site gap, and most importantly, the time to dynamization. Fracture comminution and high energy trauma were the main factors associated with a higher risk for malunion. The odds were 5 times more with high comminution and 13 times more with high-energy falls.

SIR01-07

EFFICIENCY OF LOW-INTENSITY PULSED ULTRASOUND ON DISTRACITON OSTEOGENESIS - A PROSPECTIVE, RANDOMIZED STUDY

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BG Trauma Center Bergmannsheil (GERMANY)

INTRODUCTION: Low-intensity pulsed ultrasound has been proven to accelerate fracture healing both clinically and experimentally. In this study the influence of low-intensity pulsed ultrasound during distraction-osteogenesis was investigated. **MATERIALS AND METHODS:** 40 patients with distraction osteogenesis and external fixation could be included in this study. 20 patients underwent an adjunctive transcutaneous ultrasound treatment (Exogen® ultrasound device, frequency 1.5MHz, signal burst width 200 microseconds, signal repetition frequency 1.0kHz, intensity 30mW/cm²) for 20 minutes daily. **RESULTS:** Due to low intensity pulsed ultrasound therapy mineralisation of the distraction zone was significantly faster than in the control group ($p < 0.05$). This was investigated by standardized X-rays and digital image analysis. Also the distraction consolidation index and the healing index according to Paley were significantly improved in patients with ultrasonic treatment. **CONCLUSIONS:** We conclude that ultrasound treatment can accelerate bone maturation and formation in distraction osteogenesis, sometimes even in states of poor callotasis. Our findings indicate that due to the additional application of low-intensity pulsed ultrasound biomechanical healing after distraction-osteogenesis can be achieved faster. It may provide a method of great promise in cases where delayed bone formation during distraction osteogenesis occurs.

SIR01-08

THE INFLUENCE OF IMPLANT DESIGN IN THE NON-UNION OF FEMORAL FRACTURES

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INTRODUCTION: We observed an unexpectant high nonunion rate (9%) in young patients with closed femoral fractures treated with the newer Intramedullary(IM) nailing system. We hypothesised that reduced fracture stability was the most likely cause for the observed high nonunion rate. **AIMS:** To biomechanically test how factors such as, cross screw length, number of cross screw, cortical thickness and the mechanical properties of bone influence the stability of IM nail systems. **MATERIALS AND METHODS:** The fracture fixation model was constructed using custom-made stainless steel IM nails and artificial bone cylinders of clinically relevant diameters (50mm, 75mm and 100mm) and

wall thicknesses (3mm and 5mm), to represent different parts of the femur. The cylinders were secured to the distal end of the test IM nail using dedicated cross screws of 5mm core diameter. Axial loading was undertaken with an Instron testing machine up to 2KN at a rate of 0.5KN/sec. RESULTS: Long cross screws (100mm) provided considerably less stability than short cross screws (50mm). Similarly, thin walls (3mm) offered less stability than thick walls (5mm). Overall, there was an eight-fold difference in stability when the least stable configuration (100 x 3mm) is compared with the most stable configuration (50 x 5mm). CONCLUSION: Very distally placed cross screws are prone to bending under load giving rise to fracture instability. By comparison, traditional IM nail systems, that use more proximally placed shorter cross screws, are more rigid and offer greater stability with less risk of nonunion.

Session: SIROT 02

Moderators: Bjorn L. Rydevik (Sweden)
Farid Ismael (Morocco)

FREE PAPERS

SIR02-01

REPLICATIVE CAPACITY AND MULTILINEAGE DIFFERENTIATION POTENTIAL OF PORCINE BONE MARROW STROMAL CELLS DURING LONG-TERM CULTIVATION

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INTRODUCTION: Bone marrow stromal cells (BMSC) are regarded as an attractive source for tissue engineering and regeneration due to ease of harvesting and their capability to differentiate into the mesenchymal lineages such as bone, cartilage and fat. Given the large number of BMSC necessary for therapeutic applications and their low frequency in bone marrow aspirates, a consistent in vitro expansion is required. Consequently, the utility of BMSC relies on their ability to retain, after expansion, the potential of differentiate. The aim of this study was to investigate the changes of proliferation and multilineage differentiation potential during long-term passage of porcine BMSC. **MATERIAL AND METHODS:** The BMSC were isolated by Ficoll density gradient centrifugation combined with adherent culture method. Cells were cultivated for 21 passages. Replicative capability was evaluated by means of Thymidine assay. The 1st, 4th, 8th, 15th passage cells were induced to osteogenesis, adipogenesis and chondrogenesis, respectively. Osteogenesis was evaluated by ALP activity assay and quantitative calcium deposit. Adipogenesis was confirmed by Oil Red O staining. Chondrogenesis was verified by Toluidine blue staining. **RESULTS:** The average number of population doublings was 81 ± 8 , at which time the cells maintained proliferation potential. The osteogenic and chondrogenic potential of cells was conserved as evidenced by the increase in ALP activity, calcium deposits, and proteoglycan positive staining. However, the adipogenic potential was decreased in the late passage. **CONCLUSION:** These results indicate that long-term cultivated porcine BMSC remain replicative capability and undergo the osteogenic and chondrogenic lineage at the expense of adipogenic potential.

SIR02-02

CHONDROGENIC DIFFERENTIATION OF PORCINE MESENCHYMAL STEM CELLS FROM BONE MARROW

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OBJECTIVE: To establish a method to induce chondrogenic differentiation from isolating pig bone marrow mesenchymal stem cells (MSCs). **METHODS:** Bone marrow from 3-month-old about 50 kg landrace pigs, was aspirated from the medullary cavity of the proximal tibia. The MSCs were isolated and purified by Ficoll density gradient centrifugation combined with adherent culture method. The MSCs from passage 1 were cultivated as pellets in DMEM with $37.5 \mu\text{l/ml}$ ascorbic acid, 10 nM dexamethasone, 1:100

ITS premix, 10 ng/ml human recombinant TGF- β 1 up to 21 days. The MSCs were cultivated in DMEM with 10% inactivated fetal bovine serum as a control. Cell morphology was observed by microscope after histochemical staining. Presence of proteoglycan was analysed by means of Toluidin blue staining. RESULTS: Characterization of primary MSCs: At day 1, most cells depicted round and floating hematopoietic cells. Colonies consisting of fibroblast-like cells were observed at day 3 after removal of non-adherent cells, which grew to various sizes at day 7. Chondrogenic differentiation: The cell pellets exposed to chondrogenic stimulation medium had an increased cellular density and increased in size over the course of 3 weeks compare to the control. Proteoglycans appeared within 21 days in chondrogenic stimulation medium. Proteoglycans were not detected in the basic medium. CONCLUSION: Porcine MSCs harvested from bone marrow by density gradient centrifugation are capable of chondrogenic differentiation in vitro. The combination of TGF- β 1, ITS premix and ascorbic acid has fine capacity of inducing MSCs chondrogenic differentiation.

SIR02-03

INFUENCE OF MATRIX-BASED MICROFRACTURE ON THE THERAPY OF CHONDRAL DEFECTS IN A SHEEP MODEL

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Hyaline cartilage defects generally progress to osteoarthritis. Knutson et al. demonstrated that there is no benefit of ACT compared to microfracture for smaller defects. According to the hypothesis of the 'Kausale Histogenese' of Pauwels mesenchymal stem cells have the potential to differentiate under mechanical stress to several tissues including hyaline cartilage. Aim of the present study was to improve cartilage defect repair by differentiation of adult mesenchymal stem cells with matrix based microfracture. Two chondral defects (8mm diameter) were created in the weight-bearing area of the femur condyle of 12 sheep. The defects were either left untreated as control group, filled with matrix or were treated by microfracture or the combination of matrix and microfracturing. The animals were allowed full weight bearing after the operation. After 12 weeks the animals were sacrificed. Investigated parameters were: quantity and the quality of the regenerative tissue, evaluated by the score according to O'Driscoll and immune-histochemistry for Aggrecan, Collagen I and II. The results of all treated groups showed significant higher tissue regeneration compared to the untreated controls. Only the matrix based microfracture showed a significant improved result in the score according to O'Driscoll. (void: 8.3 points, microfracture 8.8 points, matrix 12.5 points, matrix based microfracture 20.8 points. This tissue shows hyaline like orientation. In our present animal model, the combination of matrix with microfracture appears to be superior to clinically established microfracture.

SIR02-04

OSTEOGENIC, CHONDROGENIC, AND ADIPOGENIC POTENTIAL OF HUMAN NUCLEUS PULPOSUS CELLS

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INTRODUCTION: Future cell-based therapies for intervertebral disc degeneration will

benefit from a source of cells for implantation to create a new functional extracellular matrix. Recently, increasing evidence has suggested that adult stem cells are not exclusive to bone marrow, but are also present in various tissues and organs. The purpose of this study was to test the ability of isolated human nucleus pulposus cells to express several phenotypic identities within the mesenchymal lineage. **METHODS:** Human nucleus pulposus cells (NPCs) were isolated from patients undergoing disc surgery and were analyzed for osteogenic, chondrogenic, and adipogenic capacity in defined in vitro culture conditions. **RESULTS:** Osteogenic Assay: Monolayer culture system with osteogenic medium resulted in a vigorous increase in ALP activity as compared with control. Matrix calcification by von Kossa staining and ALP expression correlating with an increase in ALP activity were shown. Chondrogenic Assay: Histological analysis showed cartilage-specific metachromasia. Immunohistochemistry and RT-PCR for type II collagen further confirmed the chondrogenic phenotype. Adipogenic Assay: Histological examination revealed the formation of small lipid droplets in both monolayer and pellet culture. **DISCUSSION:** The data demonstrate that culture-expanded human NPCs from degenerated discs have the potential to exhibit osteogenic, chondrogenic, and adipogenic properties. These encouraging results suggest that because of their ability to differentiate, this cell population may possibly be targeted for in situ tissue engineering to treat intervertebral disc disease. Further investigation of the precise mechanisms involved in the differentiation may permit development of strategies to repair or regenerate disc degeneration.

SIR02-05

PAIN MANAGEMENT IN LUMBAR DISCECTOMY. PROSPECTIVE SINGLE BLIND RANDOMISED CONTROL TRIAL OF PERIOPERATIVE STEROID AND LOCAL ANAESTHETIC TOPICAL APPLICATION IN LUMBAR DISCECTOMY

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INTRODUCTION: This study is performed to investigate the efficacy of steroid, local anaesthesia (LA) or combination of both in reducing post operative pain in lumbar discectomy. **MATERIALS AND METHODS:** The study was ethically approved. Patients undergoing primary single level lumbar discectomy were randomised by a closed envelope system into 4 groups. 10mg of adcotyl in 1ml and 1ml of 0.5% bupivacaine were used. Combinations of above were applied topically over the nerve root prior to closure. Preoperative, day 1 and eight weeks post operative visual analogue pain score were recorded. 10cm visual analogue pain score chart was used. 24 hours post operative opiate analgesia requirements and duration of inpatient stay were recorded. Data was analysed using Student t-test and Fisher exact t-test. **RESULTS:** No significant differences in the mean pre operative pain score between all groups. Mean day 1 pain score for steroid/LA, steroid only, LA only and control were 0.9, 2.5, 2.1 and 3.3. Mean opiate requirement postoperatively were 32.4mg, 54mg, 48.8mg and 56.4mg. Mean inpatients stay were 2.2 days, 3.9 days, 4.6 days and 3.63 days respectively. At 8 weeks post operatively, no significant differences in the pain score in all groups. **CONCLUSIONS:** Significant post operative pain reduction was achieved in the steroid/local anaesthesia group compared with other groups ($p < 0.05$). The results are reflected as well in significant reduction in the post operative analgesia requirement ($p < 0.05$) and the significant reduction in inpatient stay. ($p < 0.05$) We recommended the use of perioperative steroid and LA in lumbar discectomy.

SIR02-06

SIMULATION OF CHIARI OSTEOTOMY IN 3D ENVIRONMENT - FINDING THE BEST PARAMETERS OF THE OSTEOTOMY

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Chiari osteotomy is one of the most conflicting osteotomies of the hip joint. Many surgeons who defend this osteotomy believe that the angle and height of the osteotomy from acetabular roof are crucial to obtain the best results. In this study by simulation of Chiari osteotomy in 3D environment, we analyzed osteotomy parameters to obtain a better coverage. We obtain High Resolution CT scans from patients with dysplastic hip. Then we convert these CT scans to 3D models to be analyzed by computer software. Then we simulate Chiari osteotomy on the 3D models to measure the best angle and the optimum height from acetabulum rim for osteotomy. We believe that the best osteotomy is the one which provides the largest roof for femur head in a way that the weight can be distributed on a new and wider acetabulum. In the pressure formula ($P = W / A$) when the surface of weight bearing (A) is maximized, the pressure on the unit of surface (P) is minimized. Some of the routine osteotomies, when applied on 3D models, create a gap greater than 3mm in articular surface and some of them have a very narrow space for fibrocartilage and some make a step in the articular space greater than 2mm which can be predicted before the surgery. By changing the angle or height of the osteotomy we can minimize the articular surface disruption and optimize the outcome.

SIR02-07

THE USE OF ENDOPROSTHETICS IN THE SALVAGE OF FAILED TOTAL HIP ARTHROPLASTY

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¹Royal National Orthopaedic Hospital, London (UNITED KINGDOM), ²Department of Biomedical Engineering, Royal National Orthopaedic Hospital, London (UNITED KINGDOM)

PURPOSE: We report on the design, surgical technique and early clinical outcome of a custom-made, proximally hydroxyapatite (HA) coated, and distally cemented femoral implant used in salvage revision hip surgery. The use of this implant overcomes the problem of femoral bone loss and allows the preservation of remaining bone stock and abductor mechanism. **METHODS:** This prospective study analysed all 31 patients (18 females) that underwent internal proximal femoral placement for failed total hip arthroplasty (THA) between June 1995 and December 2005. All patients were evaluated pre- and post-operatively using the Harris Hip Score (HHS) and Oxford Hip Score (OHS). Radiographs were analysed for loosening, stem migration and evidence of bone on-growth onto the implant. **RESULTS:** The mean age at the time of the operation was 67.1 (range 41 to 84). The average follow-up was 40 months (range 12 to 126). The mean number of previous operations was 2.1 (range 1 to 4). The mean pre-revision Oxford score decreased from 50.2 to 27.4 post-revision ($p < 0.001$). The Harris Hip Score increased from 31.8 to 72.8 ($p < 0.001$). There were no cases that required revision of the femoral stem. There were 3 dislocations; 2 cases were managed successfully by closed reduction. The acetabular component required revision in one patient at a later date. **CONCLUSIONS:** This technique allows instant distal fixation whilst promoting biological integration and reconstitution. With regard to functional outcome, the short-term results are encouraging and the complication rates are acceptable in this difficult group of patients.

SIR02-08

A NEW CERAMIC FOR USE IN TOTAL HIP ARTHROPLASTY

Bernard MASSON

CeramTec

Demand for ceramic bearings is increasing rapidly because of excellent clinical results. Alumina offers advantages such as chemical resistance, excellent bioinertness and tribology. However, alumina has limited strength, therefore the applications are restricted to certain designs. Zirconia materials have been used clinically for ten years, they reveal problems due to poor hydrothermal stability. Thus, there is a strong need for new bearing material that combine strength and stability. The new ceramic named Alumina Matrix Composite (AMC) uses the following principle of transformation toughening: Firstly, the dispersing of small particles of Y-TZP Zirconia in the alumina matrix and secondly the reinforcement by introduction of an anisotropic crystal like whiskers. This process dissipates the crack energy that is associated with an increase of strength. The examination of the tribological situation of AMC, especially under challenging conditions of hydrothermal ageing and under severe micro separation, shows the aptitude of this material in wear applications. Alumina Matrix Composite offers a better mechanical resistance than alumina while maintaining the structural stability and equivalent tribological qualities. This is a material that has been very thoroughly evaluated and tested as a permanent implant material for the last 9 years. The results of this evaluation and testing process have been included in the manufacturer's Master File at the Food and Drug Administration and approved. Its first clinical use in the United States was in June of 2000. Since its introduction, the Alumina Matrix Composite described in this article has been implanted in more than 65,000 patients around the world.

**Thursday, 30 August 2007
Karam 1 Room**

Session 07: Foot and ankle (I)

FREE PAPERS (1)

*Moderators: Horia Orban (Romania)
Maher HALAWA (Egypt)*

SIC07-01

A MODIFIED & EFFECTIVE PRESURGICAL PREPARATION TECHNIQUE FOR THE REDUCTION OF BACTERIAL SKIN CONTAMINATION, IN FOOT OPERATIONS

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Rabin Medical Center, Beilinson Campus, Sakler School of Medicine, Tel Aviv University, Petach Tikva (ISRAEL)

The purpose of this study is to evaluate bacterial skin contamination after surgical skin preparation with a regular two-step technique method, in foot surgery, and to compare it with a modified surgical skin preparation. 38 consecutive patients scheduled for Hallux Valgus procedures were studied (40 feet). 20 feet were prepared in the regular method with a two-step scrub technique and 20 feet were prepared first with 10 minutes of Alcohol Chlorhexidine antiseptic solution scrubbing and then the regular method with a two-step technique. After preparation, cultures were obtained at three locations: the hallux nail folds, first, second, third and fourth web spaces, and the anterior ankle (control), from the two groups. In group 1 - Prior to surgery positive cultures were obtained from 80% of hallux nail folds and 5% of web spaces. At the end of surgery, positive cultures were obtained from 80% of hallux nail folds and 25% of web spaces. In group 2 - Prior to surgery, positive cultures were obtained from 10% of hallux nail folds and 5% of web spaces. At the end of surgery, positive cultures were obtained from 10% of hallux nail folds and 10% of web spaces. None of the controls had positive culture. CONCLUSION: presurgical skin preparation with a two-step scrub technique is not sufficient in eliminating pathogens in foot and ankle surgery. 10 minutes of Alcohol Chlorhexidine antiseptic solution scrubbing before regular two-step scrub technique is superior in eliminating pathogens in foot and ankle surgery.

SIC07-02

TREATMENT OF CONGENITAL AND ACQUIRED FOOT DEFORMITIES WITH EXTERNAL FIXATIONS

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The treatment of complex foot deformities often needs the use of special external fixators to treat the deformities of multiplaner direction and contractures of the ankle joints, equinovarus deformity. In severe cases the best choice is the use of the external hinge distraction system to restore the function of joints and treat the shortening of the foot, and correct deformity. From 1993 to 2006 we treated 110 cases of severe foot deformities with congenital clubfoot, neuromuscular deformities and posttraumatic deformities age between 4 to 45 years with external fixators. In some cases the treatment was combined with lengthening and axial correction of the lower leg if needed. The average time for

correction was 4 to 6 weeks followed by 2-3 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 stiffness of the joints in neuromuscular diseases. The walking ability was in most cases much better. The satisfaction rate of all patients was very good; some of the patients were able to walk for the first time due to the correction. The use of external fixation is an ideal treatment in complex congenital or posttraumatic foot deformities to achieve a good correction and good functional and cosmetic result for the patient.

SIC07-03

TREATMENT OF ACQUIRED HALLUX VARUS DEFORMITY

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Hallux varus is a rare cause of pain in the foot mostly occurring after failed hallux valgus surgery. We reviewed 12 patients with unilateral hallux varus treated with soft tissue techniques (4x), arthrodesis of the first metatarsophalangeal joint (3x) or with a distal chevron osteotomy (5x) with medial transposition of the first metatarsal head and reconstruction of the soft tissues on the lateral side of the metatarsophalangeal joint. 10 patients had previous hallux valgus surgery, in 2 cases the deformities were of unknown origin. 1 male and 11 female patients were followed up on average 26.4 months postoperatively. AOFAS hallux score improved from 46 (range 10-75) to 86 (range 72-95) points. The metatarsophalangeal angle measured with the center-head to center-base method was reduced from -16.1° (range -35° to -8°) to 5.1° (range -15° to 21°). The intermetatarsal angle increased from 5.8° (0-11°) to 10.5° (0-19°). All patients were subjectively satisfied with the procedure. Our results indicate that joint preserving operation techniques are viable methods in the correction of mild and moderate symptomatic hallux varus deformities. Mild remaining varus deformities are well tolerated. In case of severe varus deformity or major signs of osteoarthritis in the first metatarsophalangeal joint MTP arthrodesis provides good results.

SIC07-04

DIAGNOSIS AND TREATMENT OF PENETRATING FOOT INJURIES

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INTRODUCTION: Foot penetrating injuries are common. We present our diagnostic and therapeutic approach to this pathology. PATIENTS & METHODS: Between 2002-2005, 63 Pts (8-63Y; mean 38Y) were treated for penetrating foot injuries, by nails or wood pieces, either through shoes (45 Pts) or bare feet (18 Pts). Each patient had a routine X-ray and foot sonography. RESULTS: Foreign bodies were detected in 58 Pts (92%). They were treated by debridement, removal of FB and IV antibiotics. In 53/58 Pts (91%) FB were detected by sonography, most of them on arrival. The false negative rate of sonography was 19%. The presence of FB was detected only by a second sonography. Complete healing was observed in 62 Pts (98%), although 6 (9%) underwent secondary debridement. One patient developed chronic osteomyelitis of the second metatarsal bone. CONCLUSIONS: The main problem in such conditions is to detect FB inside the foot. Sonography is a good diagnostic technique, but it is operator dependent; thus a high index of suspicion must be maintained when sonography is negative. In our experience, repeated sonography in such circumstances are likely to reveal the presence of a FB. It

should be emphasized that injury through a shoe rather than a bare foot may result in local infection secondary to penetrating objects, like fiber, rubber or leather. Excellent results are observed following meticulous debriedment combined with systemic antibiotics.

SIC07-05

OPERATIVE TREATMENT OF LISFRANC FOOT INJURIES

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INTRODUCTION: Injuries of the tarsometatarsal (Lisfranc) joint are very rare, involving only 0.2% of all fractures. On the other hand, Lisfranc injuries are very often seen in polytrauma patients without being diagnosed in 20-35% of the cases. This leads to a significant morbidity and loss of function of the foot. Good knowledge and understanding of the anatomy and injury mechanism as well as possibilities of accurate diagnostics play the key role in the successful treatment of Lisfranc injuries. **AIM OF THE STUDY:** to retrospectively evaluate a group of patients with Lisfranc injuries. **MATERIAL:** We are presenting a group of 6 patients with dislocated Lisfranc fracture operated on in the period from 1997-2003 in the Zagreb University Hospital of Traumatology. **METHODS:** The Myerson classification was used for injury evaluation and the results of treatment were assessed using the American Orthopedic Foot and Ankle Society (AOFAS) Midfoot Score questionnaire. The mean follow-up was 31 months (10-72). **RESULTS:** The mean AOFAS Midfoot Score was 78 (range 0-100, 100 points for the excellent result). Lower score was the consequence of occasional mild pain, diminished recreational activity and use of orthotic devices. 3 patients had excellent, 2 good and 1 satisfactory results. One patient developed posttraumatic arthritis. **CONCLUSION:** Operative treatment with anatomical reduction and stable internal fixation is the method of choice. The goal of the surgery is to regain normal anatomical and biomechanical relations of all structures of the Lisfranc joint.

SIC07-06

BIMALLEOLAR ANKLE FRACTURE, SURGICAL TREATMENT (ABOUT 90 CASES)

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Hôpital Ibn Sina (MOROCCO)

INTRODUCTION: Bimalleolar Ankle Fractures are articular fractures that compromise the stability of the tibio-tarsal articulation. The goal of our study was to establish the relationship between their frequency and the corresponding severity of the complications. **MATERIALS AND METHODS:** Retrospective study on 90 Bimalleolar Ankle Fractures operated in the Orthopaedics Department of Hôpital Ibn Sina, Rabat, between 2001 and 2005. **RESULTS:** Bimalleolar Ankle Fractures affect mostly young men. Falls, followed by traffic accidents represent the majority of etiologies. Intertubercular fractures by external rotation were the most frequent types. According to the type of fractures, we used a plate and screws or pinning for the external malleolus. The internal malleolus were fixed with screws or pins. After an average follow-up of 2 years, 79% were considered good or acceptable versus 21% of unsatisfactory results. **DISCUSSION/CONCLUSION:** The factors directly related to the final result are: age, operatory delay, type of fracture, surgery quality, and rehabilitation.

SIC07-07**LONG-TERM EVALUATION OF TRIMALLEOLAR FRACTURES TREATED SURGICALLY**

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Selection of an optimal management method for ankle fractures depends on ankle stability. Authors present their long-term results in operative treatment of trimalleolar fractures. From 1996 to 2006 a total of 220 patients with trimalleolar fractures, based on the Weber classification, were treated operatively. There were 138 females (63%) and 82 males (37%), with mean age of 45 yrs (18-80 yrs). In 120 patients (55%) trimalleolar fracture was accompanied with luxation and in 60 patients (27%) with subluxation of the talocrural joint. All 220 patients were treated with open anatomical reduction and internal rigid fixation. In 80 patients, after posterior malleolar reduction, stabilization was done with a screw. Early functional motion and continuous passive motion began immediately after surgery. The mean follow-up period was 5 years. All patients responded to a questionnaire and were examined. 93 (43%) patients had shown good results, 112 (51%) satisfactory results and 15 patients (6%) had poor results. 151 (68%) patients returned to their previous jobs and activities as before injury. It is important to check intraoperatively for a possible tear of ligaments. Syndesmosis injury gives additional tibiofibular instability so it must be controlled by screw fixation. The mean arthritic score was significantly higher ($p > 0.05$) in patients with posterior malleolar fracture fixed with a screw as compared to the patients with exact anatomical reduction. Our data show that satisfactory results can be achieved in posterior malleolar fractures measuring less than 25% of the joint surface when acceptable reduction is performed even without osteosynthesis.

FREE PAPERS (2)

*Moderators: Michael Zimlitski (Georgia)
Thamer Hamdan (Iraq)*

SIC07-08**REGIONAL VARIABILITY ON WEIGHT BEARING STATUS AFTER ANKLE FRACTURE FIXATION - QUESTIONNAIRE STUDY**

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Here, we report the findings of the questionnaire study undertaken to assess the variations in weight bearing after ankle fracture fixation in order to formulate a post-operative protocol. **METHODS AND MATERIALS:** We undertook a postal questionnaire study on weight bearing status after ankle fracture fixation in London area. Questionnaires were sent to 233 orthopaedic consultants. 148 surgeons responded (63.5%) out of which 17 did only elective orthopaedic surgery leaving 131 respondents (88%). They were asked about weight bearing after ankle fracture fixation in various types of fracture configurations and in diabetic and osteoporotic patients. **RESULTS:** The results show variation in post-operative management of ankle fracture fixation with majority of surgeons favouring partial to full weight bearing for various ankle fracture patterns. 32 of the respondents were aware of guidelines and the rest were not aware of any guidelines regarding post-operative mobilisation after ankle fracture fixation. The post-operative management was based mostly on personal experience. Majority (100/131) of the surgeons immobilised their patients for up to 6 weeks. 97 respondents used plaster cast for immobilisation while 9 used ankle brace and 18 used both types. 70 of the surgeons felt the need to mobilise the ankle early. Nearly half of surgeons

preferred monocryl stitch. Regarding management of diabetic and osteoporotic fracture patients, 49 surgeons opted for surgical stabilisation while 30 preferred conservative approach. CONCLUSION: This study showed variations in managing internally fixed ankle fractures with majority of surgeons based their management protocols from their personal experience.

SIC07-09

IMPACT OF INTRAOPERATIVE 3D-FLUOROSCOPY IN THE TREATMENT OF CALCANEAL FRACTURES

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Subtalar incongruity over 1mm can lead to early post traumatic arthritis of the subtalar joint. The use of 3-D-fluoroscopy (3DF) enables immediate recognition and correction of any remaining incongruities. PATIENTS: From 2002 to 2004 we treated 58 patients (50 men, mean age 42 years) with calcaneal fractures with an internal fixator after intraoperative 3DF. We saw 54 joint depression injuries, according to Sanders, 18 fractures were type II, 33 fractures type III. F/U was on average 15 months postoperative (10-25). METHODS: After temporary reduction, a 3DF (Siremobil ISOC3D, Siemens, Germany) was performed. Remaining steps over 1mm were immediately re-reduced. Fracture fixation was with a locked plate (Tifix©, LITOS, Germany).RESULTS: The median theatre time was 72 mins (53-112) including 3-D-fluoroscopy. In 22 cases (38%) a remaining incongruity of more than 1mm was observed and the reduction was repeated. Bohler's angle could be raised on average by 18 degrees (11-22) the shortening of the hindfoot by 13 picture millimetres (9 to 17). An autologous bone graft was not required in any case in this study. Until follow-up, in no case an arthrodesis was required. 25 patients were completely pain free at follow-up. One patient complained about constant pain. DISCUSSION: Treatment of calcaneal fractures using 3DF provides the opportunity to recognize subtalar incongruity. The combination of 3D fluoroscopy with locked internal fixation could show promising results. Short term outcome shows a good functional result. If the rate subtalar arthrosis will decrease will have to be shown in long term follow-up.

SIC07-10

SHOULD CALCANEAL FRACTURES BE TREATED OPERATIVELY OR NON-OPERATIVELY?

Chetan MODI

University of Warwick (UNITED KINGDOM)

INTRODUCTION: The management of calcaneal fractures is an issue of debate. Management involves operative and non-operative treatment for displaced intra-articular calcaneal fractures (DIACF). METHODS: A systematic review was performed to assess the available evidence. Search: Cochrane and Medline databases - limited to meta-analyses; randomized clinical (RCT) and multi-centre trials involving humans in English language. The studies from October 1998 until present date were included (since the last systematic review in Cochrane database. RESULTS: The search revealed 23 papers, of which 6 papers were eligible and critically analyzed to assess the level of evidence. There were 4 randomized clinical trials, 1 meta-analysis and 1 multi-centre case-control study. The 4 RCTs revealed that there was no overall difference in outcomes ($p=0.001$)

between the groups. Operative results were better in females (RR=3.18), patients with lighter workloads (RR=4.04) and if patient not receiving Worker's Compensation (p=0.01) with fewer complications in these groups. All 4 studies had limited power to substantiate these conclusions. The meta-analysis included poor studies with no validated outcome measures and the multi-centre trial was poorly designed with unreliable results. CONCLUSION: There are limitations in all the current available evidence concerning the management of calcaneal fractures. The current evidence suggests that there is no overall difference in outcomes between operative and non-operative management. There may be a benefit for operative treatment for females, young males, patients not making compensation claims and those with less severe fractures with higher Böhler angles with jobs involving a light to moderate workload.

SIC07-11

NAVICULAR DISLOCATION IN COMPLEX MIDFOOT INJURIES

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PGIMER (UNITED KINGDOM)

The Navicular is the Keystone to the midfoot, and contributes significantly to the stability. It is dislocated in a specific pattern when major midfoot trauma involves it. MATERIALS: 6 cases of total dislocation of navicular without fracture, and an analysis of 7 similar cases reported worldwide was used as the basis for this hypothesis. Radiographs of our patients and the published cases were analyzed, and associated injuries/instabilities were assessed. The position of the dislocated navicular and the mechanism of trauma were considered, and this hypothesis was propounded. RESULTS/DISCUSSION: Dislocated Navicular without fracture comes to lie medially, with superior or inferior displacement, depending upon the foot position at injury. It is hypothesized that the forefoot first dislocates laterally (perhaps transiently) at the naviculo-cunieform joint by an abduction injury; in all cases we recorded significant lateral injury (either cuboid fracture, or lateral midfoot dislocation). The relocating forefoot subsequently pushes the unstable navicular from the talo-navicular joint, and depending upon the residual attachments of soft tissues, this bone comes to lie at different places medially. This is a similar mechanism to the lunate dislocation in the wrist, where the relocating carpus push the lunate volarly. Our clinical experience with these complex injuries has shown that the whole foot is extremely unstable. For reduction, the talonavicular joint has to be reduced first, and then the rest of the forefoot easily reduces on to the navicular. CONCLUSIONS: Navicular dislocations in complex midfoot instabilities and are similar to perilunate injuries of the wrist.

SIC07-12

TREATMENT BY CANNULATED SCREW FOR JONES FRACTURE

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Jones fracture is a difficult fracture which athletes frequently develop, thus, earlier return to sports activities is the point of treatment. We have treated Jones fracture by intramedullary screwing which provides the least invasion and intense fixation, and achieved excellent results. MATERIALS: Subjects were 68 feet and their age ranged from 17 to 72 years old. For fixation, cancellous screws of 4.0 millimeters in diameter (Titanium) were used. Walking was allowed at 1 week after surgery. Running was started at 2 weeks. Follow-up period ranged from 1 year to 9 years with an average of 4 years and 2 months. RESULTS: Bone union was achieved in all the feet. Mean period of bone union was 8.3 weeks for acute type as well as delayed union type, while it was 10.8 weeks for non-union type. There were no patients who had limited daily living activities.

Return to sports activities ranged from 3 weeks to 6 weeks. Skin incision was 1.5 through 2.5 centimeters. No feet developed screw failure. **DISCUSSION:** As the treatment method for Jones fracture, a number of reports recommended surgery. However, it is required to select surgical procedure enabling earlier return to sports since athletes frequently develop this fracture. This method gives strong pressure on the fractured part because it tracts by engaging the end of cancellous screw with cortex of peripheral bone fragment. This method using hollow screws also allows surgery through a small incision by use of the guiding wire.

SIC07-13

1-15 YEAR RESULTS OF BUECHEL PAPPAS UNCONSTRAINED UNCEMENTED TOTAL ANKLE REPLACEMENT

Salman ALI

Capio West Midlands Hospital (UNITED KINGDOM)

OBJECT: I would like to present the functional and radiological results of my 1-15 year follow-up of the Total Ankle Replacement. **MATERIAL & METHODS:** Thirty-four consecutive uncemented Buechel Pappas total ankle replacements were performed over a period of 15 years which form the basis of this series. The mean follow-up was 5 years. All ankle replacements were performed by me between 1990 and 2005. One patient died before the final follow-up. The preoperative diagnosis was osteoarthritis in all the patients. They were assessed clinically and radiologically using the American Foot & Ankle Society score. **RESULTS:** There were 8 female and 25 male patients with an average age of 69 years (range 58-84). All patients were happy and considered that their operation was successful except for one which was revised. This patient will be discussed. Sixty-nine percent of patients had no, or occasional, twinges of pain. One patient complained of occasional instability. All patients were mobile and forty-six percent of patients required no walking aids. Only four percent of patients required two walking aids. The American Foot and Ankle Society Score was 73.3 (54-100) at follow-up, compared to 34.6 (20-56) pre-operatively, and no prostheses were revised ($p < 0.001$). One fractured medial malleolus occurred and no deep infections were noted. **CONCLUSION:** We feel that with careful patient selection Buechel Pappas Uncemented Total Ankle replacement, performed by an independent surgeon, can give good intermediate results comparable to data published by the designer. Our data also compares well with results from other uncemented total ankle replacements.

SIC07-14

DEVELOPMENT OF A NOVEL HYBRID IMPLANT FOR ANKLE ARTHRODESIS - A BIOMECHANICAL STUDY OF THE "ANKLE-FIX" DEVICE

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Gold standard in the treatment of posttraumatic ankle arthrosis is still the ankle arthrodesis. Established methods for arthrodesis still have significant problems with complication rates of up to 60%, including non-union rates as high as 20%. Aim of this study was the development of a method for the isolated internal arthrodesis of the ankle joint with a high primary stability, reproducible results and low complication rates. **METHODS:** Biomechanical studies of different contemporary arthrodesis techniques led to the design of a novel locked internal fixator plate. Compression screws appeared to have the highest primary stability, the new design of a titanium hybrid plate system

incorporates locked plate technique with compression screws. Implantation is via a ventral approach, the tibio-talar positioning is individual. The stiffness and motion amplitude of the developed ankle-fix plate and established techniques were tested in 18 cadaver studies with cyclic testing in flexion/varus/valgus and rotational stress. Micromotions were evaluated using the optical Vicon ®-system. A paired T-test was used for statistical evaluation. RESULTS: Testing results showed a significant increase in stiffness with the Ankle-Fix system, especially under flexion and rotation compared to established methods. Amplitudes of the micromotions were significantly lower, the loosening of the implanted material decreased in comparison. CONCLUSION: The newly developed hybrid implant allows a reproducible surgical technique and can be tailored to the individual anatomy. The biomechanical testing leads us to the conclusion that in clinical use a higher primary fusion rate and fewer complications can be expected.

Plenary lecture

Moderator: Thami Benzakour (Morocco)

SICPS-02

FIFTEEN TO 28 YEARS' FOLLOW-UP RESULTS OF HIGH TIBIAL VALGUS OSTEOTOMY, TOGETHER WITH ARTICULAR CARTILAGE REGENERATION

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A long-term follow-up study was performed on 75 knees of 53 patients after high tibial valgus osteotomy. There were 15 knees in 11 men and 60 knees in 43 women. The follow-up period ranged from 15 to 28 years with a mean of 19±3 years. The age at osteotomy ranged from 46 to 73 years with a mean of 59.6±6.7 years. The diagnosis was medial compartmental osteoarthritis (OA) in 68 knees (46 patients) and spontaneous osteonecrosis of the medial femoral condyle in 7 knees (7 patients). Valgus osteotomy was performed above the tibial tuberosity, with removal of a laterally based wedge in all cases, aiming for anatomical valgus angulation of 10° (standing). The American Knee Society Score showed a Knee Score of 37±20 and a Function Score of 38±16 preoperatively and 87±13 and 80±19 at the final 15 to 28 years' follow-up. The femoro-tibial angle in standing was 186±6.5° (6° of anatomical varus angulation) before and 171±7.5° (9° of valgus) at final follow-up (p<0.0001). The repair of articular cartilage after high tibial valgus osteotomy was observed in 146 knees of 115 patients, through an arthrotomy at the removal of the blade plate, an average of 2 years after the initial osteotomy. There were no regeneration (Stage A) in 13 knees; partial regeneration with fibrocartilaginous tissue (Stage B) in the previous degenerated area in 86 knees; and total coverage by new regenerated fibrocartilage of hyaline-like cartilage (Stage C) in 47 knees.

Session 07: Foot and ankle (II)

Moderators: Reinhardt Windhager (Austria)
Slaheddine Karray (Tunisia)

CONFERENCE

SICIS07-01

FOOT-PUMPS WITHOUT GRADUATED COMPRESSION STOCKINGS FOR PREVENTION OF DEEP-VEIN THROMBOSIS IN TOTAL JOINT REPLACEMENT: EFFICACY, SAFETY AND PATIENT COMPLIANCE - A COMPARATIVE, PROSPECTIVE CLINICAL TRIAL

Rocco PITTO

Dept. of Orthop. Surg. (NEW ZEALAND)

Mechanical prophylaxis with foot-pumps provides an interesting alternative to chemical agents in the prevention of thromboembolic disease following major orthopaedic surgery procedures. Recent studies have suggested that simultaneous use of graduated compression stockings (GCS) may hinder the pneumatic compression effect of foot pumps. The hypothesis of this prospective study was that the use of foot-pumps without GCS does not affect the efficacy of DVT prophylaxis, and improves patient compliance. 846 consecutive patients admitted at a single institution undergoing total hip (THR) or knee replacement (TKR) were included in the study. The A-V Impulse System® foot-pump units (Orthofix Vascular Novamedix, Andover, UK) was used in all patients. Forty-six patients discontinued the use of foot-pumps, leaving 400 patients who received foot-pumps in combination with GCS and 400 patients with foot pumps alone. Eleven patients of the stocking group (2.7%) and 9 patients of the no-stockings group (2.3%) developed postoperative symptomatic DVT ($p=0.07$). DVT was more frequent in TKR (10 of 364; 2.7%) than in THR (10 of 436; 2.3%). Non-fatal pulmonary embolism occurred in 4 patients out of 20 with symptomatic DVT, 2 each of the stockings and no stockings groups. The foot-pump discontinuation rate of patients treated with stockings was 7%, versus 4% of patients treated without stockings ($p<0.05$). In conclusion, management of patients with foot-pumps without GCS does not reduce efficacy of DVT prophylaxis after THR and TKR, and improves patient compliance.

FREE PAPERS

SIC07-15

STAPLE BIOMECHANICS IN FOOT SURGERY - A COMPARATIVE ANALYSIS

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BACKGROUND: The use of bone staples is an accepted method of fixation in foot surgery. The stapler system reduces surgical time and trauma in reconstructive and repair procedures. New variety of memory staples have come into the market. We

compared the strength of 3 types of staples. MATERIALS & METHODS: This was a biomechanical study. Standardized bone models of metatarsals from Tufnol tubes were used. These models were osteotomized stabilised using the 3 types of bone staples of similar sizes (12mm). The staples used were standard Richard staples, frozen memory staples and heat regulated memory staples. 5 sets of each staple type constructs were stressed in bending and torsion using the Instron Material testing machine. The stiffness of the constructs, load-displacement curves and permanent deformation of the staples were assessed. RESULTS: The Richard's staple was found to be the stiffest among the 3 staples but had permanent deformation in both bending and torsion. The frozen and heat regulated staples were equal in their stiffness and had good elasticity preventing any permanent deformation of the staples. Permutation test for 2 independent samples revealed significant difference between the Richard's staples and the frozen and heat regulated staples ($p = 0.0048$ and 0.0079 respectively). CONCLUSION: Although the Richard's staple is stiffer, the permanent deformation of the staple is its disadvantage. The frozen and heat regulated staples were found to provide adequate stiffness and easier to handle. We recommend use of the frozen or heat regulated staples in foot surgery.

SIC07-16

ASEPTIC NECROSIS OF TALAR DOME - PECULIARITIES OF DIAGNOSIS AND CHOICE OF TREATMENT

Igor PAHOMOV

Novosibirsk Scientific Research Institute of Traumatology and Orthopaedics (RUSSIAN FEDERATION)

Aseptic necrosis of the talar dome leads to rapid ankle arthrosis in young people. Late stages inevitably ask ankle arthrodesis or endoprosthesis. What do we have to do to determine early stage and prevent disability? PATIENTS AND METHODS: 15 patients of both sexes and ages. Different stages of AN. R-x, MRI, SKT diagnostics. Subchondral drilling, fragment replantation, mosaical osteochondral plasty, ankle arthrodesis. Mistakes and complications. Results and evaluation. CONCLUSION: 1/ Young people with ankle pain are suspected with AN. 2/ Both MRI and SKT are indicated for them. 3/ Surgical treatment in early stages of AN is fruitful.

SIC07-17

SURGICAL APPROACH IN TREATMENT OF CENTRAL IMPRESSIVE FRACTURES OF CALCANEUS

Miroslav KEZUNOVIC, Zarco DASIC

Clinical Center of Montenegro

Central impressive breaks of calcaneus still represent serious therapeutic problem. In order of better understanding the way of treatment it is necessary to understand and explain the mechanism of break and the effect it has on lowering Bohler's angle. In the five-year period out of 37 breaks of calcaneus 7 were central impressive and they were all treated with open surgical reposition with lifting of impressive osteochondral surface and specific corticospongioplastics. In two cases we had excellent results, in four cases results were satisfying, and in one case we had arthrodesis of subtalar joint. When it already came to significant impression of subtalar joint of calcaneus, congruence of the joint and positive Bohler's angle can be obtained by lifting of impressive articulation surface and the right spongioplastics.

SIC07-18**FUNCTIONAL OUTCOME AT 7-10 YEARS IN PATIENTS OVER 55 FOLLOWING WEBER B ANKLE FRACTURES**

Abeera ABBAS, Abhijit GUHA, Andrew MCMURTRIE, Rajiv KULSHRESHTHA, Nilesh MAKWANA

Wrexham Maelor Hospital (UNITED KINGDOM)

AIMS: To assess the functional outcome of Weber B fractures in the elderly at 7-10 years following treatment comparing conservative and operative management. **MATERIALS AND METHODS:** All patients with Weber B ankle fractures between 1997 and 2000 were recruited for the study. This provided a cohort of patients with a follow-up of 7-10 years. Data collection was carried out using the Olerud-Molander Ankle (OMA) score and the EuroQol (EQ-5D). **RESULTS:** The data for 34 patients (28 females, 6 males) was analysed. Mean age 64.03 years. 26 patients with unstable fractures were treated operatively (ORIF) while 8 patients had stable fractures and were treated non-operatively (MUA). In the ORIF group, 65.4% achieved excellent/good OMA scores, 26.9% had fair scores and 7.7% reported poor scores. In the MUA group, 37.5% achieved excellent/good OMA scores, 37.5% had fair scores and 25% reported poor scores. The mean OMA score in the ORIF group was 75.0% and the mean OMA score in the MUA group was 58.7% ($p < 0.05$). The mean EQ-5D score in the ORIF group was 66.6 compared to 73.7 in the MUA group. **CONCLUSION:** The optimal management of Weber B fractures in patients over 55 years remains controversial. This study suggests that accurate open reduction and internal fixation of these fractures results in a significantly higher level of ankle function at 7-10 years follow-up. We believe this is the first study looking at the long-term functional outcome in patients over 55 years old with Weber B fractures.

SIC07-19**TREATMENT OF INTRA-ARTICULAR CALCANEAL FRACTURES ACCORDING TO PALMER**

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Our objective was to assess patient outcome after operative treatment of a displaced intra articular calcaneal fracture according to Palmer. Eighteen cases in 16 patients (9 males, 7 females) were retrospectively reviewed. Mean age at surgery was 35 years (17 to 61 years). According to Utheza et al., 5 fractures (28%) were classified as vertical, 3 as horizontal (17%), and 10 (55%) as combined. Mean pre operative Böhler angle was -4° (-42 to 26°). An L-shaped lateral approach was used in each case. A cortical bone autograft was firmly impacted in the sub thalamic void after reduction. Stabilization was achieved by 2 or 3 axial Kirschner wires, and 1 or 2 screw(s) inserted in a transverse position. At a 23 months follow-up (12 to 38 months), mean Kitaoka score was 70 points (34 to 98 points). Functional result was considered good or excellent in 11 cases (68.7%), fair in 2 (12.5%), and poor in 3 (18.7%). No skin complication was noted. One case required a subtalar arthrodesis for progressive osteoarthritis. Mean Böhler angle was 24.5° (10 to 40°) post operatively, and 24° (8 to 38°) at the last follow-up. A loss of correction was observed in 3 cases, with a mean of 2° . Functional score correlated well with restoration of Böhler angle. Operative treatment of intra articular calcaneal fractures according to Palmer provided functional and anatomical results that compared favourably with previous reports. Main advantages of this technique include a limited hardware prominence and a stable fixation.

Session 08: General orthopaedics

*Moderators: Wahab Yinusa (Nigeria)
Abderrahmane Lamine (Morocco)*

FREE PAPERS

SIC08-01

SACROILIAC ARTHRODESIS IN POST TRAUMATIC SEQUELA OF UNSTABLE PELVIC FRACTURES

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Post-traumatic sacroiliac joint osteoarthritis and pseudarthrosis is rare. They generally appear as a complication of an unstable pelvic fracture. The goal of this study was to describe the functional and radiographic outcomes of sacroiliac joint arthrodesis (SJA) in post-traumatic sequel of unstable pelvic fractures. We performed a retrospective review of patients who underwent sacroiliac joint arthrodesis between 1984 and 2005 at our center with a minimum of 1 year follow up. From a total of 235 patients with the diagnosis of an unstable pelvic fracture within this period, 11 presented chronic sacroiliac pain refractory to conservative treatment that required SJA. The average age was 42 years old (range 24-58). Seven patients had post-traumatic osteoarthritis and 4 post-traumatic pseudarthrosis. Time between the accident and SJA was in average 15.8 months (range 6-55). The SJA was performed utilizing a posterior sacroiliac approach followed by curettage of the articular cartilage and bone grafting. The joint was then stabilized with the use of screws and/or a plate. All the patients were evaluated radiographically in the postoperative period. Functional outcome was evaluated using Majeed's grading score. The mean follow up was 8 years (with a minimum of 1 year). Nine of the 11 patients achieved solid fusion. Five of 11 had excellent and good functional results and 6 of 11 had fair or poor. The SJA is thought to be the last procedure in posttraumatic disorders of the sacroiliac joint. In this group of patients, the functional outcome is less satisfactory than other sacroiliac disorders.

SIC08-02

SKELETAL COMPLICATIONS IN SICKLE CELL DISEASE IN IRAQ

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Bone changes in sickle cell disease are usually due to marrow hyperplasia, tissue ischemia and infraction due to vaso-occlusive crisis, and the increasing susceptibility to infection. Between 1988 and 1998, two hundred and eighty patients were treated in Basrah University, Department of Orthopaedic Surgery with bone and joints manifestation of sickle cell disease. There were 150 males and 130 females aged between 5 and 56 years (mean 31 years). Two hundred and two patients showed multiple structural bone and joints lesion, and the rest had transient manifestation related to their haemoglobinopathies. The HB electrophoresis pattern were SF in 180 patients, SS in 100 patients. Two hundred and fourteen patients had some sort of diffuse myalgia and back

pain. Fusion of the sacroiliac joint was discovered on plain radiography in 160 patients, 40 patients had established bone infection and 20 patients presented with joint infection. In both bone and joint infection the organisms were dominantly *Staphylococcus aureus*. A vascular necrosis of bone was proved in 124 patients, only 94 patients had surgical intervention. Almost all patients with sickle cell disease will end up with some sort of skeletal complications, irrespective of their age, for that reason, clinical awareness, early diagnosis, aggressive treatment and close follow-up are always necessary to reduce the expected disabling complications.

SIC08-03

JOINT REPLACEMENT POST OPERATIVE FOLLOW UP - A TIME FOR REVIEW

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INTRODUCTION: Arthroplasty represents a large consumer of resources in orthopaedic surgery. Although the need for follow up is universally accepted, there is much debate on the duration and frequency of outpatient visits. To date there is no evidence regarding the cost effectiveness of follow up. 90% of arthroplasty failures do so after 5 years. Joint replacement review is conducted by a variety of personnel including orthopaedic surgeons, surgical care practitioners (SCPs) and extended scope practitioners (ESPs). **METHODS:** A questionnaire was sent out to orthopaedic surgeons working in the Sandwell and West Birmingham Hospitals Trust enquiring about their practice for following up patients who have had joint replacements. Information regarding the length of follow up, frequency of visits and the use of check radiographs were recorded. **RESULTS:** The mean length of follow up was 28.3 months (12-60 months). The mean number of visits in the first year was 3.7 (3-4). The mean number of total visits was 6 (4-9). On average 2 check radiographs were performed in the first year. Mean total number of check radiographs performed was 4. The mean cost for each patient is 590 pounds (224-896 pounds). **DISCUSSION:** There is considerable variation in arthroplasty follow up with ensuing cost implications. Guidance is required for the appropriate review, which will allow early detection of complications in an efficient and cost effective manner. In our trust a protocol has been suggested for the follow up of joint replacements by ESPs and SCPs.

SIC08-04

THE RISKS OF SPLASH INJURY WHEN USING POWER TOOLS DURING ORTHOPAEDIC SURGERY - A PROSPECTIVE STUDY

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INTRODUCTION: The use of power tools during orthopaedic surgery results in a high risk of splash injury to the face. **MATERIALS AND METHODS:** A prospective study was carried out at Nevill Hall Hospital, Abergavenny over a three-month period. The study involved 25 consecutive patients undergoing elective hip and knee arthroplasty by 6 different Consultant Orthopaedic Surgeons. The visors worn by the operating surgeon, assistant and theatre nurse were examined postoperatively against a template of the face to count any visible blood, fat and body tissue splashes. **RESULTS:** 25 patients underwent primary total hip (11) and knee (14) arthroplasty. In the knee group there were 217 and 238 injuries to the mouth and lips, 105 and 147 to the nose and cheeks, and 62 and 82 to the eyes of the surgeon and assistant. In the hip group there were 214 and 137

injuries to the mouth and lips, 90 and 39 to the nose and cheeks, and 53 and 27 to the eyes. There were no masks in either group that had no splash contamination when examined postoperatively. **CONCLUSION:** This study shows that the face is vulnerable to material and fluid strikes during joint arthroplasty surgery. The visor was found to be a reliable barrier to blood, fat and body tissue splashes and minimized the risk of exposure to blood-borne viruses. The authors believe that the visor should be used during all joint arthroplasty procedures and any procedures that involve the use of power tools.

SIC08-05

EVALUATION OF A NEW TECHNIQUE FOR X-RAY DOSE REDUCTION IN ORTHOPAEDIC IMAGING

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Aim of this study is to assess objective and subjective changes in image quality of optically re-exposed, radiation-reduced X-ray images in comparison to a normal reference image and if optical re-exposure compensates the loss of information caused by underexposure. **MATERIAL + METHODS:** Anterior shoulders of lambs were used as the animal model. After taking a normal exposed reference image, dose-reduced, underexposed images were prepared by reducing the mAs product. These underexposed X-rays were then re-exposed for a defined period of time. Four different osseous structures were defined as regions of interest (ROI) for evaluation of the objective changes in image quality. The contrast transfer factors as the function of local frequency were determined from this, which served as the basis for calculating the modulation transfer factor. Subjective changes in image quality in the four ROI were recorded using evaluation sheets filled out by 10 experienced traumatologists. **RESULTS:** In comparison of the different re-exposure times, the technically optimal time was found to be 60 seconds, the objective quality was even better than that of the film in conventional exposure technique. Evaluation of the subjective picture quality as assessed by the group of trauma surgeons showed the best picture quality ($p < 0,05$) with a re-exposure time of 60s. **CONCLUSION:** Film sensitization provides a technically simple and inexpensive procedure, which is easily integrated into previous film development processes and considerably reduces the patient radiation exposure as well as clearly improving the image quality and thus detail recognition in trauma radiography.

SIC08-06

USE OF COMPUTER ASSISTED ORTHOPAEDIC SURGERY AS A TRAINING TOOL IN ORTHOPAEDIC SURGERY

Rohit RAMBANI

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There is thus an increased need for training systems to aid development of psychomotor skills of the surgical trainee. Simulation environments can provide a friendlier and less hazardous environment for learning surgical skills. **PURPOSE OF THE STUDY:** This study develops our existing surgical CAOSS (Computer Assisted Orthopaedic Surgical System) for fracture fixation into a training tool for skill acquisition of the basic orthopaedic principle of 3D navigation using X-ray images. **MATERIAL AND METHODS:** The study is divided into two parts. The initial part of the study involves the use of the conventional CAOSS to train the orthopaedic trainees with no prior exposure of distal locking of femoral nails and the dynamic hip screw. The second part of the study involves the use of

modified CAOSS to assess whether the initial training has helped in developing mental navigation skills of using a 2-D image and navigating the drill bit in 3-D space. The trainees are assessed using a scoring system. RESULTS: The presentation will discuss the theories, methodology and scoring criteria to produce a training tool for training of the basic orthopaedic principle and how the training tool was validated. DISCUSSION: The ability to quantify precisely three-dimensional navigation and processing of virtual information to help in hand eye co-ordination has not previously been used as a formal orthopaedic training tool. Currently, there is no known scoring system which can accurately assess the ability to navigate instruments in 3-D space using a X-ray image.

SIC08-07

WAY TO ETHICAL AND EFFECTIVE ORTHOPAEDIC TRIALS

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Randomised controlled clinical trials produce the most reliable evidence about the effects of clinical care. In surgical trials lack of surgeons' individual equipoise (state of genuine uncertainty about treatment arms) appears to be one of the greatest obstacles. Collective equipoise based on present or imminent controversy in the expert medical community has been proposed as a solution, but could be applied only at the beginning of a trial to a general trial question. We developed a system that quantifies corporate uncertainty among a group of surgeons for an individual clinical case. Using modern technology, anonymous clinical data including images is published on a secure online forum. Surgeons registered in a forum estimate the probability that the patient would be better or worse by various degrees if a procedure in question applied. These votes are analysed and feedback emailed to a submitting surgeon. In a pilot study seven surgeons from five hospitals voted on ten retrospective calcaneal fracture cases. No special training was given. Surgeons filled in an evaluation questionnaire. Clinical information was found sufficient and the whole process user friendly by all surgeons. The voting data was used to develop an algorithm for calculating level of uncertainty. This approach appears to have methodological and ethical merit, is popular with surgeons, and may offer a way to work with surgeons' predisposition not to be uncertain. Measurement of corporate uncertainty as described above has now been implemented in the UK Heel Fracture Trial and can be used in international trials.

SIC08-08

THE ORTHOPAEDIC POSTGRADUATE TRAINING PROGRAM IN ASSIUT UNIVERSITY, EGYPT

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The Orthopaedic Department in Assiut University has 35 trainees. We have 23 residents, 8 assistant lecturers and 4 fellows, covering 85 elective beds and 120 trauma beds. In 2006 we started a structured training program which includes biweekly lectures, logbook, MCQ exams, journal club, training assessment and Ortho sports day. We describe the pros and difficulties of implementing a new program in a busy department with an established system, and the benefits and success of each aspect of the training program.

Session: SICOT/SMACOT Trainees' Meeting 01– General orthopaedics and trauma

*Moderators: Mohammed Rafai (Morocco)
Hatem Said (Egypt)*

FREE PAPERS (1)

TM01-01

PSEUDO-OBSTRUCTION: A RARE COMPLICATION OF SHOULDER ARTHROPLASTY

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INTRODUCTION: Acute pseudo-obstruction of the colon (Ogilvie's syndrome) is a recognised complication following lower limb arthroplasty, pelvic and spinal surgery. If unrecognised, it may result in massive colonic dilatation that may lead to life-threatening perforation. We performed a literature review and could not find any reported cases of pseudo-obstruction following upper limb arthroplasty. We describe a case of pseudo-obstruction following Copeland shoulder re-surfacing. **CASE REPORT:** An 84-year-old lady with glenohumeral osteoarthritis underwent an uneventful right Copeland shoulder re-surfacing under general anaesthesia. Initial analgesia was provided by intra-venous patient controlled analgesia (PCA). On Day 3 post-operatively the patient began to complain of nausea, abdominal distension and informed the team of absolute constipation for 3 days (no flatus or stool). Examination revealed a tender and distended abdomen with hypoactive bowel sounds. Digital rectal exam revealed an empty cavernous rectum. Haematological and biochemical investigations were unremarkable. A plain abdominal radiograph demonstrated dilatation of the entire colon with a competent ileocaecal valve. The general surgical team was involved and performed an unremarkable rigid sigmoidoscopy. The patient was managed non-operatively by cessation of oral intake and intra-venous fluid administration. Bowel habitus was restored at day 7 post-operatively and her remaining post-operative recovery was unremarkable. She was discharged on day 9. **CONCLUSIONS:** Pseudo-obstruction is a complication that is seen following lower limb arthroplasty. Our case report demonstrates that this potentially life-threatening condition can happen in a patient undergoing upper limb surgery and therefore should be considered in a patient with abdominal distension following such surgery.

TM01-02

A COMPARATIVE STUDY OF THE COMPRESSION HIP SCREW AND THE INTRAMEDULLARY NAIL FOR TROCHANTERIC FEMORAL FRACTURES

Minoru KASHIHARA
Naze Tokushukai Hospital (Japan)

PURPOSE: The purpose of this study is to compare the results between compression hip screw and intramedullary nail for the treatment of trochanteric femoral fractures. **METHODS:** 101 patients were treated with compression hip screw, and 53 patients were treated with intramedullary nail (25 with Gamma nail and 28 with MIJ nail similar to Synthes proximal femoral nail). Fracture types were 52 stable, 49 unstable and 17 stable,

36 unstable types, respectively for compression hip screw and intramedullary nail. RESULTS: There was no significant difference in postoperative walking ability between two groups. However, the average postoperative telescoping of lag screw for unstable fractures was 16mm and 7mm, respectively in compression hip screw and intramedullary nail group. Postoperative complications were 6 cases of lag screw cutout, 1 case of non-union and 2 cases of distal cortical screw breakage in the compression hip screw group. While in the intramedullary nail group, complications such as lag screw cutout or non-union did not occur except 1 case of femoral shaft fracture. CONCLUSION: The intramedullary nail is an effective method for the treatment of trochanteric fractures in elderly patients. The indication for either compression hip screw or intramedullary nail is similar in stable fractures. However, we recommend the use of intramedullary nail for unstable trochanteric fractures.

COMPARISON OF CEMENT PRESSURISATION IN FLANGED AND UNFLANGED ACETABULAR CUPS

Fahad ATTAR, Raj BHATTACHARYA, Andy PORT
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INTRODUCTION: There has always been a debate in total hip arthroplasty with regards to using flanged vs. unflanged cups. Is any one better than the other and if so how? The aim of our study was to evaluate difference in cement pressures generated by flanged and unflanged acetabular cups in cemented total hip arthroplasty, to assess if there was a difference. METHOD: A biomechanical study using a model metal acetabulum was used. Cement was mixed and pressurised followed by acetabular cup insertion and pressurisation. Constant static pressures were generated and recorded. Charnley Ogee, Exeter contemporary flanged and Exeter low profile unflanged cups were compared. 3 sets of experiments were done with each type of cup using Simplex cement, and then repeated using CMW cement. RESULTS: Using Simplex cement, the results were as follows: Initial Pressure: Charnley Ogee > Exeter Flanged (significant); Charnley Ogee > Exeter Unflanged (significant); Exeter Unflanged > Exeter Flanged (not significant). Mean Pressure: Charnley Ogee > Exeter Flanged (significant); Charnley Ogee > Exeter Unflanged (not significant); Exeter Unflanged > Exeter Flanged (not significant). Using CMW, there was no significant difference between the pressures generated by the 3 cups. CONCLUSION: Our experiment suggests that flanged cups do not consistently generate significantly higher cement pressures compared to unflanged cups in cemented hip arthroplasty.

TM01-04

IS THERE ANY POINT IN CLASSIFYING SUBTROCHANTERIC FRACTURES? THE REPRODUCIBILITY OF FOUR CLASSIFICATION SYSTEMS

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INTRODUCTION: Classification systems are used for communication, deciding/planning treatment options, predicting outcome and research purposes. The vast majority of subtrochanteric fractures are now treated with intramedullary nails, which questions the need for classification. OBJECTIVES: To assess the intra- and inter-observer reliability of the Seinsheimer, AO and Russell-Taylor (RT) classification systems and assess a new simple system (KMG). METHODS: The KMG system was developed to alert the surgeon to potential hazards: Type 1 - subtrochanteric fracture (ST#) with intact trochanters. Type 2 - ST# involving greater trochanter (entry point for nailing difficulty). Type 3 - ST#

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involving lesser trochanter (most unstable). 32 AP and lateral radiographs of subtrochanteric fractures were classified independently by 4 observers twice with a 6-week interval (2 Consultants and 2 Registrars). The observers were asked to rank the systems based on how descriptive they thought they were, whether they felt they influenced treatment plan and whether they would predict outcome. RESULTS: The intra- and inter-observer variation was poor in all systems. KMG gave the best inter-observer reproducibility (Kappa 0.3 to 0.6) followed by AO and RT, and then Seinsheimer. The observers felt that Seinsheimer and KMG were the most descriptive and would influence the treatment plan, and Russell-Taylor would perform worst at predicting outcomes. All of the fractures in this series united. CONCLUSIONS: The classification systems analysed in this study have poor reproducibility and seem to be of little value in predicting outcome of intramedullary nailing. The KMG system may be of some use in alerting the surgeon to potential problems.

TM01-05

SURGICAL OUTCOMES IN SCOLIOSIS SURGERY IN PATIENTS WITH CEREBRAL PALSY

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Cerebral Palsy has many musculoskeletal manifestations including spinal deformity. These children present a challenge to the Paediatric Spinal Surgeon with multiple medical issues and a high complication rate following scoliosis surgery. We reviewed 41 CP patients who had corrective scoliosis surgery between 1993 and 2005 at Starship Children's Hospital Paediatric Spinal Deformity Department. Outcomes including progression of disease pre-operatively, amount of correction at surgery, complications and clinical outcomes have been assessed using clinical notes and X-rays. 19 males and 22 females were included in this study with an average age at surgery of 15 years. Average operative time was 9 hours and average time in Intensive Care Unit 1.5 days. Average follow-up time was 21 months (range 2-78 months). There were 5 peri-operative deaths. There were 2 deep infections and 2 superficial infections. The average Cobb angle pre-operatively was 92° (30°-133°) with pelvic tilt 28° (3°-63°). Post-operative average Cobb angle 34° (9°-70°) and pelvic tilt 9° (0°-26°). This represents an improvement of 65% (30%-100%) in the pre- and post-operative curves and a 58% correction in pelvic tilt (0%-100%). The child with Cerebral Palsy continues to prove a challenging patient for the spinal surgeon. Huge improvements can be made in the posture of these patients with spinal fusion surgery; it is important that both patients and parents are aware of the risks involved and benefits attainable before proceeding with surgery.

FREE PAPERS (2)

TM01-06

CHANGING PATTERNS OF ORTHOPAEDIC TRAUMA ADMISSIONS - A 5-YEAR REVIEW

Syah BAHARI
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INTRODUCTION: This study was performed to review the changing patterns of trauma admissions in Ireland over 5 years (1999-2005). MATERIALS AND METHODS: A review of prospectively collected admission data of trauma patients admitted to the Adelaide & Meath Hospital (AMNCH) in Dublin, Ireland, during 2005. Data obtained from the Hospital

In Patient Enquiry (HIPE) system. A comparison is made with similar data from 1999. Demographic data, mode of presentations, type of injuries, time of injury and place of injury were recorded. Injury severity was defined using the Injury Severity Score (ISS). RESULTS: 23% increase in number of admissions in 5-year period. Mean age of admission reduced from 35 (1999) to 32 (2005). 67% of admission occurred outside normal office hours (9a.m.-5p.m.). Commonest mode of injury was road traffic accident in 1999 and sports related injury in 2005. Work related trauma increases by 40% and assault increases by 35% from 1999 to 2005. High energy trauma cases reduce by 50% but open fracture cases double in 5 years. Mean overall ISS score was 37.2 (1999) decreased to 27.9 (2006). High energy trauma reduced by 40%. CONCLUSION: These changes cause significant impact on the health system. The changing patterns of orthopaedic trauma admission are vital in the development of a trauma referral centre. Increase in facilities for management of trauma is essential as this trend is more likely to continue.

TM01-07

SUPRACONDYLAR NAILING FOR FRACTURES OF THE DISTAL FEMUR

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Chandrapur Multispeciality hospital (INDIA)

Amongst the variety of implants available for treating the fractures of the distal femur, the Intramedullary Supracondylar nail (IMSC) is the latest entrant. Distal femoral fractures are often multifragmentary and/or intra articular and are often subject to deforming muscular forces that render the non operative treatment a poor option. The morbidity and the prognosis is often guarded in the distal femur fractures. We carried out a prospective analysis of the data of 20 consecutive patients who had closed distal femur fractures and 5 compound fractures (Grade I Grade II) treated from Jan. 2003 till Jan. 2006 at our institute. In 18 patients we achieved close to anatomic reduction of the fracture fragments. In 2 patients we had to resort to limited open reduction. During the follow-up period of one year, complications occurred in five patients, particularly restriction of ROM of knee in 5 and infection in 2 patients. We strongly advise a careful surgical technique and modification as per the individual fracture pattern to reduce the complications. Osteosynthesis with the IMSC features the advantages of high rotational stability of the distal metaphyseal and shaft fragment, an unreamed implantation technique and the possibility of static distal locking.

TM01-08

A CASE OF ANTERIOR FORAMEN MAGNUM TUMOR

Minoru KASHIHARA

Naze Tokushukai Hospital (JAPAN)

INTRODUCTION: Determination of the level of spinal cord tumors that develop around the foramen magnum or high cervical region can be difficult, because the symptoms of such tumors are quite variable. The surgical approach for such cases remains controversial. We present a case of anterior foramen magnum tumor. CASE: A 70-year-old man complained of occipital, nuchal, and shoulder girdle pain. Physical examination revealed motor weakness and sensory disturbance of the right upper extremity, numbness of bilateral upper extremity and right lower extremity, and long tract sign. MRI showed intradural mass situated at the anterior foramen magnum. Total resection of the tumor was performed by lateral approach which removed right hemilateral occipital condyle and right side of posterior arch of C1 and lamina of C2 after 7 months from the symptom onset. The final diagnosis of schwannoma of C2 ventral root was based on the

intraoperative and histological findings. **CONCLUSION:** The clinical appearance of foramen magnum tumor is the discrepancy between the site of tumor and the spinal segmental sign. The symptoms of lower cervical spinal cord lesion which include the intrinsic muscle atrophy of the hand often occurred in foramen magnum tumor. The advantages of lateral approach are that there is no need for retraction of the spinal cord, and there is good exposure of the tumor located at anterior foramen magnum, no postoperative cervical instability, no risk for cerebrospinal fluid leak and infection that are often occurred by anterior approach.

TM01-09

MULTIPLE TRAUMA INDUCES GENERAL STEM CELL PROLIFERATION

Zsombor LACZA

Dept. Clinical Experimental Research (HUNGARY)

We investigated the anabolic effect of severe traumatic injury on stem cell proliferation in a rat model of multiple injury. Cold lesion was performed in the brain cortex and the soleus muscle of anesthetized male Wistar rats, followed by bromodeoxyuridine (BrDU) application for 6 days in order to label dividing cells. The control group suffered no injury, the single trauma group suffered brain and muscle injury once, while the repeated trauma group suffered cold lesion twice with a 6 days interval. After completion of the experiment the animals were sacrificed and paraffin embedded sections were prepared from the gut and the lesioned brain and muscle areas. BrDU labeling was visualized by immunofluorescence and confocal microscopy. The gut epithelial cell layer, which was unaffected by the injury showed a marked increase in the proliferating cell number after single or repeated trauma in a similar manner. In the brain there were only occasional BrDU positive cells in the penumbra area of the lesion, showing that in this timeframe brain regeneration is mainly due to plasticity and not replacement of tissue. In case of striated muscle we observed rapidly regenerating areas at the border of the necrotic zone where BrDU positive cell nuclei were incorporated into muscle fibers. Interestingly, a second trauma at the same site did not block, but further increased this regeneration rate. We conclude that traumatic injury induces general enhancement of stem cell proliferation, which is not inhibited when a repeated injury poses a second hit on the tissue.

TM01-10

AN ANALYSIS OF REVISED PROXIMAL FEMORAL NAILS IN EXTRA-CAPSULAR TROCHANTERIC FEMORAL FRACTURES

Moez BALLAL

Arrowe Park Hospital (UNITED KINGDOM)

PURPOSE: To analyse the Proximal Femoral Nails (PFN) performed in our institute that needed a revision surgery between January 2000 and June 2006. **METHODS:** We retrospectively reviewed 234 PFNs performed in our district general hospital between January 2000 and June 2006. We looked at reasons for failure including reduction method of the fracture and quality of reduction of the fracture fragments. We also looked at the timing of failure from the initial procedure. **RESULT:** 13 out of 234 PFNs performed needed revision surgery. Poor anatomical reduction of the fracture fragments was the leading cause of revisions with a significant tendency of these needing early revisions while late revisions were mainly due to implant failure or infection ($p=0.03$). There was no significant difference between failure and open or closed reduction of the fracture, however we demonstrated a high incidence of deep infection in open reduction cases ($p=0.0127$) and thus failure and revision due to infection. **CONCLUSION:** Proper anatomical reduction, whether achieved by closed or open reduction of the fracture, is

mandatory prior to insertion of the nail to prevent subsequent failures. Poorly reduced fractures tend to fail early (<24 weeks). Open reduction can achieve better stability, however, this adds another risk of failure due to infection.

TM01-11

DOES THE USE OF AN AIRCAST WALKER BOOT FOLLOWING OPERATIVE FIXATION OF ANKLE FRACTURES ALLOW FOR EARLY PATIENT DISCHARGE?

Christopher ARMITSTEAD

SANDWELL HOSPITAL (UNITED KINGDOM)

INTRODUCTION: The use of an Aircast walking boot following operative fixation of ankle fractures has been shown to significantly improve early patient comfort, post-fracture swelling and time to full rehabilitation. However, the practical implications and in particular the financial impact of this orthosis has not been assessed. The current study, therefore, aims to determine whether use of the removable splint following operative fixation provides an economically viable alternative to the standard below knee cast.**MATERIALS AND METHOD:**Between May 2006 and January 2007 those patients who underwent operative ankle fixation and who were treated postoperatively with the use of an Aircast walker were identified. A group of age-matched controls were used for comparison. Demographic details and postoperative outcomes including postoperative stay were obtained from the hospital notes and computer records. **RESULTS:**12 patients were treated with an Aircast boot during the study period. The mean age of the study group was 43.6 years compared to 43.3 years in the control group. Operative fixation was carried out within 0.83 days and 0.92 days respectively. Patients in the Aircast group were discharged within a mean period of 2.92 days following surgery compared to 3.58 days in the control group.**CONCLUSIONS:** The current study demonstrates that the use of an Aircast walker boot in the postoperative period is clinically comparable to the standard below knee cast. In particular, the orthosis also enables patients to be discharged home earlier, which has positive implications both for patient recovery and the overall cost of treatment.

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Session: SICOT/SMACOT Trainees' Meeting 02 – Knee

*Moderators: Mohammed Rafai (Morocco)
Rocco Pitto (New Zealand)*

FREE PAPERS

TM02-01

FIRST RESULTS IN MINIMALLY INVASIVE TOTAL KNEE ARTHROPLASTY (TKA) USING THE MINI- MIDVASTUS INCISION (MMI) TECHNIQUE

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INTRODUCTION: Since November 2003 we performed more than 600 minimally invasive total knee arthroplasties. The results of 100 consecutive patients undergoing mini-midvastus incision (MMI) technique should be shown. **METHODS:** 100 patients (73 female, 27 male, average age 67 [54-83] years, BMI 28 [21-40]) with varus (83 cases, 8° [1-21°]) and valgus (17 cases, 7° [4-17°]) deformities were operated in MMI technique in a prospective, randomized study. Full-leg-length weight bearing films were used for preop planning and postop controlling. Anaesthesia, pain management and mobilization were standardized. Clinical evaluation was performed by two scores (KSS and WOMAC) preop and at 1 and 6 week(s) and 12 months postop. Follow-up was 12.2 (6 to 18) months in the average. **RESULTS:** After 1 week KSS (Knee/Function) increased from 55/62 in the average to 82/65 and to 92/86 after 6 weeks and to 93/92 after 12 months. The WOMAC decreased in the average from 37 preop to 16 after 1 week, to 12 after 6 weeks and to 11 after 12 months. Skin cut length was 10.5 cm (7 to 13.5 cm), surgical time was 98 (70 to 145) minutes. On long-standing radiograph the over-all alignment was in 93% $\leq \pm 3^\circ$ postop. Complication rate was 5%. **CONCLUSION:** Increasing surgeon's experience, the daily application of this limited arthroplasty procedure is possible even in a routine program. Most of patients benefit by the new surgical technique, mobilisation and rehabilitation are faster. Risk of component malalignment and overall complication rate are not increased.

TM02-02

RESULTS OF TOTAL KNEE REPLACEMENT IN GENU VALGUM

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During 2005 and 2006, 120 total knee replacements were performed in our clinic, and of those 42 were in genu valgum deformities. The genu valgum etiology found in our experience included developmental factors (constitutional genu valgum), rheumatoid arthritis, trauma and failed osteotomy. The technical problems were the ligament balance restoration and patellar tracking. The replacements were achieved by medial capsulotomy; a lateral release was needed in seven cases and an anterior tibial tuberosity osteotomy in two. All the implants were posterostabilised; in 12 cases, a patellar arthroplasty was also performed. The results were evaluated by clinical (KSS) and roentgenographical examination (including whole limb in loading position, patella axial

view, CT scan). In seven cases (16.6%) we found a hipocorrection of the deformity - the persistence of over five degrees of valgus the reason being either the femoral malposition or the internal compartment laxity. External patellar subluxation was found in 5 cases (12%) (ascertained by CT scan), situations in which patellar arthroplasty was not performed. **CONCLUSIONS:** In moderate genu valgum (under 20 degrees) the complication rate was not significantly greater than that resulting in common knee replacement. Alternatively, in knee deformities of over 20 degrees a capsuloligamentar laxity and a valgus persisted; we recommend the routine patellar arthroplasty which provides a better tracking.

TM02-03

PARTIAL PATELLAR OSTEOTOMY FOR PATELLO-FEMORAL OSTEOARTHRISIS: AN ALTERNATE SURGICAL TREATMENT

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The frequency of patello-femoral osteoarthritis and dysfunction ranges from 8-52% according to the considered population. We included 42 partial patellar osteotomies (40 patients) in a retrospective study with a previous diagnosis of patello-femoral osteoarthritis. The mean age was 50 years (range 40-62). We compared symptoms, clinical function and radiological measurements before surgery and postoperatively. We used the Oxford Knee Score (OKS) as well as X-ray and CT scan angles and indexes. The performed surgery was a resection of the lateral third of the patella combined with a proximal realignment of the extensor mechanism. The results we obtained were as follows: preoperational OKS was a mean of 42.7 and postoperational 24.3, with good to excellent results in 95% of the cases; the radiological measurements showed a better outcome in the postoperative patients. There are many options still under study for the treatment of patello-femoral osteoarthritis. We conclude that a partial patellar osteotomy is a good alternative for the treatment of this pathology.

TM02-04

THE USE OF INTRA-ARTICULAR MORPHINE IN ADDITION TO LOCAL ANAESTHETIC FOR POST-OPERATIVE ANALGESIA IN ANTERIOR CRUCIATE RECONSTRUCTION

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INTRODUCTION: Anterior cruciate ligament (ACL) in the knee joint is often damaged in various sporting activities. Around two-thirds of these patients will require reconstructive surgery, which is associated with significant post-operative pain. Effective pain management plays a key role in determining the short-term outcome of the surgery. It is common practice to use intra-articular local anaesthetic for post-operative pain-relief. Use of intra-articular morphine in combination with a local anaesthetic has been evaluated in several trials but the results are inconclusive. **MATERIALS AND METHODS:** In a double-blind randomised control study, 50 patients were randomised to receive either bupivacaine alone (Group L) or morphine and bupivacaine (Group M). Three pain scores were recorded using the visual analogue scale; pre-operatively (expected post-operative pain level), 6-hours and 24-hours post-operatively. The time to first request for analgesia and the amount of analgesic used were also recorded. **RESULTS:** Higher pain scores were reported in Group M. Group L had lower pain scores, but also a higher consumption of opiate analgesics and a shorter time in requesting painkillers. Differences were not

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proven to be statistically significant. **CONCLUSION:** The post-operative scores were lower than the pre-operative scores, signifying that the actual pain experienced was lower than expected pain. Morphine was not associated with an improvement in pain scores, but was associated with reduced opiate use post-operatively. It was concluded that there were no additional benefits from intra-articular morphine after ACL reconstruction.

TM02-05

THE BIOLOGY OF ANTERIOR CRUCIATE GRAFT INTEGRATION: THE BIOLOGICAL ENVIRONMENT IN THE KNEE AFTER SURGERY

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INTRODUCTION: The anterior cruciate ligament (ACL) is a key structure in the knee joint, and when torn does not heal spontaneously. Surgical reconstruction is often required, but is not a universally successful procedure. Failure of graft integration may be responsible in a significant number of cases. The biological environment in the knee after ACL reconstruction surgery may affect graft integration, and may offer potential for modulation, but has not been studied in any detail. **MATERIALS AND METHODS:** Fluid (synovial fluid, post-operative drain fluid at one hour and 6 hours) and tissue samples (ACL stump, hamstring graft) were collected from 14 patients undergoing ACL reconstruction. Fluid samples were centrifuged and stored. Tissue samples were cultured for 24 hours and the culture medium then stored. Samples were then analysed for Matrix Metalloprotease (MMP) activity and the levels of thirteen inflammatory markers and growth substances, including IL-1, II-6, TGF- β , and PDGF. **RESULTS:** Latent collagenase activity was found in all samples, but there was considerable variability in amount present. Most of the growth substances analysed were found to be present, but again with considerable variability. Concentrations of most factors were higher at 6 hours than at one hour post-operatively. **CONCLUSION:** This observational study has confirmed the presence of several bioactive molecules in the knee prior to and after ACL reconstruction. Any attempt to modify the biological environment in the knee after ACL surgery must be based upon an understanding of the natural history, and these results provide a basis for further studies.

TM02-06

AVASCULAR NECROSIS OF PATELLA PRESENTING AS ANTERIOR KNEE PAIN FOLLOWING TOTAL KNEE ARTHROPLASTY

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PURPOSE: To report a case avascular necrosis of patella following total knee replacement. **MATERIALS AND METHODS:** A 74-year-old lady underwent total knee replacement with patellar resurfacing. Post-operatively she was complaining of anterior knee pain and clinical examination did not reveal any signs of infection with a range of flexion from 10-90 degrees. Blood parameters were within normal limits and radiographs showed satisfactory position of the prosthesis. A bone scan performed did not show any evidence of infection or loosening of the prosthesis. However, she continued to have anterior knee pain and a repeat bone scan and Indium white cell scan performed ruled out infection. At subsequent clinic follow-up, 14 months post-op, she was noted to have extensor lag of about 30 degrees with subsequent flexion to 95 degrees without any history of trauma. Radiographs performed showed fracture of the patella and the fracture pattern was consistent with avascular necrosis. She underwent exploration of the knee where the femoral & tibial components and the patellar prosthesis were found to be

stable. An excision of the lower pole of patella was done with reconstruction of the extensor mechanism. RESULTS: At follow-up her symptoms had improved and at latest follow-up, 9 months after surgery, she did not have any anterior knee pain and was mobilising well without any support. CONCLUSION: This case report highlights the need for high index of suspicion for avascular necrosis of patella in a patient presenting with anterior knee pain following total knee replacement.

CONFERENCES

TMIS02-01

UNICOMPARTMENTAL KNEE ARTHROPLASTY WITH REVERSE WINDING SCREW FIXATION FOR OSTEOARTHRITIS OF THE KNEE

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Our latest surgical techniques of unicompartmental knee arthroplasty (UKA) for osteoarthritic knee (OA) were introduced and the factors to obtain better clinical results of UKA were addressed. UKA was performed on 93 knees (49 right, 44 left) with medial compartmental OA in 77 patients (65 women, 12 men) with average age at surgery 72.6 years (range, 53-86). The mean follow-up duration was 5.2 years (2-20). Among 93 knees, 20 underwent previous surgeries, in which high tibial osteotomy was carried out most in 15 knees. The types of UKA were Marmor in 25 knees, Ceramic UMCK Unicom Knee in 54, Compartment Uni-knee in 14. The preoperative average HSS score was 52-12 (S.D.) points, and after surgery, it significantly increased to 79-13. There were 38 knees judged as excellent, 34 as good and the other 11 as fair or poor. The preoperative average flexion contracture was 11 (and postoperatively it decreased to 5). The knees with residual flexion contracture showed worse clinical results. In 93 knees, the preoperative average (femorotibial angle) was 184 – and the postoperative pne was 174.

TMIS02-02

DIAGNOSIS AND TREATMENT OF PATELLOFEMORAL INSTABILITIES

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In the last years there is an increased interest and knowledge on aetiology and treatment of patellofemoral instabilities. In the earlier years surgical treatment often was a kind of soft tissue alignment, whereas nowadays many modalities exist to tailor the surgery to the individual patient. Sometimes the only manifestation of an instability is peripatellar pain, and the diagnosis of the occult instability is often missed. After a complete dislocation the diagnosis is readily made. The investigation starts with a proper physical examination, after which often the cause for the instability can be suspected. The etiology of the instability can often be established by conventional X-rays. Seldom CT-scanning and/or MRI are necessary. In general there are four main causes for patellar instability: patellofemoral dysplasia, patella alta, lateralisation of the tuberosity and insufficiency of the medial patellofemoral ligament (mpfl), which all four can be established by the combination of physical examination and x-rays. The only requisite for the conventional X-ray is to obtain a true lateral view (with both condyles overlapping on the posterior side) in order to correctly classify trochlea dysplasia and highriding patella. Only on a true

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lateral view one can judge if a crossing sign is real. Already slight aberrations lead to false positive and-negative results. Since we are better able now to recognise the abnormal anatomy we can also tailor the treatment based on the anatomic features. Surgeries nowadays include trochlear osteotomies for trochlear deficiencies, tuberosity transfers for lateralisation and patella alta and finally mpfl-reconstructions if the structures on the medial side of the patella have been torn. The indications, surgical technique, results and pitfalls of the different reconstructions will be discussed.

Session: SMACOT/SICOT Ankle Trauma Round Table

*Moderators: Abdelkrim Largab (Morocco)
Abderrahmane Bensaid (Morocco)*

CONFERENCES

SMIS-01

BIMALLEOLAR FRACTURES

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CHU IBN Rochd (MOROCCO)

INTRODUCTION: The bimalleolar fractures can be considered as common skeletal injuries in the ankle. They are generally unstable and must be treated by open reduction and internal fixation. **MATERIALS AND METHODS:** Six hundred and fifty-five cases of bimalleolar fractures are treated with between 2000 and 2005. The average age is 30 years (range between 20 to 80 years), 63% of patients are males. Etiologies: fractures were due to road traffic accidents (37%), work injuries (45%) and domestic accidents (18%). Generally, the mechanism was indirect in 76% cases and the skin injuries were found in 14% cases. The syndesmotic injuries were reported in 30% cases. Eighty-one percent of fractures were surgically treated while 19% benefited from non surgical management. **RESULTS:** The follow-up is average 27 months. The result was good and very good in 92%. 96% with surgical treatment and 82% with non surgical treatment. **CONCLUSIONS:** The bimalleolar fractures are generally unstable. Most of the time, the severe lesions must be managed by surgical treatment and physiotherapy. The arthroscopy can well investigate the talar chondral injuries.

SMIS-02

TRIMALLEOLAR FRACTURES AND ANKLE SYNDESMOTIC INJURIES

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INTRODUCTION: Reports on surgical treatment and long term follow-up outcome after trimalleolar fractures with ankle syndesmotic injuries and on how bad prognosis is in case of this association. **MATERIALS AND METHODS:** One hundred and twenty patients with trimalleolar fractures were available for evaluation among 846 ankle fractures (14.2%). Average age is 31 years and follow-up is 14 years. Weber A.O. type B: 75 cases including 9 syndesmotic lesions, type C: 45 cases, with syndesmotic lesions. Before syndesmosis screwing, our patients had internal fixation of malleoli by screws, wires or plates. **RESULTS:** A scoring system assesses the outcome, any instability of syndesmosis and osteo-arthritis. As far as the syndesmosis could be considered as a virtual forth malleolus because of its apical topography, it seems then logical that it should be also well reduced and fixed. This is related to the significant adequacy found between the initial reduction of the syndesmosis and its late complications. Global results look quite better in absence of syndesmotic injury. - In Group 1: 66 ankles without syndesmotic lesions: good and very good are 72.7%, fair is 19.6% and poor is 7.7%. - In Group 2: 54 ankles with syndesmotic lesions showing good and very good in 57.4%, fair

in 22.2% and poor in 20.4%. CONCLUSIONS: - Syndesmotic injuries aggravate trimalleolar ankle fractures and require their accurate reduction and fixation. - We could then reduce the risks of instability and range of motion loss, and also avoid or delay arthritis changes.

Session: SMACOT/SICOT Ankle Trauma

Moderators: Mohammed Salah Berrada (Morocco)
Mourad Hamdani (Algeria)

FREE PAPERS

SM01-01

OPEN ACHILLES TENDON RUPTURE

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Achilles tendon rupture is a not uncommon injury, however, the incidence of open Achilles tendon injury is infrequently reported. It is generally perceived that open Achilles tendon injury is associated with a poor outcome and severe complications. In this study, we review the demographic features of open Achilles tendon injury and their functional outcome following surgical intervention. A retrospective investigation was done at Hospital Tengku Ampuan Afzan (HTAA) Kuantan, Pahang from January 2001 until December 2005. Universal sampling was used to include all open Achilles tendon rupture cases. We reviewed the records of these patients as well as performing clinical assessment on them. We reviewed the demographic data, the etiology of the injury and the functional outcome using the Olerud and Molander scoring system. Patients were asked about satisfaction to the current condition either through the telephone or during follow-up. Thirty-three patients were available for review (26 male and 7 female patients). Their age ranged from 12 to 58 years old. Toilet bowl injury is the most common cause of these open injury (23 cases, 68%) followed by motor vehicle accidents (6 cases, 21%). Excellent and good outcome were achieved in 69% of cases. Operative treatment of open Achilles tendon rupture restores sufficient ankle function and a significant percentage of patients has excellent and good outcome. Early intervention, proper debridement and good antibiotic coverage are important to ensure the outcome. Some sort of prevention is required to reduce the rate of toilet bowl injuries resulting in open Achilles tendon injuries.

SM01-02

PERCUTANEOUS GALLAGHER NAIL ANKLE STABILIZATION FRAGILITY FRACTURE

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BACKGROUND: Osteoporotic fractures of the ankle in the elderly present a difficult challenge for the orthopaedic surgeon. Many present with bone and skin which is manifestly unsuitable for standard surgical fixation using plates and screws. The majority of these patients are treated conservatively in plaster. However, holding ankle mortice reduction can, in itself, prove difficult in these cases. We present a series of osteoporotic elderly ankle fractures treated with percutaneous ankle stabilization with a Gallagher nail introduced via the calcaneum and directed through the talar dome into the tibia.

METHODS: A retrospective review of a prospectively collected database was conducted

at a single institution. Patient follow-up was by outpatient clinical review and telephone contact. RESULTS: Nine cases were identified over the period 1996-2005. The average patient age was 82.4 years (range 53-101 years). Five patients had bimalleolar fractures, 3 patients had trimalleolar fractures and 1 patient had a fracture dislocation of the ankle at presentation. All patients were treated conservatively in cast initially. Once reduction was lost, a decision was made to stabilize the ankle using a Gallagher nail. Pain free transfer with assistance was possible in all patients by 8 weeks post-operatively. The nail was removed in one patient, 6 patients returned to previous mobility status and union was achieved in 8 cases. Average duration of patient follow-up was 34 months. CONCLUSION: Gallagher nail percutaneous trans-calcaneal stabilization provides a viable alternative in the management of unstable osteoporotic fractures in the elderly.

SM01-03

POSTERIOR ANKLE ARTHROSCOPY - EXPERIENCE WITH A NEW TECHNIQUE AND EARLY RESULTS

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We report the results of a prospective study of 41 consecutive patients with posterior ankle pain unresponsive to conservative treatment who underwent posterior ankle endoscopies by the senior author. There were 25 males and 16 females (average age - 26 years). There were 8 professional and 15 competitive athletes. The mean duration of symptoms was 20.4 months. 38 patients were available for follow-up at a mean of 16 months (range 12-28 months). The three most common findings on posterior ankle arthroscopy were soft tissue impingement, bony impingement or an osteochondral lesion (OCD). In 31 cases, these were found in isolation, but combinations of pathology were encountered in 8 cases. We found the site of pain and tenderness was more highly predictive of pathology. There was a mean increase in AOFAS score of 73.5 to 86.4 points ($p < 0.34$). 30 patients (79%) reported no pain or mild pain only. 23 patients (61%) returned to pre-injury activity levels, including 7 of 8 professional athletes. Complications included one wound haematoma and one slow-healing wound. 12 patients had a normal range of ankle movement post-operatively, 19 had a mild restriction (30 degrees or more range) but seven had a moderate degree of stiffness (<30 degrees range). Overall, 29 patients (76%) were satisfied with their operation. The overall AOFAS score was significantly lower post-operatively in the group who had conversion to an arthroscopy and 3/5(60%) was dissatisfied overall, compared to 5/33(15%) in the arthroscopy group.

SM01-04

FUNCTIONAL RESULTS OF PERI-ARTICULAR/LOW PROFILE PLATING OF PILON FRACTURES

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Low profile plating have been used in distal radial and metacarpal fractures but not studied in lower limb fractures. Here we report the early results of low profile plating for distal tibia (Pilon) fractures. We studied twenty patients (mean age 42.7, range 20-64 years) undergoing peri-articular low profile plating of the distal tibia (Zimmer) for 43A, 43B or 43C fractures in the period 2002-2006. Mean follow-up was 26 months (range 12-52). 18 patients had closed injuries while 2 had open injuries (one Gustilo I and one Gustilo III type injury). There were 12 males and 8 females. Five patients had associated injuries of foot and other joints. Eight patients had delayed operation with three-staged procedures (mean delay -5 days). Bony and functional results were classified into three categories

ranging from excellent to poor. Union was achieved in all patients with a mean of 16 weeks (range: 12-20 weeks). The mean AOFAS scores were 87.9 points post-operatively. Mean range of dorsiflexion was 20 degrees and plantar flexion was 35 degrees. Thirteen patients had excellent and good bone results, 80% of patients were satisfied with their treatment and 80% returned to work. Two patients developed arthritis of the operated ankle, one had superficial infection and one had the plate removed. This reported use of peri-articular plating techniques in the management of fractures of the distal tibia is preliminary. However, the functional results and the lack of soft tissue complications are encouraging.

SM01-05

APPLICATION OF ARTHRODIASTASIS FOR DEGENERATED OSTEOARTHRITIS OF THE ANKLE

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External fixator is popular for treatment of fracture, deformity, shortening of bone. However, it is little for intra-joint disorders. We report about the treatment for ankle joint disorders utilizing the function of opening joint space and joint mobility. MATERIALS: There are twelve cases between 26 years old and 62 years old, including degenerative arthritis and osteochonritis lesion of the talus with destruction of anatomical structure. The accompanied operations are resection of bony spur, drillind, autologous osteochondral graft and low tibial osteotomy. RESULTS: The pain was improved to all cases and there was not any case in the change of job. ROM: improved 8 feet, unchanged 4 feet. There was no case of progressing to osteoarthritic changes on X-ray. It had improved from 54 to 88 points in AOFAS score. DISCUSSION: It has been reported that joint debridement can not obtain good results. However, because it can be performed not only the treatment of original joint disorder but also the early joint movement (improvement of soft tissue) by using this external fixator, good results are expected.

Session 09: IFPOS/SICOT – Paediatrics (I)

FREE PAPERS (1)

*Moderators: Mohamed Ktiri (Morocco)
Nando De Sanctis (Italy)*

SIC09-01

PERCUTANEOUS INTRAMEDULLARY FIXATION OF FRACTURED SHAFT BONES IN CHILDREN

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INTRODUCTION: Internal fixation of long bones performed percutaneous is a minimal invasive operation-technique with small operative trauma and low risk.(3) There is a resurgence of interest in intramedullary fixation of fractured shaft bones in children especially when redisplacement, malunion and residual loss of motion may be expected after conventional treatment.(1,2) **MATERIAL AND METHOD:** In a retrospective review we evaluated children treated with intramedullary nailing. From 1998 to 2007, 84 children with fractures of the humerus, forearm, tibia and femur were operated in this technique. It affected the humerus 18%, forearm 75%, tibia 2% and femoral shaft 5%. Age of the patients: 5-14 years. **RESULTS:** Subjective, objective and radiographic evaluation three years after trauma average follow up revealed no significant side to side differences. There were three complications, two pseudarthroses at the femur, and one irritation of the radial nerve with sensibility deficit at dorsum mani. **DISCUSSION:** Although closed reduction and casting is standard for treatment of shaft fractures in children, surgery is reserved for patients with irreducible fractures.(4) Intramedullary fixation with flexible rod systems has been developed to avoid the problems with plating. After anatomic reduction, the nail resists angular deformity. Axial stability is provided by the main cortical fragments, rotatory stability by interdigitation of the fracture fragments and the intact portion of the periosteal envelope.(5) **CONCLUSION:** Due to the stability and early mobilisation the reported results also in literature are all good. It is an alternative for children with unstable fractures for whom non operative management failed.

SIC09-02

TO EVALUATE INTERNAL FIXATION BY ENDERS NAIL AS A SURGICAL TECHNIQUE IN THE TREATMENT OF FEMORAL SHAFT FRACTURES IN CHILDREN BY A PROSPECTIVE STUDY

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To evaluate internal fixation by enders nail as a surgical technique in the treatment of femoral shaft fractures in children by a prospective study. **METHODS:** 22 diaphyseal femoral fractures at various levels in 22 children aged 6-15 years were treated by enders nail under image intensifier control between 2004 and December 2007. No external splint was used. **RESULTS:** Early callus seen in 3 weeks. Fracture union was achieved in average 9.5 weeks. Non-weight bearing crutch walking was started 2-3 days after

surgery. Full weight bearing started 6-8 weeks. There were no infections, no limb length disparity. One child malunion valgus >10 deg. 3 children had stiffness and knee pain. CONCLUSION: 3 precautions need to be taken - convenience, cost and complication. Intramedullary nailing of femoral shaft fractures in children by enders nail is an effective method, which compares well with other studies. Based on our experience we recommend non operative treatment in children <6 years and operative/non operative in children between 6-9 years and definitely operative in children >10 years of age.

SIC09-03

RESULTS OF CLOSED REDUCTION AND INTRAMEDULLARY K-WIRES FIXATION OF LONG BONES IN CHILDREN

Osama FARAG

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OBJECTIVES: To evaluate intramedullary K-wires as a tool of fixation of long bone fresh fractures in children and the rate of union. METHOD: 56 cases with different fractures were studied in the period between March 2004 and January 2007 at Saudi German Hospital. The ages 4-13 years, male:female 41:15. The ratio of humerus:forearm:tibia:femur 17:28:7:4. Closed reduction under image and percutaneous fixation with K-wires was done. The K-wires were embedded under the skin in femoral and tibial fractures and left protruding in humeral and forearm fractures. RESULTS: The cases were evaluated according to union rate and return to pre-fracture activity, excellent results in humeral and forearm fractures with union of fracture within 4-7 weeks and return. In femoral and tibial fractures the results were good for femoral fractures with union of all cases between 6-12 weeks and return to functional activity within 8-15 weeks but for tibial fractures the results were satisfactory with 2 cases of delayed union which ranged between 12-16 weeks and the rest of cases developed full union within 8-12 weeks. CONCLUSION: The method of percutaneous fixation of long bones fracture in children with the use of K-wires showed excellent results with rapid return to functional activity and union rate specially in humeral and forearm fractures, whereas in femoral and tibial fractures it has not shown any difference in comparison to other methods of conservative treatment, the only advantage was ensuring good alignment of the bone.

SIC09-04

RADIOULNAR FUSION FOR DEFECTS IN THE FOREARM BONES IN CHILDREN - SALVAGE PROCEDURE

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University of Kwazulu-Natal (CANADA)

INTRODUCTION AND AIMS: Defects in forearm bones can lead to progressive deformity with bowing, dislocation and functional disability. The aim of this paper is to report the outcome of surgical radioulnar fusion in children with forearm bone defects. METHODS: In 10 years, 7 children (aged 2-15 years) underwent radioulnar fusion for ulna and 2 for radial defects. The defects were due to healed osteomyelitis of the radius (n=2), and ulna (n=1), congenital pseudarthrosis of the ulna (n=1), ulnar dysmelia (n=1) and osteochondroma of the ulna (n=4). All children with ulna defects had a dislocated radial head and limited movements. Those with radial deficiency had wrist instability and deformity. The bones were sectioned at the same level and transferred to each other and fused with an intramedullary rod in neutral rotation. All osteochondromas of the ulna were excised (3-7 cm). RESULTS: Good bone healing occurred in all by 3 months. Residual flexion deformity of the elbow of 20° was seen in 3 patients. All patients had improved hand grip, stability and elbow flexion to over 100°. Shortening ranged from 4cm-10cm at 7

months to 8 year follow-up. **CONCLUSION:** The one bone forearm reconstruction is a less demanding procedure than microvascular and bone lengthening techniques in forearm defects. It is a useful salvage procedure to restore good elbow and wrist function.

CONFERENCES

*Moderators: Amar Korchi (Algeria)
Mohammed El Sobky (Egypt)*

SICIS09-01

THE ETIOLOGY OF VERTEBRAL AND DISC WEDGING IN SCOLIOSIS

David ARONSSON

University of Vermont (UNITED STATES)

Asymmetric loading of the adolescent spine can cause asymmetric growth leading to progressive scoliosis. Mechanical loading may also be used to create asymmetric growth and correct scoliosis. The risk of progression of scoliosis is higher in young patients with large curves. Progression of scoliosis caused by asymmetric growth is governed by the Hueter-Volkman law which states that compression decreases growth and tension increases it. Asymmetric growth can lead to the "Vicious Cycle" of scoliosis where a spinal curve leads to asymmetric loading, causing asymmetric growth, resulting in vertebral wedging, which further aggravates the scoliosis deformity. To test the Vicious Cycle hypothesis, an Ilizarov type external fixator was designed to apply compression with an imposed 30 degree Cobb angle between the eighth and tenth caudal vertebrae of Sprague-Dawley rats for 6 weeks. Radiographs were obtained weekly and Calcein labeling was administered at 3 weeks, and again at 4 days before the conclusion of the experiment. The scoliosis deformity initially was secondary to wedging of the intervertebral discs, but by 6 weeks the wedging of the discs and vertebrae were approximately equal. The loaded vertebrae developed an average wedge deformity of 15 degrees with a total wedge angle of 30 degrees. Fluorochrome labeling confirmed that the vertebral wedging resulted from asymmetric growth in the physes. To further test the Vicious Cycle hypothesis, ten Sprague-Dawley rats had an Ilizarov type external fixator applied to the caudal vertebrae to impose a 30 degree Cobb scoliosis deformity and an axial compression force (60% body weight). After creating a scoliosis deformity during 4 weeks, group I animals had 1 week of distraction followed by 4 weeks of reverse loading, and group II animals had the external fixator removed. The results showed that after the initial 4-week loading, the combined average wedge deformity in the apical vertebra of the animals in both groups was 10.7 degrees. The load reversal group I showed correction of the deformity with the wedging of the apical vertebra decreasing to 0.1 degrees. The load removal group II showed correction of the deformity with wedging of 7.3 degrees during the first week, but no changes occurred after that week. This study documented that a vertebral wedge deformity can be corrected by reversing the load used to create it, and that vertebral growth is not permanently affected by applied loading. Although scoliosis includes wedge deformities of both vertebrae and discs, little is known about the causes of the discal changes, and whether they result from mechanical influences on growth and/or remodeling. An external fixator applied axial compression and 15 degrees of angulation to each of two adjacent young rat caudal intervertebral discs for 5 weeks in Group I and for 10 weeks in Group II. Each week, micro-CT scanning documented the in vivo discal wedging. After euthanasia, tail segments (three vertebrae and the two angulated discs) were excised and their flexibility was measured over a range of lateral bending. The discs were then fixed in situ and sectioned for polarized light microscopy. The results documented that the disc-wedging deformity averaged 15 degrees initially, 20 degrees after 5 weeks, and then reduced to 10 degrees in Group II.

The lateral bending flexibility showed a distinct maximum at an average of 1.1 degrees from the in vivo position in the 5-week animals, indicating structural remodeling of the discs. Collagen crimp angles were not significantly different between convex and concave sides, suggesting that remodeling had occurred. **CONCLUSIONS:** In the rat tail model, the induced scoliosis includes vertebral wedging, caused by asymmetric growth, and disc wedging, caused by remodeling.

FREE PAPERS (2)

*Moderators: Gaetano Pagnota (Italy)
David Aronsson (USA)*

SIC09-05

DISLOCATIONS OF THE ELBOWS IN CHILDREN

Mahomed RASOOL

University of Kwazulu-Natal (SOUTH AFRICA)

INTRODUCTION AND AIMS: Traumatic dislocation of the elbow is rare in children. Pure dislocations are uncommon and associated fractures and avulsions may be missed due to overlap of fragments. The aim of this paper is to highlight the spectrum of dislocations of the elbow in children and to increase the awareness of the less common types. **METHODS:** A total of 47 children aged 5-13 years, were treated for acute traumatic dislocation of the elbow between 1994 and 2006. Forty-one dislocations were posterior and 6 anterior. Two injuries were compound. Four had nerve injuries (medial=2; radial=1; ulnar=1). One child had brachial artery injury. Eight children had pure dislocations and 39 had associated fractures or avulsions. Sixteen dislocations were associated with medial epicondyle avulsions, the remainder had lateral condyle fractures (9), radial head and neck injuries (1), olecranon avulsion (1), divergent dislocation (2). Combined injuries (radial head, olecranon, lateral condyle, medial epicondyle) were seen in 7 children. **RESULTS:** Thirty-four elbows required fixation of associated fractures. Follow-up ranged from 4 months to 4 years. The results were good in 67%, fair in 25% and poor in 8%. Complications included pseudarthrosis of the medial epicondyle (1) and pin tract infection in 5. A dislocation of the elbow in children may be associated with an unrecognized additional fracture. Comparative radiographs are helpful to detect overlap of fragments.

SIC09-06

PYOGENIC SACROILIITIS: A DIFFICULT DIAGNOSIS

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Doncaster Royal Infirmary (UNITED KINGDOM)

Pyogenic sacroiliitis is uncommon in childhood. We report a 13-year-old girl who was misdiagnosed as having acute appendicitis but was later found to have pyogenic sacroiliitis. A 13-year-old girl came with a 3-day history of right hip and lower abdominal pain. There was no associated vomiting. There was a previous medical history of psoriasis. Physical examination on admission revealed normal pulse and temperature although later she became pyrexial with temperature of 38°C. There was a 15-20° flexion deformity of the right hip; the remainder of the hip movements were within normal range although painful. Laboratory examinations on admission revealed a white cell count of 13,600/mm³; CRP was 56 on admission. In view of the lower abdominal a diagnosis of appendicitis was made. A normal appendix was found at laparotomy Staphylococcus sensitive to flucloxacillin was cultured from blood samples taken on admission and the patient was commenced on intravenous flucloxacillin. Despite antibiotic therapy the

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patient still complained of right hip pain. An orthopedic opinion was requested. Sacro-iliac joint plain radiographs were normal. CT and MRI of the pelvis identified a small amount of fluid in the right sacroiliac joint and a small focus of fluid anterior to the inferior limit of sacroiliac joint; these features were suggestive of early sacroiliitis. Intravenous flucloxacillin was continued and her symptoms gradually resolved. She was discharged.

SIC09-07

COMPARTMENT SYNDROME IN FLOATING ELBOW IN SKELETAL IMMATURE PATIENTS

Adnan AL-ZAHRANI, Mohamm. ALHOSSAN
Riyadh Military Hospital

Several studies have suggested that children who sustained these fractures are not at increased risk of having forearm compartment syndrome. **MATERIAL:** We perform retrospective review of the trauma database at Riyadh military hospital from Jan. 1993 to Jan. 2003, there were 978 children admitted for upper extremity fracture of long bone; 978 cases, 86 children (8%) were identified as having sustained ipsilateral fracture of the humerus and the forearm; all those 86 child files and their X-ray were reviewed. **RESULTS:** The mean age of the 86 with ipsilateral fractures of the distal humerus and the forearm was 8 years. The lateral condylar in 6 patients, supracondylar fracture in 80 patients, 46 of them they had complete displacement of their supracondylar fracture grade III, 20 had type II supracondylar fractures and 16 had type one supracondylar fracture. For their forearm fracture of those 46 patients who had type III supracondylar fractures, 29 had complete displacement of their forearm fractures while 17 of them had no displaced fractures, all those supracondylar fractures went for reduction and stabilization. **DISCUSSION:** In our study we found from those 80 patients who had floating elbow, 12 developed compartment syndrome and they went for decompression of their compartment. All these patients went for their surgical management after 6 hours from their injury, which we believe its risk factor for the compartment syndrome, the finding suggest the children who sustained a displaced supracondylar fracture of the elbow extension type with forearm fractures are at high risk of compartment syndrome.

SIC09-08

THE FLOPPY ARM SYNDROME IN NEONATES

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We would like to present a case series of three neonates with osteomyelitis of the proximal humerus and septic arthritis of the glenohumeral joint who presented with a floppy arm and nil else. Examination revealed complete brachial palsy. Investigations were inconclusive. Plain radiographs revealed a translucent shadow in one patient with early MRI scans being negative. Patients underwent open arthrotomy and washout with intravenous antibiotics followed by physiotherapy and were discharged approximately 6-9 weeks post arthrotomy with near normal movements. A neonate presenting with a floppy arm of sudden onset raises many possible etiologies most common being neurological or late obstetric presentations. Misdiagnosis is common. In patients with persisting symptoms and signs precious time is lost by carrying out investigations. Due to the unique nature of blood supply in neonates proximal humeral infection can spread to the glenohumeral joint causing septic arthritis. This can present as a floppy arm with or without signs or symptoms of septic arthritis. Theories include an ischaemic neuropathy due to thrombophlebitis of vasa vasorum or possible direct compression from capsular

distension. Time lost in identifying the cause can lead to disastrous sequelae in untreated cases. We stress that in neonates with a floppy arm a diagnosis of osteomyelitis of the proximal humerus and septic arthritis of the glenohumeral joint should always be borne in mind proceeding to prompt arthrotomy and washout with intravenous antibiotics. We feel that time should not be wasted in confirming the diagnosis as investigations may not always reveal the true picture.

SIC09-09

SURGERY VERSUS SURGERY PLUS PAMIDRONATE IN THE MANAGEMENT OF O.I. PATIENTS - A COMPARATIVE STUDY

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The aim of this study was to evaluate the efficacy of the pamidronate in the management of O.I. patients. This study was carried out on two groups. The first was treated only surgically while the second was treated by a combined approach, medical and surgical. Forty patients, divided into two groups, were surgically treated in order to correct bony deformities secondary to O.I. Group I: Twenty patients were operated at an average age of 6.5 years. Nine were type I, 5 type III and 6 type VI. Group II: Twenty patients to whom intermittent intravenous pamidronate were given at regular intervals for an average of 2 years postoperatively. The average age at surgery was 8.5 years. Four patients were type I, 6 type III, 8 type IV, one type V and the remaining one type VII. The results were assessed according to a scoring system suggested and used by the authors since 1999. Group I: We had 3 good, 9 fair and 8 poor. Group II: We had 11 excellent, 4 good and 5 fair results. The BMD increased by an average of 35.2% (22.7-112%) and the refracture rate decreased statistically. Best results in management of O.I. patients can be obtained through the combined approach (surgical and medical treatment). We advise pre- and post operative pamidronate for these patients.

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FREE PAPERS

*Moderators: Ernesto Ippolito (Italy)
Chadwick Smith (USA)*

SIC09-10

TRIPLE OSTEOTOMY OF THE PELVIS IN ADOLESCENT WITH PERTHES DISEASE

Anatolij SAKALOUSKI, Alexandre BELETSKY, Oleg SAKALOUSKI, Andrej DEMENTSOV, Aleh SAKALOUSKI

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PURPOSE OF THE RESEARCH: Demonstration of opportunities of matrix modeling caput of a hip and restoration of stability of a joint after triple osteotomy of the pelvis a basin on A.M. Sakalouski was performed. **PATIENTS AND METHODS:** From 1998 to 2006, we performed 24 triple osteotomy of the pelvis in 24 patients at 4 to 16 (average age 10 years) with adverse course of Perthes disease. In 24 cases patients were male and in 12 cases patients were female. We observed patients clinically and with radiological methods, including computer tomography with 3D-reconstruction. There are such indications for performing operation as adverse radiological attributes of disease on II-III stages and incomplete dislocation of the femoral caput later. **RESULTS:** The triple osteotomy of the pelvis prevented deformation of the head of a hip at early stages as a result remodeling of femoral caput by spherical acetabulum. At late stages operation has provide to avoid hip arthrosis. In all cases stability of a joint is restored. Central-age angle has increased on the average with 150 up to 360, an index head-heck has increased from 136% up to 170%, an index acetabulum-femoral head from 72% up to 100%. In all cases clinically the lengthening of sick finiteness has been received with 0.5-1 cm and a gait of patients has improved. **CONCLUSION:** The triple osteotomy of the pelvis is an operation of a choise for operative treatment of Perthes disease at different stages.

SIC09-11

ARTHRODIATASIS FOR TREATMENT

Tarek ALY, Osama AMIN

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It is hypothesized that the interruption of the blood supply is the important factor causing femoral head osteonecrosis in the early stages of Legg-Calve-Perthes disease. Currently, treatment by containment is recommended to direct and guide remodeling of the softened femoral head as it evolves from fragmentation through ossification. **OBJECTIVES:** The aim of this study was to show the results of arthrodiatasis to induce angioneogenesis around the joint, and to achieve true ambulatory non-weight-bearing containment. **PATIENTS AND METHODS:** We studied twenty-three patients with a diagnosis of Perthes disease based on the concept of arthrodiatasis. Arthrodiatasis or articulated distraction of the hip combines off-loading of muscles and body forces with distraction of the joint space by means of external fixator, which crosses the hip joint. Sagittal plane hip movement is encouraged by the addition of a hinge. **RESULTS:** On clinical and radiological basis 21 cases were satisfactory (91%), and two cases were unsatisfactory

(9%). **CONCLUSION:** Arthrodiastasis of the hip joint is an effective method in the management of Perthes disease and restoration of the joint function can occur particularly in the younger patients even the radiological improvement is not always seen. **KEY WORDS:** Perthes disease, management, arthrodiastasis.

SIC09-12

ONE STAGE HIP RECONSTRUCTION FOR NEGLECTED DEVELOPMENTAL DYSPLASIA OF THE HIP (DDH)

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Menoufia University (EGYPT)

BACKGROUND: It is not uncommon to see an older child who has untreated DDH. This condition can result in osteoarthritis in early adulthood. Some authors have recommended a one-stage procedure consisting of open reduction, capsulorrhaphy, femoral shortening and pelvic osteotomy. **OBJECTIVE:** To assess the clinical and radiological outcomes of one stage reconstruction for neglected DDH in older children. **PATIENTS AND METHODS:** We studied 17 hips in 15 girls with neglected DDH treated by one-stage reconstructive procedure in the form of open reduction, capsulorrhaphy, femoral shortening with derotation and pelvic osteotomy (Salter or triple osteotomy if necessary). The average age at the time of surgery was 9 years and 8 months, and the average duration of follow-up was 38 months. The outcome was assessed clinically using the modified criteria of McKay, and radiologically using Severin's criteria. **RESULTS:** Clinically according to the criteria of McKay nine hips (52.3%) had an excellent result; six (35%), a good result; and two, a fair result. According to Severin's classification for the radiographic appearance, eight hips (47%) had an excellent result; four (23.5%), a good result; four (23.5%), a fair result; and one (6%), a poor result. Avascular necrosis of the femoral head was seen in one hip. **CONCLUSION:** A one-stage hip reconstruction for late neglected DDH provides an excellent approach to the problem with minimal complications. The procedure results in a functional hip, or at least improves the anatomical relationships, increasing the prospects of success should total replacement become indicated in the future.

SIC09-13

THE 'CHEVRON OSTEOTOMY' OF THE ULNA IN POST TRAUMATIC DISTAL RADIAL GROWTH ARREST

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The purpose of this retrospective study was to assess the factors which induce the post traumatic distal radial growth arrest and the efficacy of 'chevron osteotomy' of the ulna to restore a good function. 9 patients with a total growth arrest of radius are included in this study. Average age was 11 years at the time of the initial injury and 14.5 years at the time of reconstructive surgery. The original injury of the distal radial physis was classified as Salter Harris II in 7 cases, Salter Harris III in 1 case and in 1 case there is no lesion at the exam of the initial X-ray. Previous treatment of the first 8 cases included closed reduction and cast immobilization. 7 patients (Salter II) required repeated manipulation after lost reduction and 3 patients percutaneous pin fixation to maintain reduction. Patients were questioned about pain and activity level and examined for wrist motion before and after surgical intervention ('chevron osteotomy' of the ulna associated with ulnar epiphysiodesis). Wrist function was graded according to a modification of the Mayo Wrist Score. Complication included one case of displacement of osteotomy (treated by

synthesis with plate). There is no non union. After treatment, 5 patients were graded as excellent, 4 were graded as good. To prevent this rare complication a good initial treatment is necessary (no repeated manipulation, good immobilisation, no pinning). It is necessary to survey these children until the end of the growth to detect this complication.

SIC09-14

AN EVALUATION OF RESULTS OF PECTUS EXCAVATUM CORRECTION BY A MODIFIED NUSS TECHNIQUE

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Pectus excavatum is a congenital anomaly of the chest, caused by dysplastic changes in the cartilaginous elements of the rib cage. The defect is characterized by a deep depression of the sternum trunk and xiphoid process with the adjacent rib sections. Results of conservative treatment are unsatisfactory for patients as well as for medical staff. Operative treatment is undertaken due to cosmetic indications and functional limitations. MATERIAL AND METHODS: Between 2004 and 2006, 24 patients (3 girls and 21 boys) with pectus excavatum were treated with the use of a modified Nuss technique. Evaluation of the results of treatment was based on radiograms and CT scans. In all patients improvements in the Koper-Król index, depression index and Haller index were observed. RESULTS: In all patients a good cosmetic result and an improvement in radiological parameters were achieved. Correction of the chest deformity with the use of a modified Nuss technique with only two small skin incisions is a treatment of choice which results in a good correction of the deformity and shortens the time of hospitalization.

SIC09-15

TUBERCULOSIS - THE MASQUERADER OF BONE LESIONS IN CHILDREN

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INTRODUCTION AND AIMS: Tuberculous Osteomyelitis without synovial involvement is rare. The variable clinical and radiological features of solitary bone lesions in children can mimic a variety of bone conditions. The aim of this paper is to describe the protean radiological manifestations of the various osseous lesions of tuberculosis other than the spine and synovium. METHOD: Fifty-three children, (1-12 years), were treated for histologically confirmed tuberculosis of bone in 22 years. There were 66 osseous lesions. Seven children had more than one site involved. The metaphysis was the common site (n=30). The remaining lesions were in the small, round and flat bones. Four types of bone lesions were seen; (a) Cystic (n=36), (b) Infiltrative (n=15), (c) Focal Erosions (n=9), (d) Spina Ventosa (n=6). All patients had biopsy with curettage and antituberculosis therapy. Several bone lesions resembled simple and aneurysmal bone cysts, pyogenic and fungal infections, haematological conditions, benign cartilaginous tumors and osteochondroses. RESULTS: Follow-up ranged from 9 months to 14 years. All lesions showed clinical and radiological healing in 3-6 months. Growth disturbance was seen in 6 children and joint contracture in 8. Remodeling of cystic and spina ventosa lesions occurred in all. Solitary bone lesions in tuberculosis are more commonly reported in recent years. The lack of familiarity with the spectrum of bone lesions in tuberculosis may delay diagnosis. These lesions can imitate various common conditions. Biopsy is mandatory.

CONFERENCE

Moderators: *Patricia Fucs (Brazil)*
György Szőke (Hungary)

SICIS09-02

TREATMENT OF THE HAND AS SEQUELLAE OF ERB PALSY

Amar KORCHI², Christophe OBERLIN¹, Zoubir BELKEYAR¹, Mans RANTISI¹, At FIKRY²
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We report 31 cases of supinated hands as sequelae of Erb Palsy. They were from 2 to 30 years old, the average being 12 y.o. Their follow-up was 30 months. In 15 cases, supination was treated by a rerouting of tendons: biceps 9, out of which 3 were combined to the interosseous membrane release. In 6 cases the brachioradialis was concerned. As supination was irreducible, an osteotomy was performed in 14 cases: 2 isolated osteotomy of radius, 5 osteotomies of both bones of forearm, and 7 isolated osteotomy of ulna. Such osteotomies were combined to a tendon transfer at the hand, and 4 transfers of the biceps on the brachialis. At last, in 4 cases, a derotation osteotomy of the humerus was combined to such transfer either in the same stage or in two stages. In 1 case, a subscapularis muscle release was performed. All the patients expressed a functional as well as aesthetic improvement. Thus, it seems more useful to use a pronated hand. As the supination is reducible, a rerouting of tendon may be performed. Currently, we privilege the rerouting of brachioradialis combined to a transfer of biceps to the brachialis (namely as the biceps is contracted). In some cases, we performed multilevel osteotomies of the ulna unless fixing these osteotomies. Such surgery preserves part of the passive pronosupination. Then, a transfer of carpal ulnaris extensor on the radialis long extensor was sometimes combined to it. Such procedure allows a correction of the ulnar bending of the wrist.

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FREE PAPERS (1)

*Moderators: Pascal Jehanno (France)
Guy Grimard (Canada)*

SIC09-16

PERCUTANEOUS PINNING OF DISPLACED SUPRACONDYLAR FRACTURES OF THE HUMERUS IN CHILDREN: THE EFFECT OF PIN CONFIGURATION ON THE OUTCOME AND MAINTENANCE OF REDUCTION

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BACKGROUND: Fracture reduction and percutaneous fixation is the most commonly accepted treatment of displaced extension supracondylar fractures of the humerus in children. Although crossed pins provide good stability, some studies suggest that two properly placed lateral pins offer enough stability to prevent redisplacement. A medial pin places the ulnar nerve at risk.**OBJECTIVE:** We evaluated the outcome of children with these fractures treated by crossed pinning versus those treated by lateral pinning only.**PATIENTS AND METHODS:** We treated 58 children with these fractures with closed reduction and percutaneous pinning. The fracture was fixed with two lateral pins in half of the patients and with two crossed pins in the other half. Clinical evaluation at final follow-up was based on a modified Flynn classification. Postoperative AP radiographs were compared with those taken at the time of removal of the wires and at final follow-up to assess the maintenance of reduction. **RESULTS:** The average follow-up was 11.9 months. At final follow-up, the clinical result was excellent in 49 patients, good in seven and poor in two. No significant difference could be detected between the two forms of initial treatment, regarding the final clinical outcome and the maintenance of reduction ($p > 0.05$). Ulnar nerve was injured in two patients and both were in the cross pinning group ($p < 0.05$). **CONCLUSION:** The lateral percutaneous pinning technique of displaced supracondylar fractures of the humerus in children provides adequate fixation and maintain stability without the incipient risk of iatrogenic ulnar nerve injury.

SIC09-17

TRAMPOLINE OR THE SKATEBOARD – WHICH IS THE WORST EVIL? A COMPARATIVE ANALYSIS

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Glan Clwyd Hospital (UNITED KINGDOM)

BACKGROUND: Trampoline and skateboarding are popular recreational activities among children. There is evidence that these activities have increased the incidence of injuries in children. We performed a comparative analysis of injuries related to trampoline and skateboard. Our aim was to evaluate any difference in the pattern of injury and epidemiology of these two recreational activities. **MATERIALS & METHODS:** All trampoline and skateboard related injuries in a four-year period were included. Data on the age & sex incidence, pattern of injury, season, type of injury, treatment and final

outcome of trampoline and skateboard related injuries were collated from the hospital trauma database. RESULTS: 121 patients were identified in both groups. Trampoline injuries accounted for 62.8% patients. There was a male predominance in the skateboard group as opposed to female predominance in the trampoline group. Most patients in both groups were under 15 years and injuries occurred in the summer. Fractures, although common in both groups, seemed more prevalent in the skateboard group. The upper limb was affected more in both groups although the incidence in skateboard injuries was higher. The most affected region of the lower limb was tibia in the trampoline group and ankle in the skateboard group. The distal radius was most affected in both groups. CONCLUSION: Trampoline related injuries had a higher incidence while the seriousness of the injury was higher with the skateboard. Safety education of children involved in these activities is essential as forbidding them to take part or banning these activities is impossible.

SIC09-18

DIAGNOSTIC AND THERAPEUTIC ASPECTS IN CHILDREN WITH OCCULT SPONGIOUS FRACTURES OF LONG BONES

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INTRODUCTION: Occult spongy fractures of long bones lead to traumatic plastic bowing deformities in children and becomes less common with increasing age.(1) MATERIAL AND METHOD: We diagnosed and treated 6 patients with this fracture within 5 years. Radiologically we found no cortical fractures, MRI demonstrates the fracture line endosteal. Physical examination reveals pain, swelling, bowing deformity and painful rotation. Untreated limitation of rotation after healing persists. Remodelling and spontaneous correction is seen in children under 5 years. To define treatment in the 5-10 years old group, correction is done at a severe deformity of 20 or more degrees in general anaesthesia. The force is applied 3-5 minutes. A long arm cast for 6 weeks is applied. RESULTS: All fractures healed with full function compared with the uninjured limb. Only one girl had a limitation of rotation: 20° supination, 30° pronation. Motility of wrist and elbow were unrestricted. DISCUSSION: Occult spongy fractures are exceptional. Axial compression or slow bending lead to reversible elastic deformation, occult endosteal or bowing fractures. Barton(2) reported first about bone-bending in 1821. Demos(3) reviewed 74 patients in literature up to 1980 and found 78% forearm-fracture, 14% of lower leg. Borden(4) suggested a force of 100-150% of body weight of children for reduction. Sometimes it is combined with 'green-wood'-type fracture and overlooked as attention is focused on the fracture of the other bone. CONCLUSION: The restoration of range of motion and good cosmetic are cornerstones in treatment of occult endosteal fractures, and heal uneventfully with appropriate treatment.

SIC09-19

PERCUTANEOUS VERSUS OPEN EPIPHYSIODESIS

Adnan AL-ZHRANI, Yesear BEHAIRY

Riyadh Military Hospital (SAUDI ARABIA)

OBJECTIVES: Epiphysiodesis is used for the treatment of leg-length discrepancy in skeletally immature patients. Pnemister described an open technique that requires surgical dissection with potential morbidity. Recently, minimally invasive approaches that utilize intraoperative fluoroscopy have been introduced. The aim of this study is to compare our experience using the open and the minimally invasive percutaneous

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techniques. **METHODS:** A prospective follow-up of 103 consecutive patients undergoing epiphysiodesis for correction of post traumatic leg-length discrepancy using either the open or the percutaneous technique at the Armed Forces Hospital, Riyadh, Kingdom of Saudi Arabia between January 1993 and December 2005. **RESULTS:** Out of the 103 patients, 50 were carried out using the open technique and 53 were utilized by this percutaneous technique. There was no statistically significant difference between the 2 groups in terms of demographic data, operative time, perioperative complications or time required to achieve the growth arrest. However, there was a significant difference in the hospital stay and postoperative need for physiotherapy. The percutaneous group had a shorter hospitalization (average 2.5 days) compared to the open technique group (average 4 days). **CONCLUSIONS:** Our experience is similar to what is reported in the literature and confirms that the percutaneous technique has an advantage over the open technique with shorter hospitalization and less duration of physiotherapy.

FREE PAPERS (2)

*Moderators: Federico Fernandez-Palazzi (Venezuela)
Alaric Aroojis (India)*

SIC09-20

DOES THE PERCUTANEOUS ACHILLES TENOTOMY IN CLUBFOOT TREATMENT OBJECTIVELY MODIFY THE EQUINUS IMMEDIATELY AFTER THE PROCEDURE?

Guy GRIMARD, Benoit MORIN, Marie-Andrée CANTIN, Morris DUHAIME
Hôpital Sainte-Justine (CANADA)

PURPOSE: The purpose of this study was to determine the immediate effect of Achilles tenotomy on the tibio-calcaneal (TC) tibio-foot (TF) angles. **METHODS:** This prospective study was carried out at the clubfoot clinic between July 2005 and August 2006. After a minimum of four weeks of manipulation and serial casting, patients with a residual equinus or a lack of ankle dorsal flexion that was filled to restrain the improvement of correction received a percutaneous Achilles tenotomy under local anesthesia. Before and immediately after the tenotomy, a lateral X-ray of the foot with maximal dorsal flexion of the ankle was obtained using a mini C-arm fluoroscope. Afterwards, the foot was placed in a long leg cast for 2-4 weeks. All the X-ray images were stored on the PACS and measured by two observers. Two measures were assessed, the tibio-calcaneal and the tibio-foot angles, respectively. A paired-t test was used to compare the measures pre- and post-tenotomy. **RESULTS:** There were 17 males and 6 females. The right foot was involved in 17 cases. The mean age at the tenotomy was 50.7 days (± 16.6 days). The mean pre- and post-tenotomy TC angle was 83 degrees (± 10 degrees) and 66 degrees (± 9 degrees), respectively ($p < 0.001$). The mean pre-tenotomy and post-tenotomy TF angle was 77 degrees (± 10 degrees) and 60 degrees (± 6 degrees), respectively ($p < 0.001$). **CONCLUSIONS:** Percutaneous Achilles tenotomy performed in the initial stage of the treatment of clubfeet immediately improves the residual equinus in idiopathic clubfeet.

SIC09-21

ULTRASOUND EVALUATION OF CLUBFOOT CORRECTION DURING PONSSETI TREATMENT

Alaric AROOJIS
Bai Jerbai Wadia Hospital for Children & Holy Family Hospital (INDIA)

PURPOSE: We report our experience using sonography as a tool to evaluate correction of clubfeet during the Ponseti method of manipulation, and to detect the incidence of

spurious correction. PATIENTS & METHODS: 26 patients (12 days - 3 months) with 32 affected feet were included (6 bilateral). All feet underwent three serial ultrasound evaluations with the forefoot at rest (static measurement) and using the simulated Ponseti maneuver. The following measurements were made: Distance between tip of medial malleolus and medial end of navicular in mm (MMN) and Talo-cuneiform angle in degrees (TC). RESULTS: In 20 normal feet (controls), the mean medial malleolus to navicular measurement was 6.45 - 9.88 mm and the mean talo-cuneiform angle was -4.3 to -3.7 degrees. In 32 clubfeet, the mean medial malleolus to navicular distance was 4.5 - 6.44 mm pre-treatment and 6.9 - 9.1mm post-treatment. The mean talo-cuneiform angle was 26.5 to 21.7 degrees pre-treatment and -4.5 to -4.0 degrees at the end of treatment. Five feet (15.6%) underwent a spurious correction, with normalization of talo-cuneiform angles but minimum change in medial malleolus to navicular distance, indicating that the break had occurred in the naviculocuneiform joint. DISCUSSION: This is the first such study from India showing the use of Ultrasound in monitoring clubfoot correction. Normative data have been established and accurate realignment can be demonstrated during Ponseti correction. Sonographic evaluation is a relatively simple, non-invasive and a promising technique for assessing and monitoring of clubfeet during treatment.

SIC09-22

SERIAL CASTING AND POSTERIOR RELEASE FOR A 7-YEAR-OLD CHILD WITH NEGLECTED CLUBFEET

Syed Ahmad Faisal SYED KAMARUDDIN, Abdul Halim ABDUL RASHID, Sharaf IBRAHIM

Hospital Universiti Kebangsaan Malaysia (MALAYSIA)

The Ponseti method of treating clubfeet in infants has been well accepted. Treatment of clubfeet in the older child will usually require extensive surgery or the use of an external fixator for gradual distraction. We report a case of a 7-year-old Indonesian boy who presented with severe bilateral clubfeet. The boy did not have any previous treatment and was walking on the dorsolateral aspect of his feet. Weekly gradual manipulation and serial casting was performed. After the 6th casting, only equinus of the feet remained. The equinus was treated by lengthening of the Achilles tendon and posterior releases of the ankle and subtalar joints. The feet were casted for another 2 months in the plantigrade position postoperatively. Both feet remained plantigrade after removal of the cast. We were unable to find any published reports on the use of gradual manipulation by serial casting in the older child. Based on our experience, we believe that gradual manipulation by serial casting followed by posterior release is feasible in the older child and should be attempted.

SIC09-23

THE POSTERIOR AND ANTERIOR ROTATIONAL INTERTROCHANTERIC OSTEOTOMY OF THE FEMUR IN CHILDREN

Oleg SAKALOUSKI, Oksana KOVALCHUK, Ihar SHPILEUSKI, Jurij LIKHACHEVSKIJ
Belarusian Research Institute of Traumatology and Orthopaedic Surgery, (BELARUS)

The RIOF can effectively correct several hip pathology problems: reorient the damaged segment of femur head, improve femoral head centralization and articular congruence, correct angular neck deformities and normalize the position of trochanter major, improve leg-length discrepancy. We studied the results of treatment in 112 children (114 hips) from 2 to 23 years (the mean 6.9 years) after operation. The patients' age on the moment of operation was from 3 to 18 years. We performed 103 posterior and 11 anterior

rotational osteotomy with turn 45-90°. There were 69 cases of residual dysplasia, 19 cases Perthes' disease, 13 cases hip subluxation and proximal physis deformities after septic coxitis, 6 cases slipped capital femoral epiphysis, 4 cases posttraumatic avascular necrosis and 3 cases of another pathology in our group. The good and excellent results were registered more than in 80% of all cases, satisfactory results in 16% of all cases. The merits of the RIOF are reorientation of the femoral head in three dimensions, absence of negative influence on the growth plate of the femoral head, absence of angle deformities of the femur, lengthening of the femoral neck and the limb. Thus, unlike traditional osteotomies, the rotational osteotomy allows changing the femoral head position in three dimensions. It is very helpful in many severe cases which may seem hopeless at first sight.

IFPOS PLENARY LECTURE

Moderator: S.H. Lee (Korea)

SICPS-03

SLIPPED CAPITAL FEMORAL EPIPHYSIS (S.C.F.E.)

Henri BENSANEL

IFPOS

Slipping of the upper femoral epiphysis is the most common cause of hip disability in adolescence and pre-adolescence. Many factors contribute to a relative weakness of the growth plate that culminate and in a shearing displacement through the zone of hypertrophic cartilage. SCE is not frequent, but its prevalence varies according to the areas in the world. The slippage can be uni or bilateral, but there are divergences about the frequency of such bilaterality. Although SCFE is a disease of teenagers, it can occur from 10 years of age. It is a little more frequent in boys whereas the girls are almost immune after the menarche. Heavy weight is a predisposing factor, but cases can also be observed in boys with normal morphology. The disorder appears to be an autosomal dominant with variable penetrance. Aetiology yet is not known, but the occurrence around the period of puberty evokes an endocrine factor in its mechanism although the various studies could not prove this up to now. More recently, some studies mentioned the role of a retroversion of the upper femur in the pathophysiology of the slippage. However, here also, this has not been confirmed widely. The result of the weakness of the growth plate is a separation of the epiphysis which opens the way to a double and simultaneous displacement: although the femoral epiphysis remains connected to the acetabulum, it is displaced downwards and posteriorly. As for the femoral neck, it rotates laterally and upwards. The periosteum remains attached to the posteriomedial margin of the femoral head, bringing with it the posterior vessels. This notion is fundamental to be thought about the treatment. CLASSIFICATION: The stages in slipping of the epiphysis are conventionally described as: -Acute (approximately 20% of cases), being considered transphyseal fracture; -Chronic (approximately 40% of cases); -Acute-on-chronic (approximate 40% of cases). It is not clear why some epiphysis slip minimally and then stabilise, and why others displace either catastrophically, or slowly and progressively. More recently, another classification has been introduced described as: -Stable; -Unstable; -Unstable on Stable. SYMPTOMS: Stable: The first sign which sights the attention is a moderate limping, the whole lower limb appearing to be in lateral rotation. In some other cases, the adolescent complains of aching in the groin, the thigh or the knee. These symptoms are often present for weeks or months before the first medical visit. By the stage of physical examination of the hip, a limitation of the movements can be noted: abduction is limited as well as medial rotation; even the flexion will be disturbed as from around 60° the flexion is combined to a moderate abduction to be complete. Acute slip,

whether this occurs primarily or, more commonly, as a complication of a stable (or chronic) slip, a sudden severe pain makes weight bearing impossible. 50% of the children who present will recollect an injury, although this usually is trivial, the acute slip occurring just before the injury which it favours. In adolescents and pre-adolescents, SCFE is the first diagnosis to think about, at least in developed countries. X-rays: As soon as this hypothesis is evoked, plain radiographs must be performed as an emergency investigation. They are AP view and, much more, a Frog view. Three degrees of slip which individualize 4 grades of slip: -Grade 0 = Pre-Slipping; -Grade I, 0 to 30° = Mild Slip; -Grade II from 30 to 60° = Moderate Slip; -Grade III over 60° of displacement = Severe Slip. These 3 last grades correspond to the thirds of the femoral head. The Grade 0 has been added as some children are complaining but X-rays do not express the slip. It is the stage of the joint effusion, the epiphyseal plate being osteoporotic and slightly wider than the contralateral side. As the slip is moderate and stable, some radiographic signs have been described: -Klein's line: a line drawn along the upper border of the neck will, in the normal hip, cut off a segment of the superior epiphysis. When a minor slip has occurred, the line will skirt the lateral margin of the epiphysis. -Bone density of the affected side is reduced. But the lateral view is essential for the diagnosis and to assess the degree of the slip: a line is drawn at 90° between the anterior and posterior borders of the epiphysis; another line is drawn in the long axis of the femoral neck. The transection of both lines will evaluate the degree of slip. As the stable slip is misdiagnosed but remains stable, some adaptive changes develop quickly. New bone is laid down under the posterior cortex of the neck where the periosteum is stripped up. We can also observe that the anterior edge of the femoral neck will progressively be prominent and round: it produces a bump which the direct flexion of the hip. Ultrasonography will be used at the onset and it confirms the joint synovitis. Bone Scan is also valuable in the stable cases. It shows an increased uptake as the metaphyseal blood supply is higher. This investigation is also of value to detect early an AVN. COMPLICATIONS: The major complications occur commonly after surgery. They are: -Avascular Necrosis: it is made of stiffness and muscle spasm with a relative increase in femoral head density some months after treatment. -Chondrolysis: the clinical signs are the same, but X-rays show progressively a narrowing of the joint space. -Early Arthritis. TREATMENT: The treatment of SCFE is always surgical. It depends upon whether the slippage is stable or not. Stable Slip: There is currently an agreement that, up to 50-60° the alone procedure which has to be performed is in Situ Pinning. Another agreement is about the fact that only 1 cannulated screw has to be used to fix the slip. The more posterior is the femoral head slip, the more anterior will be the place where the screw will be introduced in the upper femur. This unique screw will be directed, using the image intensifier, towards the center of the femoral head. It must be stopped at least 3mm before the margins of the epiphysis, before the subchondral zone of bone. Nowadays, the agreement is also obtained for using a percutaneous approach to this pinning. In the cases of the displacement, it is important that, in the course after having performed the fixation of the femoral head, some complementary procedures can be performed in a second stage: -resection of the anterior prominent wedge of the femoral neck; -femur lateral derotation osteotomy. As the slip is severe, the reduction of the deformity can be discussed according to the Dunn procedure. It is fascinating, but one has to remember the very high risk of AVN with this technique. Recently, some severe slips have been progressively reduced with the mean of an external fixator. It is said to be an Arthrodiastasis. In the acute, severe cases, are we allowed to perform a conservative reduction? Gentle medial rotation of the leg may improve the position with the leg extended. But, manipulations of the flexed hip, under general anaesthesia, should be forbidden. Then, in situ pinning will be made. Contralateral Hip: As SCFE is unilateral, the attitude with regards the contralateral hip has to be evoked. In my experience, sex and bone age will orient the decision about an eventual preventive in situ pinning. It will be proposed: -if the girl is less than 12 years; -if the boy is less than 13 years.

Session 09: IFPOS/SICOT – Paediatrics (IV)

FREE PAPERS

*Moderators: Gamal Hosny (Egypt)
Piero V. Frediani (Italy)*

SIC09-24

THE INFLUENCE OF HYDROSTATIC PRESSURE AS REAL SPECIFIC STIMULUS OF SUPPORTING TISSUES IN THE LENGTHENING PROCEDURE OF EXTREMITIES

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KEY WORDS: The authors observed that there are many biological laws in human body which unfortunately have not been discovered yet. Also, many of them can not be neglected, they are evident, more or less known and some of them are criticized or separately reaffirmed. **MATERIAL AND METHOD:** In this study, 1567 patients were observed in a period of 30 years. They were treated with *method strain of tension* by Anderson R, Wagner H, Srakar F, Muller M, and finally by Iliyazov G. The distance of lengthening was obtained from 5 to 34cm. **RESULTS:** The response of supporting tissues varied according to ethyology and age, with appearance either transversal contraction neither transversal dilatation on the cross section of the place lengthening. On the other hand, we have had more hydrostatic points of pressure observed, such as an epiphysis cartilage-one formed, a multiple islands of bone to exist always in III-th phases of lengthening procedure. **CONCLUSION:** The whole attention was focused on the influence and consequences because of the strain of tension and pressure in lengthening procedures.

SIC09-25

MORPHOLOGICAL CHANGES IN DORSAL ROOT GANGLIA AND SPINAL CORD AFTER LIMB-LENGTHENING

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PURPOSE: Nerve injury is one of the most serious complications of the limb lengthening. As a result, pain, sensory loss and motor weakness are frequent symptoms. Precise etiology of nerve injury in elongation is still unknown. **METHODS:** In group A (5 rabbits) after callottasis once 1 mm/day was applied for 20 days, up to 120% length. In group B (5 rabbits) after callottasis lengthening was three times 1 mm/day for 10 days, up to 130% length. Group C was operated but not lengthened. Using immunohistochemistry and confocal image analysis, the portion of the Substance P (SP) immunoreactive neurons was determined in dorsal root ganglia (DRG) and the changes in SP immunoreactivity were detected in the spinal cord. **Statistics:** logistical regression analysis. **RESULTS:** In group A and B, huge vacuoles appeared in large ganglion cells in the operated side. The morphological appearance of the vacuoles was very similar to those existing after nerve transection in rats. However, the number of the SP immunoreactive cells in the DRGs decreased (by 10%), while the total number of DRG neurons was not changed. SP, CGRP and IB4 immunoreactivity also decreased in the operated side of the spinal cord.

CONCLUSION: Our results suggest that vacuolisation and changes in peptide expression in DRGs and in the spinal cord could result in different pain symptoms in patients during limb lengthening.

SIC09-26

INFECTED NONUNION IN CHILDREN

Gamal HOSNY

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This study evaluates our experience in treating children with infected nonunion using Ilizarov principles. **MATERIAL & METHODS:** From 1993 till 2002, 23 cases with infected nonunion of the tibia or femur were referred to our center. The age of patients at operation ranged from 1y5m to 15y with an average of 11y2m. There were 6 femoral & 17 tibial cases. 16 cases were males. The right side was affected in 14 cases. The number of previous operations ranged from 1 to 5. Preoperative shortening was evident in 20 patients [range 1-12 cm]. Ankle or knee stiffness or both were present in 12 cases. Ilizarov external fixator was applied in all cases with 1.5 transfixing k wires. The bloodless technique was used in 5 cases, debridement, corticotomy & bone transport in 16 cases and corticotomy & compression distraction in 2 cases. Rotational flap was performed in 2 cases. Evaluation parameters were: union, functional activities, ROM, axis deviation, limb length discrepancy & satisfaction of the patient. **RESULTS:** There were 6 excellent, 10 good, 5 fair & 2 poor results after an average follow-up 33.6m [range 12-80m]. Time in the fixator ranged from 2.5-12m. **CONCLUSION:** To the best of our knowledge, this is the first report of using a single method in treating infected nonunion of the tibia or femur in children. Ilizarov method seems to be the treatment of choice of this complicated problem. It can also treat associated deformities & leg length discrepancy.

SIC09-27

THE TREATMENT OF BONE DEFECTS OF THE TIBIA IN CHILDREN FOLLOWING CHRONIC PYOGENIC OSTEOMYELITIS

Mahomed RASOOL

University of Kwazulu-Natal (SOUTH AFRICA)

INTRODUCTION AND AIMS: The treatment of pyogenic osteomyelitis with pathological fractures, sinuses and sequestra with subsequent bone defects is challenging. The aim of this paper is to discuss the outcomes of the methods used to treat such defects. **METHODS:** In 17 years, 31 children, aged 3-12 years, were treated for bone defects of the tibia following primary haematogenous osteomyelitis. All children had sequestrectomy and repeated debridement. Four required muscle flaps and 3 required Split Skin grafts. Defects measured 2-20cm. Four methods were used. Autogenous grafts were used in defects less than 2cm in 5 children; the Papineau technique in cavitating defects (n=2); bicortical segmented iliac crest grafts threaded and fixed over a Kirschner wire (n=15) and fibular transfer to the tibia (n=9). The children were protected with casts and orthoses till healing. **RESULTS:** All grafts healed in 3-6 months. Follow-up ranged from 1 year to 17 years. Five children required repeated cancellous grafting. Distal Tibiofibular procedures were done in 6 children. Graft hypertrophy was seen in all. **CONCLUSION:** Onlay grafting is successful in small defects. Larger defects with some continuity of the periosteal tube can be treated with bicortical segmented grafts over a K wire which provides stability and increased surface area for incorporation. Larger defects with scarring can be treated by fibular transfer as an alternative to ablation or more demanding procedures such as microvascular techniques and limb lengthening.

Friday, 31 August 2007
Fes 2 Room

CONFERENCES

*Moderators: Pasquale Farsetti (Italy)
Adnan Al Zahrani (Saudi Arabia)*

SICIS09-03

STIMULATION METHODS TO ACCELERATE FORMATION OF DISTRACTION REGENERATE

Vladimir SHEVTSOV

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(RUSSIAN FEDERATION)*

INTRODUCTION: Limb length discrepancy and short stature are severe physical disorders of locomotor system. Congenital shortening affects the development of the entire skeleton and results in secondary changes in it. The aim of study is lengthening techniques development and osteogenesis stimulation methods to reduce treatment period. **MATERIAL, METHODS.** We have conducted experimental studies in 480 dogs. Our clinical studies include more than 7,000 limb lengthening cases, and 736 cases of height increase for achondroplasia or cosmetic lengthening. **RESULTS:** The lengthening procedure consists of three stages. First stage is bone breakage. Second stage is distraction. When starting we should choose the lengthening rate and also the daily frequency of distraction. Then distraction osteosynthesis technique is chosen, either monofocal or polyfocal. Choice of external fixator construct is required too: monolateral or circular, and the latter is preferable. Third stage is the fixation mode. Switching to mode, regenerate condition should be checked and stimulated to accelerate its maturation. Mechanical, biomechanical, biological methods are used for stimulation. **DISCUSSION:** The proper bone integrity break choice, rate and daily frequency of distraction make it possible to distract 1cm for 18-20 days. If the distraction callus formation retards or delays, ways to activate osteogenesis and maturation of the regenerated area are used. **CONCLUSION:** The methods of distraction regenerate stimulation, developed at our Centre enable us to reduce the osteosynthesis index up to 15 days per 1cm lengthening, and the fixation index up to 5-8 days per cm.

SICIS09-04

SURGICAL TREATMENT OF HABITUAL PATELLAR DISLOCATION IN IMMATURE PATIENTS

Morris DUHAIME, Benoit BENOIT, Yves LAFLAMME, Dominique ROULEAU, Benoit MORIN
Canada

Patella alta is one of the major causes known to predispose children to habitual patellar dislocation. However, the surgical treatment of such a condition, before skeletal maturity, is rarely if ever mentioned in the literature. Twelve knees in eight patients were treated by a single surgeon with a surgical procedure designated to correct patella alta, the major predisposing factor causing habitual patellar dislocation. The technique involves lowering of the patella by total tendon transfer, lateral release and vastus medialis obliquus advancement. All patients were complaining of habitual dislocation. Patellar height was assessed radiographically by the Koshino-Sugimoto and Caton-Deschamps index. The average age at surgery was 10.9 years and mean follow-up was 14 years. One patient required an early surgical revision because of redislocation. Unfortunately, he was then overcorrected (patella baja) but his knee was stable and asymptomatic. The average preoperative ratios for patella alta were corrected postoperatively in everybody but the previous patient. At the latest follow-up, all operated knees were functionally stable and all but one were pain free (mean Lysholm knee score 98/100). Two patients developed a

patella baja as a late complication without any actual consequence. The mean sulcus angle improved from 160° to 147° . This technique offers a valid alternative to the immature patient presenting with habitual patellar dislocation associated with patella alta. Moreover, it seems to remodel the shallow trochlea and thus giving intrinsic patellofemoral stability at adult age. Tying back the patellar tendon to the tibial epiphysis might avoid the complication of patella baja.

Friday, 31 August 2007
Fes 2 Room

Session 10: Bone tumours (I)

Moderators: Rainer Kotz (Austria)
Mohammed El Manouar (Morocco)

FREE PAPERS

SIC10-01

ISOLATION AND FUNCTIONAL ANALYSIS OF A NOVEL PROTEIN IDENTIFIED AS THE PROGNOSTIC FACTOR IN SPINDLE CELL SARCOMAS

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¹Department of Orthopaedic Surgery, Kyoto University, KYOTO (JAPAN), ²Department of Surgery, Graduate School of Medicine, Kyoto University, KYOTO (JAPAN), ³Institute Frontier Medical Science, Kyoto University, KYOTO (JAPAN), ⁴Institute Medical Science, Tokyo University, Tokyo (JAPAN)

BACKGROUND: Spindle cell sarcomas are difficult diseases to treat. We analyzed the gene expression profiles of a panel of spindle cell sarcomas in order to isolate genes for the molecular targeting therapy. **METHODS AND OUTCOME:** We analyzed the gene expression profiles of 65 spindle cell sarcomas, using a genome-wide cDNA microarray containing 23,040 genes, and selected genes whose expression level correlated with the patients' prognosis. The expression level of the gene encoded as C7059 significantly correlated with the prognosis in the multi-variant analysis including clinical and pathological factors. This correlation was confirmed by quantitative RT-PCR. The specific polyclonal antibody for C7059 protein detected a cytoplasmic protein with a molecular weight of 110kDa by western blotting and immunocytochemistry. Down-regulation of the C7059 in C7059 expressing sarcoma cell lines by RNA interference showed no effects for the proliferation but significantly inhibited the cell invasion. On the other hand, introduction of C7059 into C7059-negative sarcoma cell lines showed that the cell invasion increased. The immortalized human mesenchymal stem cell clones stably expressing exogenous C7059 protein obtained by the Lenti virus vector showed high invasiveness and anchorage independent proliferation ability. The immunocytochemical and co-immunoprecipitation analyses indicated that C7059 protein binds to Src. **CONCLUSION:** Cell invasiveness is a key factor for the property of metastasis, and therefore the C7059 protein is a promising candidate as the target for molecular therapy improving the prognosis of spindle cell sarcomas.

SIC10-02

SSX-NEW MOLECULAR TARGET FOR BONE AND SOFT TISSUE TUMORS

Kazuyuki ITOH, Kiyoko YOSHIOKA

Osaka Medical Center for Cancer and Cardiovascular Diseases (JAPAN)

The SSX genes were initially identified as fusion partners to the SYT 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 several malignancies thereby categorized as cancer/testis antigens. Using Nucleic Acid Sequence-Based Amplification, we have reported that the expression level of SSX was

higher in the malignant bone and soft tissue tumors of advanced stage. To examine the biological function of SSX, we made stable transfectants with wild-type SSX using human osteosarcoma cell line, Saos-2, which moderately expressed SSX. The SSX transfectants promoted colony formation in soft agar and tumor formation in nude mice, but showed little change in growth rate in 2D culture. The transfectants also increased motility, chemotaxis, and invasiveness using scratch wound assay and Boyden chamber assay. Enhanced Rho activity and stress fibers were observed in these SSX overexpressed Saos-2 cells. By contrast, the lowering of the endogenous expression of SSX in human fibrosarcoma HT1080 cells by the treatment with specific siRNA markedly decreased membrane ruffling, chemotaxis and invasiveness, but did not affect cell proliferation in 2D culture. We also prepared wrapped liposome containing siRNA and introduced into nude mice bearing HT1080 cells, and observed striking *in vivo* inhibitory effects of siRNA against SSX in tumor progression. Collectively, these data suggested that SSX protein regulated Rho-family small GTPases leading to bone and soft tissue tumor invasion and progression, and thus could be a new molecular target under clinical setting.

SIC10-03

MANAGEMENT OF SOFT TISSUE SARCOMAS AFTER PRIMARY INTRALESIONAL RESECTION - EXPERIENCES WITH 310 CASES OF THE VIENNA TUMOUR REGISTRY

Philipp T. FUNOVICS, Martin DOMINKUS, Farshid ABDOLVAHAB, Rainer KOTZ
Department of Orthopaedics, Vienna Medical University (AUSTRIA)

This study investigates the results of secondary therapy after insufficient surgical treatment of unexpected soft tissue malignancies. 752 cases of soft tissue malignancies have been monitored throughout the Vienna Tumour Registry since 1969. 442 patients presented without treatment, 310 have been transferred after resection at another institution. Biopsy was performed before surgery in only 54 cases (17.4%). 154 histological reports revealed intralesional resection, 47 cases were interpreted as local recurrence. In 109 cases histology was unavailable or did not allow evaluation of resection margins. Out of 310 patients, 20 have been treated conservatively, in 290 surgery was indicated: 59 patients underwent amputation, 221 cases have been treated by re-resection, in 4 cases resection-replantation was performed, 6 required reconstruction by use of a tumour endoprostheses. 145 patients (46.8%) died after an average of 42.7 months. 442 patients without primary surgery have been treated by conservative modalities in 51, amputation in 62, re-resection in 296, resection-replantation in 8 and endoprosthetic reconstruction in 25. 247 of these patients (55.9%) died after an average of 38.7 months. In 84.8% of the 310 cases treated at another institution primary resection was regarded as insufficient, leading to a high rate of consecutive interventions. Results confirm that rapid secondary resection did not necessarily mean a draw-back of oncological prognosis. However, to reduce the number of surgical interventions and the time until adequate surgical treatment to prevent metastatic disease, the importance of diagnostic biopsy of suspect soft tissue tumours has to be emphasised.

SIC10-04

THE CURRENT APPROACH TO BONE CYSTS TREATMENT IN CHILDREN

Anton FRANTOV, Andrey SNETKOV, Igor ALESHCHENKO, Alexandr MOROZOV,
Alexandr YELTSIN
CITO (RUSSIAN FEDERATION)

In the department for bone pathology, 1010 patients aged 3-18 were treated: with solitar

bone cysts (SBC) - 615 cases (61%); aneurismal bone cysts (ABC) - 376 cases (37%), solid variant of aneurismal bone cyst (SVABC) - 19 cases (2%). SBC were mainly localized in proximal metaphysis of humeral and femoral bones, ABC - in vertebrae, pelvic bones and metaphysis of knee joint forming bones (femoral and tibia). The predominant localization of SVABC is metaepiphysis of femoral and tibia bones. Diagnostics for bone cysts included the following methods - clinical examination, X-Ray, CT, cyst pressure measurement, morphological research, and MRT and angiography if indicated. In all cases at first the cyst pressure measurement was done. If activity in cysts (the cyst pressure) was high, the therapeutic punctures to reduce the inside pressure were performed as preoperative preparation. Then, if the cyst was localized directly near the growth zone (13), an endoscopic cyst resection was done using Tutoplast® allografts «cancellous chips and granules». In other cases (20) a radical operative treatment - a marginal excision with curettage - was performed with the consequent bony plasty applying Tutoplast® allografts. In cases with pathological fractures we did resection followed by plasty with Tutoplast® allografts and metal osteosynthesis simultaneously. The treatment results were evaluated both from clinical (orthopedic) and oncological sides. Recurrence of SBC happened in 26 patients (4.2%), ABC - in 23 cases (6%), SVABC - 7 cases (36.8%). In all cases without recurrences the clinical and orthopedic results were good.

SIC10-05

AUTOLOGOUS VERSUS HETEROLOGOUS OSSEOUS GRAFTS IN THE TREATMENT OF BENIGN BONE TUMORS

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University Emergency Hospital, Bucharest (ROMANIA)

AIM: To compare the postoperative midterm results of autologous and heterologous morsellized and structural osseous grafts in the treatment of benign bone tumors. MATERIAL AND METHOD: Between 2001 and 2005, 42 benign tumors were surgically treated, through curettage and bone grafting. Morsellized grafts were used in 31 cases, while structural grafts were used in 11 cases: autologous grafts in 22 cases and heterologous in 20. The benign tumors were: giant cell tumors - 15 cases, osteoid osteoma - 12 cases and bone cyst - 15 cases. The mean age was 25 years (extremes: 16-44) and sex ratio was 24 women / 18 men. The average follow-up was 2.5 years (limits: 1 year and 4 years and 10 months). All cases were clinical and radiological assessed at 6 weeks, 3 months and 4 months. RESULTS: At 4 months, the morsellized autologous grafts showed osteointegration in 88% of cases and osteolysis and graft resorption in 8% cases (in 4% of cases initial filling of the cavity was deficient). After the same interval, structural autologous bone grafts showed union and osteointegration in 82% of cases. Heterologous morsellized bone grafts showed osteointegration in 70% of cases and in 25% of cases osteolysis and graft resorption was recorded (in 5% of cases initial filling of bone defect was not sufficient). Structural heterologous grafts were osteointegrated in 71% of cases at 4 months. CONCLUSIONS: Autologous grafts showed a better osteointegration, a faster union, a lesser incidence of grafts resorption and a lesser number of reinterventions.

SIC10-06

HINDQUARTER AMPUTATION - AN AMPUTATION TOO FAR

Coonoor R CHANDRASEKAR, Robert J GRIMER
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AIM: To review the largest series of hindquarter amputation and analyse the long term

results including complications and survival. METHODS: We reviewed 131 hindquarter amputations performed from 1971 to 2006, classifying them as palliative or curative. RESULTS: 23 palliative and 108 curative procedures were performed. There were four peri-operative deaths [3%]. Forty-two patients died within a year of surgery, twenty-three of whom had had a palliative operation. 15 patients [11%] had local recurrence. 27 patients [21%] had wound problems [infection or necrosis]. The use of quadriceps and gluteal flap when appropriate reduced the incidence of wound complications. The survival after hindquarter amputation was 70% at 1 year, 38% at 3 years and 25% at 5 years. The median survival time was 26 months, 25 patients survived more than 10 years. Overall survival was better with chondrosarcoma -52% of the patients surviving more than 10 years had chondrosarcoma. The mean TESS score of the surviving patients was 61.7. We believe that despite the advances in the diagnostic and surgical techniques in limb preservation hindquarter amputation still has a place in the management of malignant tumours of pelvis and proximal femur. As a palliative procedure it provides pain relief and provides some mobility for the patients who can thus maintain some independence and dignity for the remainder of their lives. As a curative procedure especially for chondrosarcoma hindquarter amputation can provide long-term disease-free survival.

SIC10-07

GCT IN THE IMMATURE SKELETON

Ajay PURI

Tata Memorial Hospital (INDIA)

GOALS: Very few series documenting GCT in the immature skeleton. Purpose of this study was to document the incidence of GCT in skeletally immature individuals in the Indian population and study the course of the disease. MATERIALS AND METHODS: Between January 2000 and December 2005, 285 patients diagnosed with histologically proven GCT were treated surgically at our institution. Seventeen patients (6%) were skeletally immature. GCT comprised 22% (17 of 78) of benign bone tumors in patients below the age of 18. Lesions were treated with intralesional curettage except those in the so-called expendable bones which were excised. One lesion in the proximal humerus necessitated excision and reconstruction with a prosthesis. RESULTS: Fourteen (82%) patients were females and 3 (18%) were males. Of 15 GCT in tubular bones, 13 were epiphysiomataphyseal in location. Fifteen patients were available for follow-up. In 12 of these, follow-up exceeded 24 months with a range from 24 to 58 months and mean of 33.5 months. Three of 15 patients (20%) developed local recurrence. All local recurrences were managed with repeat curettage. CONCLUSION: There is a marked female preponderance in skeletally immature patients with GCT. An open physis does not seem to pose a barrier to GCT and prevent it from penetrating the epiphyseal cartilage. Biological behaviour of the disease is similar to that seen in adults. Principles of treatment, recurrence patterns and course of the disease are similar to that in adult patients.

SIC10-08

SURGICAL TREATMENT OF METASTASES TO THE PROXIMAL HUMERUS

Adrian BARBILIAN, Marinela DRIGNEI, Mircea MARCULESCU, Trandafir LUCIANA FLORENTINA

Central Military Hospital Bucharest (ROMANIA)

Pathologic fracture is the potential main problem of the metastases in proximal humerus. From the surgical options we performed three techniques, according to the site of secondary determination and its complication: rigid intramedullary nailing with or without

cementation and hemiarthroplasty. 29 patients with metastatic disease were treated between 1999-2005, 18 were males, the median age was 60 years, resection with prosthetic reconstruction was performed in 6 cases. Myeloma was the most common diagnosis. Pathologic fracture showed in 12 patients. Intramedullary nailing achieved excellent results in terms of pain relief, functional restoration and minimal complications. The cement gives more stability and an apparent stopping of osteolysis. Cementation was necessary in 2 hemiarthroplasty. Functionality of the shoulder was poor improved but the pain was reduced significantly. Surgical treatment of metastases to the humerus can be successful and not only a palliative one. Relief of pain and preservation of function occurs for the majority of patients.

SIC10-09

LIMB SALVAGE FOR PRIMARY MALIGNANT BONE TUMOUR IN UNDERDEVELOPED COUNTRY

Thamer A. HAMDAN

Basrah Medical College (IRAQ)

Amputation was the standard operation for malignant bone lesion, it is no longer accepted except for special cases, it is a big price for a little gain, custom-made prostheses are widely used in civilised countries, though they are very expensive. The author presents his local experience in an underdeveloped country where custom-made prostheses and bone bank are not available. A limb salvage procedure for 25 cases, using autogenous bone graft, alone bone cement or resection alone is described with follow-up for five years.

SIC10-10

SOLITARY GIANT OSTEOCHONDROMA OF THE PROXIMAL FEMUR: A CASE SERIES

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¹*York District Hospital, York (UNITED KINGDOM)*, ²*Royal National Orthopaedic Hospital, London (UNITED KINGDOM)*

INTRODUCTION: Osteochondromata are the commonest benign tumours of bone and usually present in childhood or adolescence. The proximal femur is rarely affected. Giant multi-pedunculated variants can occur and are thought by some to represent a separate neoplastic entity. **AIMS:** To report on four such cases of giant osteochondromata arising from the proximal femur. **METHODS:** Retrospective Case Series. **RESULTS:** We report on four such cases. The mean age at presentation was 22 years (Range 11-37 years) and 75% (3/4) were male. All four cases presented with the triad of groin pain associated with a groin mass and a restricted range of hip motion. All were easily palpable on examination. Imaging demonstrated large multi-pedunculated cartilage capped lesions involving up to two thirds of the femoral circumference in all cases. All cases underwent successful surgical resection. This was via a single staged medial approach in 25% (1/4), single staged combined medial and posterior approach in 25% (1/4) and two stage medial and posterior approach in 50% (2/4). Histopathology demonstrated purely benign osteochondromatous tissue in 75% (3/4) and some early malignant chondromatous changes in one of the many cartilage caps in 25% (1/4). All patients made uncomplicated recoveries and there were no recurrences at a mean follow-up of 8 years (Range 5-10 years). **CONCLUSION:** These tumours despite their size are associated with good outcomes. It is important to let patients know in advance that the operation may require two separate incisions and that there is a risk that the tumour could be malignant.

SIC10-11**SURGICAL MANAGEMENT OF PRIMARY AND SECONDARY MALIGNANT TUMOURS OF THE VERTEBRAL COLUMN**

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Approximately 1 to 5% of all patients with cancer will present with spinal cord compression. Surgery plays an important role in the treatment of patients with spinal cord compression. Aim was to study the surgical management of primary and secondary malignant tumors of the vertebral treated by anterior corpectomy/vertebrectomy along with reconstruction of the anterior column using cement filled titanium mesh cages and anterior MOSS Miami instrumentation and posterior decompression and anterior reconstruction from posterior with posterior pedicle screw fixation. A total of 34 patients were included in the study, 19 males and 15 females aged between 54 and 73. Major presenting features were: pain in 16 patients, neurological deficit only in 9 patients and pain with neurological deficit in 9 patients. All patients had an uneventful recovery post operatively. 9 patients died by the end of 3rd year of study - mean post op survival of 4 months. All patients - anterior as well as posterior surgery group had significant pain relief. There was no dislodgement of the cages in any of the surviving patients at 6th month follow-up. We have concluded that major anterior thoracolumbar vertebral reconstruction is an effective treatment for local tumor control. More importantly, surgical treatment can significantly improve the quality of life by improvement of pain control and maintenance of ambulation during the patient's remaining life span. However, in those patients in whom the general condition precludes anterior surgery, posterior decompression, reconstruction anterior from a posterior approach is a good procedure in terms of relief from pain and neurological deficit.

CONFERENCE**SICIS10-01****FEMORAL TUMOURS: VARIOUS FIXATIONS OF TUMOUR PROSTHESES IN THE FEMUR SHAFT**

Rainer KOTZ

University Clinic of Orthopaedics (AUSTRIA)

In the beginning of endoprosthesis replacement of tumours cementless stems with placed screws were used (Moore) later on with the introduction of methylmetacrylate in endoprosthesis forged chrome cobalt stems were used in the Krückstock prosthesis. Due to the problem of loosening, several methods have been developed to avoid this cementing technique. First of all the ceramic conical fixation (Salzer) later conical fixation with flanges and screws and finally the successful modular prosthesis with a stem and plate fixation, first with two plates and six screws, later with one plate and three screws more distant from the base of the prostheses. Further developments were the MUTARS system, which is equipped with a hexagonal stem in straight and curved versions with additional rasps. Finally cementless forged titanium stems with flutes and a new preparation technique to avoid rotational instability (GMRS Kotz et al) as an alternative very durable forged chrome cobalt stems were used with the same system with bone cement (MRS Eckardt Malawer) and is the last and final result of the development of the modular Howmedica-Stryker system.

**Friday, 31 August 2007
Karam 1 Room**

Session 10: Bone tumours (II)

Moderators: Gershon Volpin (Israel)
Jalil Bennouna (Morocco)

FREE PAPERS

SIC10-12

COMPARISON OF TWO DIFFERENT APPROACHES IN SURGICAL TREATMENT OF PATHOLOGIC FEMORAL FRACTURES

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INTRODUCTION: The femur is one of the most frequent localisations of bone metastases. Breast, kidney, lung and prostate cancer stand on top of statistics. Surgical treatment is mostly palliative and due to pathologic fracture. The goal is reduction of pain, restoration and securing of stability for the expected life span. **METHODS:** We performed a retrospective (1998-2004) analysis. Patients operated for trochanteric, subtrochanteric and middiaphyseal pathological fractures due to bone metastases. In center A (tertiary orthopaedic clinic) 31 patients and in center B (trauma center) 35 patients met the criteria. Exclusion criteria: lymphoma, multiple myeloma, primary bone lesion and former surgery at the same site. Patients were divided into two groups. One group (A) underwent minimal invasive surgery with intramedullary devices without extra removal of metastatic tissue. The other group (B) underwent stabilisation and resection or curettage of metastatic tissue respectively. **RESULTS:** There were no differences between group A (n=33) and group B (n=33) concerning age, sex, preoperative estimated expectancy of live (Bauer-score based on primary lesion, occurrence of visceral and bone metastases), fracture pattern, mobility and mean hospital stay. One year survival: group A 29% and group B 51%. Two major complications occurred in group A and five in group B. **CONCLUSION:** We compared two similar groups of patients with pathological fractures treated differently. No significant differences in outcome could be found. However, there was a statistical trend to decreased survival but less major complications in patients treated with intramedullary stabilisation alone. Further prospective studies are needed.

SIC10-13

UNPLANNED EXCISION OF SARCOMAS - PROGNOSTIC FACTORS FOLLOWING RE-EXCISION

Coonoor CHANDRASEKAR, Robert J. GRIMER
Royal Orthopaedic Hospital, (UNITED KINGDOM)

AIM: To investigate whether our policy of routine re-excision after unplanned excision of a soft tissue sarcoma was justified. **METHOD:** Over a 23 year time period, 2202 patients were referred with soft tissue sarcoma. 363[17%] patients who had undergone a previous unplanned excision were included in the study. All patients were routinely restaged with CT chest and MRI. The original histology was reviewed. 316 patients underwent wide re-excision. Re-excision was deferred in 47 patients. The patient, tumour and treatment

factors in relation to local control, metastasis and overall survival were analysed using Statview software. RESULTS: Residual tumour was found in 60%. The resected specimen was analysed and categorized into 3 categories:1] no residual disease (sterile)-128 [10% developed LR].2] residual disease excised with wide margins (wide)-149[20% developed LR]. 3] residual disease with close margins at re-excision (marginal)-39[47% developed LR].The estimated 10 years local recurrence rate was 34%. A final positive margin in a high grade tumour had a 60% risk of local recurrence even when post operative radiotherapy was given. The overall survival improved when there was re-excision with wide margins. 24% developed metastasis and the overall survival was 78% at 5 years. CONCLUSION: We concluded that our policy of routine re-excision after unplanned excision of soft tissue sarcoma was justified especially in reducing local recurrence, metastasis and to an extent improving overall survival.

SIC10-14

RECONSTRUCTION BY VASCULARIZED BONE AUTOGRAFT AND EXTERNAL FIXATION OF LARGE UPPER EXTREMITY SKELETAL DEFECTS AFTER MALIGNANT BONE TUMOR RESECTION: INDICATIONS, TECHNIQUES AND LIMITATIONS

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Large bone defect of the upper limb are frequently encountered, mainly after tumor resection but also in case of traumatic bone loss, nonunion or extensive osteitis. Among the different sophisticated techniques developed in order to reconstruct these large defects and to salvage the upper limb, vascularized bone autograft combined with external fixation (ExFix) is a versatile and reproducible procedure. Technically, if an ExFix is not yet in place (e.g. open fracture), the first step consists in implanting the ExFix in order to maintain the skeletal length and ensure correct rotational positioning of the residual bone fragments after bone resection. Secondary, the lesion is removed (tumor, osteitis, nonunion). Then, in specific cases (infection, malignant tumor), a cement spacer or gentabeads are temporarily inserted between the bone fragments. Finally, the defect is reconstructed with a vascularized bone autograft (mainly a fibular autograft) associated or not with cancellous bone graft. The technique offers many advantages. ExFix provides adequate and versatile fixation of the vascularized transplant to the residual host bone. Moreover, ExFix ensures preservation of the normal bone vascularization which is a major factor of success after microvascular bone reconstruction, particularly with patients treated by aggressive adjuvant chemotherapy. Limitations of the technique are poor local vascular conditions and articular resections which will impose massive prosthetic reconstruction. The authors present details of the procedure in some cases of upper limb reconstruction after malignant tumor resection.

SIC10-15

THE ROLE OF LIMB SALVAGE SURGERY AND CUSTOM MEGA PROSTHESIS IN MULTIPLE MYELOMA

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¹*Governement Royapettah Hospital, Chennai (INDIA)*, ²*Madras Medical College and Research Institute, Chennai (INDIA)*

PURPOSE: To find the functional and oncological outcome of patients who underwent limb salvage surgery and custom mega prosthesis for multiple myeloma. MATERIALS AND METHODS: Nine patients with multiple myeloma underwent limb salvage surgery

and custom mega prosthetic replacement for tumour involving long bones. Females were predominantly affected and the average age of presentation was 47.7 years. Lower limb was commonly involved: 7 patients had tumour involving the femur. All patients had pathological fractures. Resection and reconstruction was done using custom mega prosthesis. Proximal femoral prosthesis was used for proximal femoral tumour and intercalary prosthesis for femoral shaft lesion. One patient each had total femoral prosthesis and total knee prosthesis. RESULTS: With an average follow-up of 88.2 months, three patients died of disease. One patient with total knee prosthesis had delayed deep infection requiring removal of prosthesis and another patient with intercalary prosthesis had fracture of femoral stem who declined revision surgery. Radiological evidence of loosening was seen in one patient. The functional outcome was excellent in 3 and good in 3 patients. The 5-year Kaplan-Meier survival rate of the patients was 66.7%. CONCLUSION: Multiple myeloma is a systemic malignancy. Chemotherapy and/or radiotherapy with bisphosphonates is the main stay of treatment. Surgery is indicated for painful pathological fractures and limb salvage surgery with custom prosthesis can provide pain relief, early mobilisation and provide good functional result with improved quality of life.

SIC10-16

ENDOPROSTHETIC RECONSTRUCTION FOLLOWING PERIACETABULAR TUMOUR RESECTION

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¹Royal National Orthopaedic Hospital, London (UNITED KINGDOM), ²Royal Orthopaedic Hospital, Birmingham (UNITED KINGDOM)

METHODS: We performed a retrospective review of 98 patients with malignant tumours of the periacetabular region. These were treated by resection and endoprosthetic reconstruction between 1971 and 2005 at the Royal National Orthopaedic Hospital, Stanmore, and The Royal Orthopaedic Hospital, Birmingham. RESULTS: The mean age of the patients was 43.6 years (10 to 76). 53 out of 98 patients were male. The age distribution shows a bimodal pattern with peaks in the 2nd and 6th decade. The mean follow-up was 65 months (6 to 405) and 5 patients were lost to follow-up. The overall 10 year survival rate was 56% (as determined by the Kaplan-Meier method). Fifty-four patients (58.1%) experienced complications. Infection was the most common (30%). Dislocation occurred in 19 patients (20%). All dislocations were recurrent with a mean of 2.9 (2 to 6) episodes. Operations performed before 1994 were associated with a dislocation rate of 40.5% and after 1996 the rate was only 3.9% ($p < 0.001$). Men experienced higher rates of death, infection and revision than women ($p < 0.05$). The local recurrence rate was 31% with high grade tumours associated with higher recurrence rates ($p < 0.05$). Tumour resection in the ilium is associated with higher rates of infection than tumours located in the periacetabular region alone ($p < 0.05$). CONCLUSION: This method of reconstruction is still associated with high morbidity. The improved dislocation rate is probably the result of improved surgical technique and the use of larger femoral heads.

SIC10-17

AN ARTIFICIAL LIGAMENT TO PREVENT DISLOCATION IN HIP JOINT RECONSTRUCTION AFTER PELVIC RESECTION

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The risk of dislocation of hip reconstruction after wide pelvic resection is high due to

resulting tissue loss. We report a procedure using an artificial ligament (LARS®) to prevent dislocation of pedestal cup implants. 15 patients (4 male, 11 female, average age 45.5 years) underwent resection of the hip and periacetabular bone stock due to tumours of the bone (6 bone metastases, 4 chondrosarcoma, 3 osteosarcoma, 1 Ewing's Sarcoma, 1 Fibromatosis). Reconstruction of the hip was performed by use of a pedestal cup and a standard femoral stem or proximal femoral tumour prostheses. To prevent dislocation of the hip joint an artificial LARS®-ligament was attached in a sleeve-wise technique around the prosthetic femoral neck and cup as a reconstruction of joint ligaments and capsule. Circular adoption of the artificial ligament allowed the tightening of its fibres in outward rotation and abduction as the typical ways of hip dislocation. Patients could initially be mobilized partially weight-bearing. Ability to walk was rated satisfying by all patients. There were 2 cases of dislocation due to major trauma throughout a fall, all other patients showed stable hip joints. One patient had to be revised due to cup loosening of an uncemented implant. The use of an artificial implant did not influence post-operative range of motion, at latest follow-up flexion averaged 84° (60° to 120°). The use of a textile implant in reconstruction of the hip after pelvic resection has shown to be a reliable instrument to prevent dislocation with satisfying functional results.

SIC10-18

ASSESSMENT OF OUTCOMES FOLLOWING MODULAR TUMOUR PROSTHETIC RECONSTRUCTION OF PROXIMAL FEMUR

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Royal Orthopaedic Hospital (UNITED KINGDOM)

AIM: To assess the clinical and functional outcomes following modular tumour prosthesis reconstruction of proximal femur in 100 consecutive patients. Modular tumour prosthetic replacement is useful especially in the region of proximal femur due to the frequent occurrence of metastasis and pathological fractures. 100 consecutive patients who underwent modular tumour prosthesis reconstruction of the proximal femur using METS prosthesis [Stanmore Implants Worldwide] from 2001 to 2006 were studied. The patient, tumour and treatment factors in relation to local control, implant survival and overall survival were analysed. There were 51 male and 49 female patients. The indications were metastasis 65 [20 renal ca, 15 breast ca, 10 ca bronchus and 20 others], primary bone tumours 30 and other indications 5. 46 patients presented with pathological fracture and 19 presented with failed fixation. The mean follow up was 24.6 months [range 12-60]. 5 patients had revision surgery [4 had conversion of unipolar head to THR, 1 had revision to total femur]. There were 6 dislocations [5 closed reduction and 1 open reduction]. 4 patients had hindquarter amputations for local recurrence and there were 8 deep infections. The implant survival was 95% with revision as end point. The implant was in situ for a mean period of 18.3 months [range 0-60 months]. We conclude that METS modular tumour prosthesis for proximal femur provides versatility, easy availability, low implant related complications and acceptable function including early mobility especially for patients with metastatic tumours, pathological fractures and failed fixations of proximal femur.

SIC10-19

PROGNOSTIC INFLUENCE OF SURGICAL THERAPY IN PATIENTS TREATED FOR SKELETAL LESIONS DUE TO METASTATIC BREAST CANCER

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INTRODUCTION: Due to an increase in survival, skeletal metastasis becomes a significant factor on life quality in carcinoma patients. Especially patients with breast carcinoma show very long survival times, which must be considered in choosing the adequate surgical approach. **METHODS:** Between 1980 and 2005, 115 patients with metastatic disease to the bone due to breast carcinoma had been surgically treated. The mean age at surgery was 58 years (17-84 years). Location and extension of the disease, symptoms, surgical approaches, complications, recurrences and survival time had been evaluated. **RESULTS:** The most often performed procedure was a decompression with or without stabilisation of the spine in 42 cases. Four vertebroplasties had been performed. The proximal femur had to be reconstructed with an endoprosthesis in 24 cases, an endoprosthetic reconstruction of the humerus was necessary in 2 patients, of the pelvis in one case. One diaphyseal prosthesis was implanted. Two resections/amputation without any reconstruction had to be performed. In 20 cases a compound osteosynthesis, in 19 cases a biopsy only was done. In most of the cases postsurgical radiation was administered in some cases preoperative radiation had been applied. Follow-up was done 1 to 26 years after surgery (average 11.7 years). Median survival was 25 months despite disseminated disease with a high quality of life. **CONCLUSIONS:** Patients with skeletal manifestations of breast carcinoma showed long survival times. The intralesional surgical approach including radiation therapy showed a better functional outcome in comparison to radical procedures with no disadvantage in survival time or local recurrences.

SIC10-20

SURGICAL STRATEGIES IN PATIENTS WITH METASTATIC DISEASE DUE TO RENAL CELL CARCINOMA

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INTRODUCTION: Most orthopaedic surgeons consider patients with metastatic disease to the bone as palliative and try to restrict the extension of any procedure. Aim of this study is to prove the hypothesis that this attitude is at least not justified in patients with renal cell carcinoma in respect to local recurrence and overall survival. **PATIENTS AND METHODS:** 75 patients treated between 1980 and 2005 due to metastatic bone disease from renal cell carcinoma were retrospectively reviewed. In 23 female and 52 male patients the average age at surgery was 63 years (28-84). Location, dissemination, symptoms, surgical approach, complications, recurrences and overall survival were analyzed. **RESULTS:** 28 endoprosthetic reconstructions, 16 spinal procedures, 13 compound osteosyntheses, 12 resection with/without bone reconstructions and 6 biopsies were performed. 18 patients showed a solitary bone disease, 19 patients multiple osseous lesions and 38 patients additional visceral disease. Follow-up was done on an average of 62.5 months. Median survival was 12.5 months. After 5 years, 20% of the patients were still alive. Local recurrence was evident in 8 intralesional treated patients. Patients treated by intramedullary nailing elsewhere showed large recurrent disease at admission in our department. **CONCLUSION:** Overall survival was comparably long. Those patients treated in a more aggressive surgical approach including resections of the lesions had not only a longer overall survival but also showed a lesser rate of local recurrence. Those patients treated with intramedullary nailing before admission in our

department showed large local recurrences and needed by far more functional deleterious procedures than those treated primarily with a resectional approach and reconstruction.

SIC10-21

AN INTERNATIONAL MULTI-CENTRE PROSPECTIVE OBSERVATIONAL STUDY OF 223 PATIENTS WITH EXTRADURAL OSSEOUS SPINAL METASTASIS TREATED SURGICALLY

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OBJECTIVE: To assess the feasibility of radical surgical excisional treatment of spinal metastasis. **MATERIALS AND METHODS:** A total of 223 patients with a mean age of 61 years with histologically confirmed spinal metastasis originating from epithelial primary site were studied. Surgical strategies were either radical excisional (enbloc and debulking) or palliative decompressive surgery. Outcomes assessed were measures of quality of life including pain, mobility, sphincter and neurological functions. **RESULTS:** Breast, renal, lung and prostate accounted for three quarters of tumours, and 60% had metastasis that extended beyond one vertebra. Patients presented with pain (92%), paraparesis (24%) and abnormal urinary sphincter 22% (5% were incontinent). Seventy-four percent of patients underwent radical surgery, 92% of all patients had instrumented fixation. 73% of the radical group had improved pain control (63% for palliative group), 72% regained ability to walk (45% for palliative group), 92% maintained a functional neurological function of Frankel E/D (64% for palliative) and 55% had improved sphincter control (21% for palliative group). While 18% were bed bound preoperatively, only 5% were still in bed postoperatively. Perioperative mortality rate was 5.8% and 21% of patients experienced complications. The median survival for the cohort was 352 days (11.7 months). The radical surgery group had a median survival of 438 days and the palliative group 112 days ($P = 0.003$). Negative survival predictors at admission were abnormal neurology, immobility, older age and abnormal sphincter. **CONCLUSION:** Surgical treatment of spinal metastatic tumour is feasible with low mortality, an acceptably low morbidity and affords patients better quality of remaining life. Radical surgical excision has even better outcome than palliative surgery in pain control and in neurological function rescue including regaining mobility.

Friday, 31 August 2007
Karam 1 Room

CONFERENCE

SICIS10-02

AN EXPERIMENTAL STUDY FOR THE USE OF CORTICAL AUTOGENEAS BONE GRAFT IN BONE DEFECTS AFTER ENBLOCK RESECTION IN SOMETIMES MALIGNANT SKELETAL TUMORS

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The principle of treatment in sometimes malignant tumors depends on two principles: 1 - Wide excision or enblock resection, this is very important because the chance of recurrence after curettage of tumor and also curettage and adjuvant therapy is more than enblock resection which eradicate the tumor with the host involved bone. 2 - The problem

of bone loss is important after wide excision of bone tumor with host bone. There are many forms of materials for filling the defects after enblock resection, such as: cortical and spongiuous, autografts, allografts, osteoinductive, osteocondutive materials, custom-made prosthesis. In this study we tried to use fibular cortical grafts without vascular pedicels plus autogenous cancellous bone for filling the defects and reconstruction. The minimum size of fibular cortical graft was 1.5 inch and the maximum size was about 4 inches. Among 88 cases of bone tumors in type of recurrence or sometimes malignant during last 10 years from 1996 to 2005. There were 48 cases of G.C.T, 24 cases A.B.C, 8 cases fibrousdysplasia, 6 cases chondromyxoid fibroma, 2 cases chondroblastoma. We had 2 cases of nonunion which we used spongiuous graft for second time, and 1 cases of resorption which we used allograft, also one case of infection which we removed the grafts and used external fixation with bone cement and then we used cortical graft. The results of this study for the use of cortical autogenous graft was successful.

Session 11: Bone loss and non union

*Moderators: Maurice Hinsenkamp (Belgium)
Abdelmajid Boudali (Morocco)*

CONFERENCES

SICIS11-01

TREATMENT OF BONE LOSS: AN OVERVIEW

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INTRODUCTION: A "bone loss" is a defect, restricted or total, in the continuity of a bone segment, or a decrease of the density of the material (osteoporosis). It is necessary to consider the multiple aspects of the problem and their interconnection. The aetiology, the significance and the location of the damage must be considered in the choice of the treatment. The aetiology: The aetiologies of a bone loss are multiple and are of major importance for the selection of the treatment. We may mention - congenital defect or agenesis; - traumatology (including non union); - infection (primary or not); - tumour (metastasis or primary lesion); - metabolic; - failure of implants. The significance: The significance of the bone loss for the patient, its extent, the impairment, the effect on the daily living activities, the expected complications, are guides for an adapted treatment. The location: The location is important for the choice of the treatment and considers the limb or a segment of the limb. The treatment of a defect at the lower limb may be different of that proposed for the same lesion, at the upper limb. The treatment: The treatment must integrate the parameters defined in the evaluation previously done. We propose to present and discuss some typical treatments.

FREE PAPERS

SIC11-01

TREATMENT OF SCAPHOID NON UNION WITH K WIRES AND BONE GRAFTING

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AIM: The aim of this study was to analyze the long-term results of K wire fixation for the treatment of scaphoid pseudarthrosis. PATIENTS AND METHOD: Between 2000 and 2006, 28 patients with scaphoid waist pseudarthrosis underwent surgery by using K wires and bone grafting. The bone graft was harvested from the iliac crest or the distal end of radius by extending the incision. During the 2-year follow-up, patients' evaluation was based on radiological findings and on the Green & O'Brien scoring system. RESULTS: Healing of the non-union was achieved in 24 (85.7%) patients. The other 3 patients underwent the same operation for a second time successfully. According to Green & O'Brien scoring system 82.1% showed excellent results and 10.7% good results. 1 patient was lost to follow up. No early post-operative complication was developed. Two patients demonstrated mild radiological radio-scaphoid arthritis. All patients returned to previous level of activities. Implants were removed after radiological and clinical evidence of union was seen. DISCUSSION: K wire fixation with bone grafting is a satisfactory

method for the treatment of long-standing or neglected scaphoid non-unions showing high percentages of healing and functional improvement. The bone graft may be used from Iliac crest or from the distal end of radius. Harvesting graft from lower end of radius reduces the operative time but is associated with higher rates of non union. Use of K wires provides reliable option where expensive hard wear and instrumentation is not available as in developing countries.

SIC11-02

SALVAGE OF PROXIMAL FEMORAL NON-UNION WITH FAILED IMPLANTS BY MODULAR ENDOPROSTHESIS

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AIM: To assess the outcomes following salvage of proximal femoral non-union with failed implants by modular endoprosthesis. Occurrence of pathological fracture and failed fixation secondary to nonunion is common in the region of proximal femur. 16 consecutive patients who underwent modular endoprosthetic reconstruction of the proximal femur for symptomatic non-union with failed implants using METS prosthesis [Stanmore Implants Worldwide] from 2001 to 2006 were studied. The patient and treatment factors in relation to implant survival, complications and overall survival were analysed. There were 8 male and 8 female patients. The indications were failure of prophylactic/therapeutic fixation of the proximal femur with symptomatic non union. The underlying pathology was metastatic renal ca in 5 patients, metastatic breast ca in 4 patients and other pathology in 7 patients. 11 patients had failed intramedullary fixation and 5 patients had failed DHS fixation. They underwent removal of the failed implant and proximal femur and reconstruction using modular proximal femoral endoprosthetic replacement [METS prosthesis - Stanmore Implants Worldwide]. The mean follow-up was 27.2 months [range 2-60]. 1 patient had revision to total femur for periprosthetic fracture. There were 2 dislocations both had closed reduction. 1 patient had hip disarticulation for deep infection. The implant survival was 87.5% with revision or amputation as end point. The implant was in situ for a mean period of 26.7 months [range 2-60 months]. We conclude that METS modular endoprosthesis for proximal femur provides versatility and low implant related complications for patients with non union and failed fixations of proximal femur.

SIC11-03

THE SIGNIFICANCE OF THE RADIOLOGICAL OUTCOME OF EARLY FOLLOW-UP AFTER OSTEOCHONDRAL AUTOGRAFTING IN TRAUMATIC AND DEGENERATIVE DEFECTS OF FEMORAL CONDYLES AND TALUS

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The aim of our study was to evaluate the MRI findings and to determine the correlation between the radiological and the functional outcome following osteochondral autografting for defects in the knee and talus. We performed a prospective study and followed up 33 patients. The grafts were harvested from the anterolateral region of the ipsilateral knee using an insider rinsing diamond bone-cutting instrument (DBCS). The grafts were implanted using a press fit technique. Sixteen (48%) women and 17 men were included in

our follow up with an average age of 38.4 years (age range: 16 to 58 yrs). All the patients were followed up with MRI scans between 1 to 4 years postoperatively. The MRI study illustrated an articular step in 16(48%) patients and 19(58%) patients had a subchondral laminar step. Twenty-four (73%) patients were shown to have inhomogeneity between the graft and the surrounding bone and cartilage tissues. A subchondral oedema was observed in 2(6%) of the cases. All the autologous grafts were incorporated by 4 years as proven by MRI scans. The MRI is a well-recognised non-invasive diagnostic tool to evaluate the articular surface but it probably has a reduced clinical significance in early follow up of osteochondral autografting, as the MRI findings did not correlate with the good clinical outcome. While the radiological results demonstrate graft incorporation, the articular steps and inhomogeneity are typical findings. Therefore the relief of symptoms and improved functional outcome are better clinical indicators for the assessment of the autologous osteochondral transplantation.

SIC11-04

FILLING OF TRAUMATIC BONE CAVITIES WITH BREPHOBONE IN OPERATIVE TREATMENT OF PROXIMAL TIBIA FRACTURES

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In operative treatment of tibial plateau fractures, we had applied grafting with embryonic bone. Brephoplastic was used in 37 patients (B.2, B.3 and C.3 types according AO-ASIF classification). It is revealed that the long tubular bones of 22-27 weeks old embryo are more suitable. In application of younger brephobone, we used methods of additional stabilization of bone fragments, including perforated cortical allografts and locking K-wires. The control over evolution of bone grafts and regeneration of bone tissue was carried out with the help of CT densitometry and radiothermometry. Osteoinductive advantages of brephobone in comparison with allobone were found, that has allowed reducing duration of weight-bearing restriction of operated extremity to 2-3 weeks without occurrence of secondary angular deformation. In the majority of patients we had achieved the full range of motions in the knee by application of device with balance weight and intraarticular injections of sodium hyaluronate (SYNOCROM manufactured by Croma Pharma GmbH)

SIC11-05

EFFECT OF BONE QUALITY AND THEIR CHARACTERISTIC ON MORCELLISED IMPACTION BONE GRAFTING INITIAL STABILITY

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INTRODUCTION: The aim of the study is to investigate the effect of bone of different densities on the initial stability of impaction bone grafting and the characteristic of morcellised graft that provided the optimum initial stability. **MATERIALS AND METHODS:** This study was ethically approved. Bone samples were harvested from patients undergoing total hip arthroplasty (THA) and patients with femoral neck fractures that underwent hip hemiarthroplasty (HH). Preoperative DXA scan of both hips were performed on THA patients while post operatively DXA scan on the contralateral hip were performed for the HH patients. Femoral heads harvested in routine manner. Samples

were morcellised using Noviomagus® bone mill and impacted into an impaction jig and were sheared to failure. Load needed for graft failure was measured and recorded in Newton. Data were analysed using SPSS. RESULTS: Mean load needed for graft failure in normal, osteopenia and osteoporosis samples were 69.3N, 69.1N and 69.1N. Mixture of bone particle consisting of small, medium and large particles provided the strongest impaction graft. No significant difference in initial stability between wash or unwashed grafts. No significant difference in energy needed for graft failure between corticocancellous and cancellous only graft. CONCLUSIONS: The density of the bone does not affect the initial stability of the impacted morcellised bone graft. Washing did not improve the initial stability. Mixtures of small, medium and large bone particles provide the optimum initial stability. Corticocancellous graft did not provide significant advantage over cancellous only graft for initial stability.

SIC11-06

APPLICATION OF AUTOLOGOUS STEM CELLS ON UPPER AND LOWER LIMB NON-UNIONS

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The purpose of this study is to evaluate the efficacy of using autologous bone marrow stem cells as an osteogenic agent in treatment of long bones fracture non-unions. 15 patients [11 males, 4 females, mean age 43.4 yrs] were treated with this method. There were two humeral non-unions, eight femoral and five tibial. Nine patients were diagnosed with infected non-unions and six with atrophic. However, prior to administration of bone marrow stem cells, there was no case with evidence of ongoing deep sepsis. Stable fixation was used in all cases, 12 with intramedullary locked nail and 3 with plates. During surgery bone marrow aspiration from the iliac crest was performed (60+60 ml) and concentrated stem cells were isolated after 15 min. of centrifugation. In order to activate the osteogenic abilities we used as a carrier BT+ Hydroxyapatite 65%+Tricalcium phosphate 35% to implant the pluripotent stem cells. Both clinical and radiological union occurred in 14 (93.3%) cases, within a mean time of 5 and 6.2 months, respectively. In one case, we had delayed union and a new fracture due to early weight-bearing. Till now, none of the septic cases have developed any recurrence. This study supports the view that the use of autologous bone marrow stem cells with BT- HA-TCP carrier is a power adjunct to be considered in the surgeon's armamentarium for the treatment of non-unions.

SIC11-07

BONE LOSS IN ACETABULAR LOOSENING; FILLING WITH BONE SUBSTITUTE AND AUTOLOGOUS STEM CELLS - PRELIMINARY RESULTS

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The purpose of this study is to present the surgical technique as well the preliminary clinical and radiographic results of using autologous pluripotential bone marrow stem cells with bone substitutes to fill the, often, large bone defects in acetabular revisions.8

patients were treated with this method, 1 with metatraumatic severe bone defects. During surgery, iliac crest aspiration of 60+60ml was performed and stem cells were isolated after 15 mins of centrifugation. In order to fill the defect we used a bone substitute of BT+ Hydroxyapatite 65%+Tricalcium phosphate 35% which was thoroughly sprayed with concentrated stem cells. The acetabular implant was a cementless hemispherical cup with screws in six cases and procotyle type cup with screws in the other two. Average follow-up was 14 months. The bone substitute remained homogenous and visible in all the cases but still irregular to shape. The X-ray showed no migration or loosening of the cup. Filling the bone loss with a bone substitute + autologous bone marrow stem cells seems an efficient way of saving bone. There was, till now, no drawback on the cup fixation as long as the implant was initially stable.

SIC11-08

USE OF ILIZAROV TECHNIQUE FOR LIMB RECONSTRUCTION BY BONE TRANSPORT AND FUSION IN PATIENTS WITH DISTAL TIBIAL BONE LOSS INVOLVING THE TIBIAL PLAFOND

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Distal tibial bone loss involving ankle is a devastating injury with few options for reconstruction. The purpose of our study was to look at the results of ilizarov technique used to achieve tibial lengthening and fusion. 17 cases (16 post traumatic and one post tumor resection) admitted between 1994 and 2003. 13 cases were done in bifocal and four in trifocal mode. Mean age was 33 years (Range 7-71). Duration of follow up was 12 to 84 months. Mean length of defect was 4.5 cm (Range 1-12). Average number of surgeries per patient was 3.2. Five patients required free vascularised grafts before the index procedure and 4 patients required realignment at the docking site. The mean time in fixator was 13 months (Range 5 to 29). Union at fusion site occurred in 88 % (15/17) with mean duration to docking and union being 8 months. FUNCTIONAL RESULTS: Fourteen (77.5%) of the patients could walk without support or bracing and twelve patients (71%) returned to same or modified occupation. COMPLICATIONS: There was a high incidence of complications with two cases of nonunion, three cases of residual equinus deformity and two persistent low grade infections. CONCLUSIONS: Our study showed 76% good and excellent scores on functional scoring but also demonstrates the high morbidity associated with this procedure. In spite of the steep learning curve and high complication rates the procedure can be undertaken in specialised centers for highly motivated patients to achieve good functional results.

SIC11-09

COMPARISON OF ILIZAROV BONE TRANSPORT AND VASCULARISED FIBULAR GRAFT IN POST TRAUMATIC TIBIAL BONE DEFECTS

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We did a retrospective analysis of 46 patients treated for post traumatic tibial bone defects of more than six centimeters from 1994 to 2000. There were 25 patients treated with Ilizarov bone transport [IBT] (mean defect 11.9 centimeters) and 21 treated with vascularised fibular graft [VFG] (mean defect 14.6 centimeters). Mean period of follow up was 44 months. OUTCOME MEASURES: Twenty-one (84%) and sixteen (76%) patients in the IBT and VFG group respectively achieved the radiological end points [p 0.5]. Bone

and functional results, analyzed by Paley evaluation system, showed no significant difference. Nineteen patients (76%) in IBT group and fifteen (71%) in the VFG group returned to productive work [p 0.72]. The hospital stay (15 Vs 19 days) and operating time 2.45 Vs 8.5 hrs were significantly less of IBT group [p < 0.05]. In IBT group external fixation index [EFI] (time in fixator / cm defect) was 1.21 [range 0.7-1.86]. Mean hypertrophy time in VFG group of 18.5 m. COMPLICATIONS: Two patients in the IBT group and one in the VFG group had amputations and one patient in VFG group died. Three cases in the VFG group had flap loss. Stress fracture of the graft occurred in eight patients in the VFG group. CONCLUSION: Hospital stay, operating time and re-fractures were significantly less in IBT group while the incidence of re-operations were less in the VFG group. Choice of treatment should be decided by available expertise, informed patient choice and financial considerations.

SIC11-10

REHABILITATION OF PATIENTS WITH EXTENSIVE LONG BONES DEFECTS

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One-stage management of extensive lone bone defects is possible with the technique of polyfocal lengthening of fragments and enables to regenerate new bone through several distraction areas. BACKGROUND: The experiment was conducted in 74 dogs in which the post-resection tibial defects were managed by double level lengthening either in the distal or proximal fragment, and by simultaneous one-level lengthening in each fragment. With a preserved nutrient artery in the proximal fragment, distraction osteogenesis was more active while bone formation was both endosteal and periosteal. On the contrary, distraction osteogenesis was mainly periosteal when the major blood flow to the distal fragment was disturbed. MATERIALS AND METHODS: The experiment resulted in clinical introduction of new technologies into bone lengthening. They were used for treatment of 65 patients with long bone defects measuring 13.1±3.6cm that were managed during one stage through several distraction regeneration areas. The technique used was divided into 2 main technologies: multilevel lengthening of one fragment (42 cases) and lengthening of both fragments (14 cases). In 5 patients the combination of the mentioned technologies was used. In 2 cases, the defects were managed by multilevel lengthening of one fragment and by lengthening of the adjacent segment. RESULTS: Distraction took 110.4±7.7 days by polyfocal lengthening of fragments; an average fixation period was 160.9±9.4 days. The technique enables to restore 86.6±1.9% or 11.4±0.6cm of lost bone tissue. CONCLUSION: These new technologies are efficient ways of Ilizarov bone plasty in management of extensive long bone defects.

Session 12: Osteoporosis

Moderators: Jochen Eulert (Germany)
Ali El Kohen (Morocco)

FREE PAPERS

SIC12-01

TREATMENT OF OSTEOPOROTIC DISTAL RADIUS FRACTURES: ABOUT 60 CASES

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Fracture of distal radius is the most commonly fractured bones mainly in older patients who have osteoporotic bones. The treatment is difficult for these patients for many reasons: - Age; - The comminution; - A displaced articular fracture. The greatest complication is to loose the mobility of the wrist and the hand related to the algodystrophic syndrome especially developed by these patients. However, we prefer surgery treatment using Kapandji method. This technique allows these patients to use their hands quickly. We report a series of 60 cases of distal radius fractures coming in older patients (50 female and 10 male) with an average age of 65 years. The treatment consists of a percutaneous pinning Kapandji technique in most cases. Algostrophic syndrome was found in all cases. This syndrome was treated by physiotherapy associated with medical treatment but the result wasn't usually excellent.

SIC12-02

INCIDENCE OF OSTEOPOROSIS IN ELDERLY PATIENTS WITH DISTAL RADIAL FRACTURES

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AIM: Distal radial fractures are the most common fractures in elderly women. At present these patients are not investigated for osteoporosis on a routine basis. The aim of this study is to evaluate the bone mineral density (BMD) in patients with distal radial fractures aged over 50 years and to investigate if screening is advisable. MATERIALS AND METHODS: Since 2004 optional examination of BMD is offered to all patients with an age over 50 years, who are treated for a fracture of the distal radius. BMD is measured using the DEXA (dual - energy x-ray absorption) - method of the spine and the hip at a renowned institution. Based on the definition of the WHO, the lowest T - score value was considered for analysis. Additional clinical and radiographic examinations were performed. Vitamin D was given in cases of osteopenia, a bisphosphonate (Fosamax®) was prescribed in cases of osteoporosis additionally. The BMD was reassessed after one year. RESULTS: The study population consisted of 61 patients, of which 37 (60.6%) showed osteoporosis, 20 (32.8%) showed osteopenia, and only 4 (6.6%) patients showed normal results. First results show that the BMD in patients treated with bisphosphonate medication increased significantly within one year. CONCLUSION: As more than half of

the patients with a fracture of the distal radius have osteoporotic BMD values, it is our opinion that such patients should be screened. Bisphosphonate medication might help to reduce further fractures.

SIC12-03

OSTEOPOROSIS RELATED VERTEBRAL FRACTURES: ITS PREVALENCE IN SAUDI ARABIAN SOCIETY

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OBJECTIVE: To establish a hospital based prevalence of vertebral fractures in postmenopausal Saudi women. **PATIENTS AND METHODS:** Consecutive Saudi women over the age of 50 years who had chest radiograph during their emergency room visit at King Fahd Hospital of the University between January 2003 and December 2005 were evaluated for vertebral fractures. Seven-hundred and eighty-five radiographs were reviewed for the presence or absence of vertebral fractures. The medical records of the women who had a fracture were reviewed. Women with the diagnosis of malignancy or connective tissue disorder and women on steroids were excluded from the analysis. **RESULTS:** A total of 159 (18.2%) patients had 198 vertebral fractures. The average age of these patients was 65.74 SD±8.52 (range 50-91 years). Tenth, 12th and 9th thoracic vertebra are the most commonly affected in that order. There were 89 (44.9%) mild, 65 (32.8%) moderate and 44 (22.2%) severe fractures. The number and severity of fractures were more common in the older group of patients ($p=0.001$). A review of the medical records showed that the 51 (32%) were suffering from cardiovascular diseases and twenty-one patients (13.2%) were on the anti-resorptive therapy. **CONCLUSION:** This study finds the hospital based prevalence of vertebral fractures to be 18.2% which is similar to the reports from the western countries. As the population is aging and the number of elderly is bound to increase in the future and we believe that this will lead to tremendous impact on the health care budgets.

SIC12-04

STRUCTURAL-FUNCTIONAL STATE OF BONE LOSS OF THE POSTMENOPAUSAL WOMEN WITH VERTEBRAL FRACTURES

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This research was aimed at studying the bone tissue state among women with vertebral fracture with aid of the ultrasound densitometry method. The total of 71 postmenopausal women 50-74 years old having vertebral fracture in their anamnesis (VF) were examined by ultrasound bone densitometer ('Achilles+') and X-ray absorptiometry ('Osteolog') The control group included postmenopausal women without any osteoporotic fractures in their anamnesis (CG), being standardized by age, BMI, etc. The speed of sound (SOS, m/s), broadband ultrasound attenuation (BUA, dB/MHz) and a calculated 'Stiffness' index (SI, %), T and Z-range were measured. **RESULTS:** The main risk factors for the osteoporotic vertebral fracture turned out to be a menarche after 15 years, an early and late menopause. All indexes of ultrasound densitometry in postmenopausal women were significantly lower compared to the data of healthy patients during all postmenopausal period. The ultrasound parameters were veritabily lower among all postmenopausal women with vertebral fracture than among control group (SOS: 1525,5±2,0 and 1498,0±4,0 m/s, $p < 0,05$; BUA: 107,3±0,7 and 99,5±1,4 dB/MG, $p < 0,05$; SI: 78,6±0,9 and 65,9±1,9 %, $p < 0,05$; all values are the mean ± standard error). In summary, ultrasound

densitometry is an effective screening method to reveal the women of risk group having future osteoporotic vertebral fracture in postmenopausal period.

SIC12-05

UNUSUAL SKELETAL MANIFESTATIONS OF PRIMARY HYPERPARATHYROIDISM

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PATIENTS AND METHODS: From 1996 to 2002, ten patients were treated in own department for PHPT with severe bone disease (fibrous cystic osteitis, pathological fractures and brown tumors). There were 9 women and 1 man. The mean age was 40 years (26-66). Clinical manifestations, radiological features, biological investigations, pathological findings, therapeutic aspects, and results were studied. The mean duration of follow-up was 18 months. **RESULTS:** All the patients had parathyroid adenoma as a cause of the PHPT. The principal presenting symptoms were pain and fatigue. 8 patients had pathological fractures and osteoporosis. 2 patients had brown tumors. Laboratory tests showed hypercalcemia in all the cases but one, and parathyroid hormone was elevated. 6 fractures were treated surgically; 5 fractures were treated nonoperatively. The brown tumors were treated by resection bone grafting (radius) and by excision (fibula). The parathyroid adenoma was removed surgically in all the cases. At the latest follow-up, 1 patient died of nephrocalcinosis and renal failure. 9 patients improved, they are symptomatic free, the fractures healed and the osteitis fibrosa cystica showed significant resolution. **CONCLUSION:** This study allowed us: - To clear up polymorphism and diagnostic problems of the bone lesions in PHPT. - To stress the need for ionized calcium assay in osteolytic lesions of the bone. - To recommend an interdisciplinary management.

SIC12-06

THE CORTICAL INDEX IN HYPERTHYROIDISM OSTEOPOROTIC PATIENTS

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INTRODUCTION: The incidence of parathyroid disease is about one in 20,000 people. The average age is 59 while the most common age is 62. Most patients are between 40 and 75. In more than 50% with hyperparathyroidism the condition runs an asymptomatic course determining osteoporosis. **AIM OF THE STUDY:** It was to evaluate the cortical index, (a parameter that can give an evaluation of bone density measured from radiographs as the ratio between combined cortical thickness and bone diameter), in the shoulder and in the II metacarpal in primitive hyperthyroidism patients. **MATERIALS AND METHODS:** The authors evaluated 41 roentgenograms of the shoulder and 44 roentgenograms of II metacarpal shot according to an AP view of primitive hyperthyroidism patients. The films were digitized and then loaded in a PC. A freeware software allowed the authors to perform evaluation of the cortical index measured at the deepness weighted according to the morphotype of the patients. **RESULTS:** The cortical index of the humerus showed a minimum and maximum of 0,513 and 0,885, with an average of 0,776 and a standard deviation of 0,065, while measurements taken at the II metacarpal obtained a maximum and minimum cortical index of 0,772 and 0,4, with an average of 0,656 and a standard deviation of 0,073. **CONCLUSIONS:** Although the self limits of the study, the authors develop a low cost and fast protocol to evaluate the cortical index. By the end it seems that the cortical index may be used as first screening

of osteoporosis in hyperparathyroidism patient.

SIC12-07

MUSCULOSKELETAL ALTERATIONS IN HEALTHY AND OSTEOPOROTIC POSTMENOPAUSAL WOMEN

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A comparative cross-sectional study to evaluate musculoskeletal alterations constituting risk factors for falls in healthy and osteoporotic postmenopausal women was conducted in two groups of women of Menopause Clinic, 30 women with osteoporosis and 33 women without osteoporosis. Diagnosis of the presence of osteoporosis was based on bone densitometry performed on the lumbar spine. Volunteers were interviewed and underwent a physical examination during which the examiner measured muscle strength and amplitude of movement of trunk flexion and extension, angles of thoracic kyphosis and lumbar lordosis, as well as static and dynamic balance. Mean muscle strength of trunk flexors and extensors was significantly lower in women with osteoporosis ($p < 0.01$). Movement amplitude of trunk flexion was similar in both groups ($p = 0.91$). The extension was 20.5° in women with osteoporosis and 28.4° in women without osteoporosis. Thoracic kyphosis angles from T1 to T4 ($p < 0.01$) and lumbar lordosis angles ($p = 0.02$) were greater in women with osteoporosis. 73.3% of women with osteoporosis and 78.8% of women without osteoporosis had good static balance. Women in both groups had poor dynamic balance. Vertebral fractures were present in 20% of women with osteoporosis and absent in women without osteoporosis. Women with osteoporosis had worse musculoskeletal status than women without osteoporosis, and this may increase the former group's risk of falling and, consequently, of fractures. These observations permit us to propose that women with osteoporosis should participate in preventive exercise programs aimed at minimizing the risk of fractures.

Session 13: Upper limb (I)

FREE PAPERS (1)

*Moderators: Federico Fernandez-Palazzi (Venezuela)
Mohammed Ouarab (Morocco)*

SIC13-01

THE MANAGEMENT OUTCOME OF ACUTE HAND INJURIES IN THE BLACK LION UNIVERSITY HOSPITAL ADDIS ABABA, ETHIOPIA

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INTRODUCTION: The hand is the most commonly injured part of our body. The aim of treatment is always to restore function (movement, strength and dexterity). The quality of primary treatment often determines the maximal potential for recovery. **MATERIAL AND METHODS:** Between January 1, 2005 and December 31, 2005, 253 patients were treated in the Black Lion University Hospital for an acute hand injury that presented within the first 24 hours of the accident. The mechanism of injury, types and duration of treatments, complications and hand impairment were assessed. **RESULTS:** The mean age was 32 years with male to female ratio of 7:1. The majority were wood workers (32%) followed by laborers (25%) and machine operators (15%). Three quarters of the injuries occurred in the workplace and 74% were caused by a machine. Common injuries were fracture 39% (85% compound), soft tissue injury 32%, amputation 31% and dislocation 9%. Most were managed in the emergency out-patient department 198 (78%), and the average time until discharge was 93 days. The main reasons for increased loss of function after treatment were the often necessary proximal corrective amputations (31%), prolonged (> 4 weeks) immobilization (28%) in a nonfunctional position (17%), to the fracture union in unacceptable position (19%) and infection (13%). The mean duration "off work" was 55 days. **CONCLUSION:** Improving the 'acute' treatment of injured hands shorten the total duration of treatment, improve results, and probably decrease the indirect cost.

SIC13-02

KINEMATICS OF THE MIDCARPAL JOINT IN RHEUMATOID WRISTS: A THREE-DIMENSIONAL MOTION ANALYSIS

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PURPOSE: Radiolunate (RL) fusion is a well-established treatment for rheumatoid wrists. The preoperative evaluation of midcarpal function is critical in choosing RL fusion because postoperative function is mostly due to midcarpal function. The kinematic evaluation, however, has been extremely difficult. The purposes of our study are to evaluate the three-dimensional (3-D) carpal kinematics of rheumatoid arthritis (RA) and to suggest the priority of the RL fusion procedure according to the radiographic subtypes of RA. **MATERIALS AND METHODS:** We acquired in vivo kinematic data on 30 wrists of 29

patients with RA by 3-D computed topographies in the wrist neutral position and two extreme positions of flexion-extension motion. All cases were radiographically classified into two subtypes, stable or unstable, by Flury's classification. We evaluated the precise range of radiocarpal and midcarpal motions by a markerless registration technique and the individual contribution to global wrist motion according to the radiographic subtypes. RESULTS: The overall average range of motion in the midcarpal joint was 31.6+17.0°. The average contribution ratio of midcarpal motion was 54.3%. The average contribution ratio of midcarpal motion in the unstable form was 66.8%, which was significantly higher than the 47.1% in the stable form. CONCLUSION: The midcarpal function of patients with RA was better preserved than previously thought. We confirmed that RL fusion is a reasonable treatment option for the wrist with advanced RA, especially in the unstable form. This treatment may have a more global indication for severe cases in which total wrist fusion would have been attempted.

SIC13-03

ANTIGRADE NAILING VERSUS PLATING FOR TREATMENT OF HUMERAL SHAFT FRACTURES

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Once operative treatment has been chosen for humeral fractures, the surgeon has two possibilities: plate and screws osteosynthesis, and intramedullary nailing. OBJECTIVE: to compare antigrade nailing versus plating of humeral shaft fractures as regard rate and duration of union, rate of complication, functional outcome. MATERIAL: between November 2003 to July 2006, 56 patients with humeral shaft fractures treated by internal fixation, 30 of them were treated by antigrade nailing (group1), 26 by plating (group2), 36 were males and 20 females, 30 were right and 26 left, 48 were closed and 8 open, 4 were pathological, and 52 traumatic, of which 36 were type A, 14 B, 8 C as regards AO code, 8 cases has primary radial nerve injury. RESULTS: the duration of follow-up ranged from 8 to 32 months (mean 15 months), in the first group the rate of healing was 93.66 percent with 3 cases of nonunion, the mean healing time was 10.5 weeks, 7 cases were complicated by severe shoulder impingement, with 3 cases of iatrogenic palsy of the radial nerve, while in the second group the rate of healing was 92.3 percent with 2 cases of nonunion, the mean healing time was 10 weeks, there was no single case of impingement, with 1 case of iatrogenic palsy of the radial nerve. CONCLUSION: our findings suggest that for unstable humeral fractures plating remains the best treatment, while antigrade nailing may be indicated for specific situations and carry higher risk of complications.

SIC13-04

LIGAMENT REPAIR AND SCREWING IN ACROMIOCLAVICULAR DISLOCATION - 53 CASES

Farid ISMAEL, Abdelouahed ISMAEL, Samir BLIDI, Mohamed DRAOUI, Maryem Fama ISMAEL

Clinique Agdal, (MOROCCO)

Components of the acromioclavicular articulation are frequently injured: the capsule, the acromioclavicular and coracoclavicular ligaments, and even the delto-trapezium aponeurotic BAUDRIER. The trauma causes different degrees of injury. In simple acromio-clavicular dislocation (type I) ligaments are not ruptured. Subluxation (type II) of the external end of the clavicle is consequence of the rupture of the acromio-clavicular ligaments while maintaining the integrity of coraco-clavicular ligaments. Acromio-

clavicular dislocation (type III) is the consequence of the rupture of both acromioclavicular and coracoclavicular ligaments which can be associated to a desinsertion of the deltoid and trapezius (types IV and V). Sprains and subluxation are treated conservatively and were not included in our study. The authors present 53 cases of type III, IV and V acromio-clavicular dislocation. The treatment was constantly surgical. It consisted in repairing the coraco-clavicular ligaments and temporary clavicular fixation with a recall nail going to the coracoid. The muscular-aponeurotic BAUDRIER was regularly and carefully repaired. The 53 cases were reviewed with an average follow-up of 6 years. Results were evaluated both on function and radiology. In 49 of the cases, the result was very good. This study confirms that this technique is very reliable, reason for which we recommend early surgery.

SIC13-05

A COMPARATIVE STUDY OF TREATMENT OF INTERCONDYLAR

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Open reduction and internal fixation with plating is well accepted as the standard modality of treatment of intercondylar fractures of the distal humerus. However, this technique is associated with some problems in certain clinical scenarios e.g. risk of infection in open injuries and mechanical failure in osteoporotic bones. We present a prospective comparative study conducted to evaluate the results following open reduction & internal fixation with plating of intercondylar distal humerus fractures and open reduction and stabilization with an indigenous external fixator system [(Joshi external stabilization system) JESS]. Thirty adult [14 males and 16 females] patients aged between 18-75 years [Average age 44.4] with intercondylar fractures of lower end humerus (AO types C1, C2, C3) were included in the study. Fifteen patients were treated with open reduction and plating while the other fifteen patients were treated with external stabilization system. Immediate active and active assisted elbow motion was started following both modalities of fixation. The minimum follow-up was 6 months with average follow-up of 11 months. The eventual functional outcome was evaluated using the Cassebaum's functional rating system. The average range of motion range [ROM] was 15-130 degrees in patients treated with plating whereas ROM in patients managed with external fixator system was 20-130 degrees. Patients treated by open reduction and dual plating had favorable outcome in 10/15 of cases while external stabilization system yielded favorable results in 11/15 of cases, comparable to that reported in literature.

SIC13-06

FIXATION OF THE PROXIMAL HUMERAL FRACTURE WITH SURFIX LOCKING PLATE: EXPERIENCE WITH A MEAN FOLLOW-UP OF 18 MONTHS

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BACKGROUND: Displaced and unstable extra-articular fractures of the proximal humerus are treated commonly by operative reduction and fixation using various techniques. We report a new technique using a locking plate with screws inserted in a crossed manner. **METHODS:** 99 patients (66 females and 33 males) and median age of 62.8 years (range 23 to 86) were treated by open reduction and internal fixation with Surfix plate from October 2002 to November 2005. As defined by Neer's classification, 25 patients had two part, 37 patients had three part, 36 had four part fractures and 1 had a bilateral four part

fracture. The median follow-up period is 18 months (range 12-27 months). The outcome was assessed using radiographs, Constant-Murley score and DASH score. RESULTS: The mean Constant-Murley was 64.8 and the pondered score fit to age and sex was 85.3% (range 38-126) and the mean DASH score was 30.4 points (range 0-85.8). 70% had a good or excellent result whereas 10% had a poor result. There were seventeen clinically relevant complications (3 pseudarthrosis, 6 avascular necrosis of the humeral head, 2 subacromial impingement, 3 implants loosening, 5 algodystrophy) that required for 7 patients further surgical intervention. CONCLUSION: According to our experience, the plate design provides stable fixation with a good functional outcome and eliminate most hardware problems such as failure, impingement syndrome and avascular necrosis. We believe that the Surfix proximal humeral plate may be a powerful tool in the management of proximal humeral fracture.

FREE PAPERS (2)

*Moderators: Charles Sorbie (Canada)
Said Wahbi (Morocco)*

SIC13-07

REVIEW OF ACROMIO-CLAVICULAR JOINT STABILISATION

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INTRODUCTION: Effectiveness of surgery for acromio-clavicular joint dislocation is a controversy. Multitude of highly variable techniques and equally variable results make the choice of surgical procedure difficult. Open Reduction and Internal Fixation (ORIF) (Intra-articular) with Tension Band Wiring (TBW) and K-wire fixation and Modified Weaver Dunn (WD) Procedure (extra-articular) are the two procedures analysed in this study. METHOD: Retrospective review of case notes of patients admitted for ACJ stabilization procedure. For each patient pro-forma filled in Conducted Telephone review of the cases and obtained the long term functional outcome using Oxford shoulder Scoring System. RESULTS: We had 18 cases of ACJ stabilization over a period of 10 years. 11WD reconstruction and 7 ORIF with TBW. Mean age of the group: 31 years. 70% were males. 77% had Grade 3 Rockwood ACJ dislocation and rest were grade 4. Reason for operative management in majority of them was pain and weakness of shoulder. 4 out of 7 ORIFs had post op complications like wire breakage, impingement and pain. Only 2 out of 11 WD had pain post operatively. All the 4 ORIFs which developed post op complications had the metal work removed. Long term functional results by Oxford shoulder score has shown good result in all the patients irrespective of the type of procedure. CONCLUSION: WD Reconstruction has got less post operative complications and better short term functional outcome compared to ORIF. Long term functional results were same for both types of procedures. SUMMARY: The extra-articular soft tissue procedures have a faster recovery but long term functional results are similar to that of intra-articular ORIF procedures.

SIC13-08

CLINICAL EXAMINATION IN HAND LACERATIONS - HOW ACCURATE ARE WE!

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Being a tertiary referral center for Hand trauma, our hospital has a catchment area of more than 15 hospitals. Clinical examination in Hand trauma is important for decision

making regarding theatre time allocation, level of surgeon, type of anaesthesia required - whether local or brachial, and to prognosticate the patient with respect to post operative recovery and rehabilitation. We retrospectively reviewed 600 cases of hand trauma seen in our Plastic surgery department over 12 months. The clinical examination was carried out by the Senior Registrar in the trauma clinic and the findings were entered on a trauma database. Details regarding the region of laceration, zone of injury, structures involved and whether injury was partial or total were recorded. Operative notes were retrieved from trauma theatre to correlate these findings. The number of true positives, false negatives and false positives were observed. The purpose of this study is to identify the clinical accuracy of our examination. We have also tried to identify zones and structures where injuries are commonly missed.

SIC13-09

LONG TERM FUNCTIONAL RESULTS OF SURGICAL TREATMENT OF RADIAL TUNNEL SYNDROME - 1-13 YEARS FOLLOW-UP

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Between 1994 and 2006, 58 patients (61 extremities) underwent decompression of radial tunnel. The senior author using a brachioradialis muscle splitting approach performed all procedures. 41 patients were available for follow-up evaluation at an average of 47.3 months (12-156 months). The average age of patients was 49.7 years (35-72 years) and the mean duration of their symptoms was 18 months. There were 12 patients (13 extremities) over 5 years follow-up. All had a trial of conservative treatment with steroid injections, physiotherapy and ultrasound. All except 2 had nerve conduction studies which were inconclusive. 14 out of 41 had previous tennis elbow release. The results were evaluated using Mayo elbow scores and DASH scores. Mayo scores improved from a mean of 62.37 pre-op to 87.13 post-op ($p < 0.05$) and DASH scores improved from 67.58 pre-op to 40.12 post-op ($p < 0.04$). 31 patients (78%) were satisfied with surgery while 8 patients were not satisfied (4 patients had other pathologies). There were few complications: neuropathic pain - 1, neuropraxia - 1, and residual pain - 2. Six patients who had simultaneous release of lateral epicondylar muscles and radial tunnel did extremely well and were satisfied. Hence there is a role for simultaneous decompression of tennis elbow and radial tunnel as recent studies suggest that extensor carpi radialis brevis tendon forms a continuous fascial sheath. Based on our results, surgical decompression of radial tunnel gives good results in majority of patients with persistent radial tunnel symptoms with long-term relief.

SIC13-10

CORRELATION BETWEEN CLINICAL OUTCOMES AND RADIOGRAPHIC FINDINGS OF HEMIARTHROPLASTY FOR COMMUNATED FRACTURE OF THE PROXIMAL HUMERUS

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PURPOSE: Purpose of this study was to identify radiographic factors influencing postoperative outcomes of hemiarthroplasty for comminuted fracture or fracture-dislocation of the proximal humerus. **MATERIALS AND METHODS:** Twenty-nine patients with acute comminuted fracture or fracture-dislocation treated by hemiarthroplasty were the subjects of this study. There were 27 females and 2 males whose average age was

74.4 years. According to Neer's classification, 3-part fracture was observed in 8 patients, 3-part fracture-dislocation in 2 patients, 4-part fracture in 14 patients and 4-part fracture-dislocation in 5 patients. The average follow-up period was 55.0 months. Postoperative results were assessed with UCLA shoulder rating scale. Factors analyzed radiographically were as follows; acromiohumeral interval (AHI), humeral offset, medial and lateral projection, a subacromial spur and radiolucent zone of the humeral shaft. RESULTS: The average postoperative UCLA score was 27.2 points. The mean values of AHI and humeral offset were 8.7mm and 28.6mm, respectively. A subacromial spur was observed in 8 patients, and a radiolucent zone of the humeral shaft in 3 patients. There was a significant correlation between postoperative UCLA score and values of AHI and humeral offset. The average UCLA score in the patients with subacromial spur or radiolucent zone was markedly lower than that in patients without them. CONCLUSION: This study suggests that results of hemiarthroplasty may be influenced by factors reflecting functions and conditions of the rotator cuff. We conclude that anatomical reconstruction of the greater tuberosity and the rotator cuff are important to obtain satisfactory outcomes in hemiarthroplasty.

SIC13-11

THE TREATMENT OF THE CEREBRAL PALSY HAND

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Boston University School of Medicine (UNITED STATES)

PURPOSE: To demonstrate an operation carefully done to the right patient can give satisfactory results. METHODS: A study of 116 patients who were treated with severe flexion contracture of the wrist, fingers and thumb, due to cerebral palsy or post-traumatic hemiplegia. Ages ranged from 12 to 65 years. The right upper extremity was involved 70 times and the left 46. Length of time from the establishment of deformity to the operation was from 18 months to 28 years. Follow-up ranged from 2 to 15 years. The operation consisted of a long zig-zag type of incision over the medial border of the lower end of the arm, elbow and medial aspect of the forearm down to the wrist. The origin of all flexors of wrist, fingers and flexor pollicis longus are released from the medial epicondyle, both bones of forearm and interosseous membrane. The ulnar nerve is now found in the ulnar groove, freed from surrounding soft tissues and investing fascia. The nerve is mobilized well proximally in the arm, the medial intermuscular septum is excised, and the nerve is mobilized from it branches and brought anteriorly to elbow. SUMMARY: Results - Excellent 35%; Good 45%; Fair 20%. CONCLUSION: These findings suggest that a properly done flexor slide can obtain a satisfactory end result with useful function to a large number of patients.

SIC13-12

CARPAL TUNNEL SYNDROME: IMPLICATIONS OF NERVE CONDUCTION STUDY AT DISTRICT GENERAL HOSPITAL SETTING

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AIM: To assess the implications of nerve conduction study for carpal tunnel syndrome and its effect on the final outcome after carpal tunnel release. METHODS AND MATERIALS: A retrospective audit of the patients who underwent carpal tunnel release at the district general hospital from July 2000 till June 2005. Due to the un-availability of facility for nerve conduction study at our district general hospital, the patients had to be referred to other hospitals in the region for the same. A total of 263 carpal tunnel releases

were performed during the study period in 206 patients (57 were bilateral). 61 patients were males and 145 were females. RESULTS: 172 of the cases had a classical presentation of carpal tunnel syndrome whereas 91 had an atypical presentation. Of the classical signs group, the nerve conduction study was requested in 76 of the 172 patients while in the atypical presentation group 53 of the 91 patients had a nerve conduction study prior to the operative treatment. DISCUSSION: The average duration between the first consultation and the operative treatment was 72 days in the patients who did not undergo the nerve conduction study, whereas for those who had the nerve conduction study was 180.5 days. The request for nerve conduction in patients with a classical presentation lead to an average 108.5 days delay in the final management of the patients' problem, with no difference in the final outcome. It also causes a significant loss of time and finances.

SIC13-13

THE EARLY RESULTS OF ARTHROSCOPIC ANTERIOR STABILISATION OF THE SHOULDER USING THE BIOKNOTLESS ANCHOR SYSTEM

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INTRODUCTION: Anterior instability of the shoulder is an extremely common condition which is increasingly being treated arthroscopically. There are several methods currently in use to affect a repair of the capsulolabral complex. MATERIALS AND METHODS: We present a series of 16 consecutive patients who underwent arthroscopic anterior stabilisation using BioKnotless anchors (Mitek) between January 2005 and March 2006. The majority were due to trauma and all had demonstrable anterior instability. They were followed up for an average of 11 months (6-18 months) and constant scores were recorded in both arms (the contralateral normal arm being used as a control). RESULTS: There was 1 poor result, 2 good results and 13 excellent results. 1 patient had recurrent dislocation and 1 had symptomatic instability following surgery. The average constant score was 78 (49-87) post-operatively compared to 92 (75-98) in the control arm. There were no other complications encountered. CONCLUSIONS: The Bio-Knotless anchors are a safe and easy to use system and early results are encouraging. Further prospective study is required to validate the long-term efficacy.

Session 13: Upper limb (II)

*Moderators: Erdal Cila (Turkey)
Azzedine Khatib (Morocco)*

CONFERENCE

SICIS13-01

MODERN TRENDS IN OPEN FRACTURES OF UPPER LIMB

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The upper limb differs from the lower limb with regards of vascularity, functional requirement and in tolerating shortening. The hand cannot be replaced by any prosthesis, therefore it should be preserved whenever possible, even with incomplete insensibility. Excision of the wound should be thorough and definitive, leaving only clearly alive tissues, to allow primary internal fixation of fractures, which is the gold standard. In the humerus, plating from the front or behind, usually through the wound, is the internal fixation of choice. Intramedullary nailing though introduced away from the injury zone, has got some disadvantages. The humerus allows shortening to avoid complex internal fixation. Shortening also allows avoiding of vein and nerve grafts and facilitates skin coverage. In the forearm, plating is still the method of choice, in order to preserve rotation of the forearm. Intramedullary rodding might be resorted to in heavily contaminated wounds. Articular fractures should be anatomically reduced and stabilized. External fixation has got its limitations in the upper limb because of the close proximity of the nerves and vessels to the skeleton, Schanz screws also restrict mobility of muscles and joints. External fixation interferes with vascular repair and soft tissue reconstruction. In ischemic limbs, arterial then venous revascularisation should be done using reversed vein graft. A well-planned rehabilitation program is an integral part of the management. The goal is early motion to ensure tendon gliding and joint movement to reduce edema and subsequent stiffness.

FREE PAPERS

SIC13-14

PERIPHERAL NERVE INJURIES AND NERVE GRAFTING

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PURPOSE: To demonstrate that severe injuries of the hand can be treated by nerve grafting with very satisfactory end results. **METHODS:** Previously applied methods of nerve grafting had disappointing results. Over a span of 15 years, new techniques have been used, namely, microscope, microsurgical techniques, and fine suture material. Of 130 patients in this study, 70 involved the median nerve, 40 the ulnar nerve and 20 the radial nerve. Ages ranged from 20 to 60 years. The time from the injury to grafting was from 6 months to 5 years. Evaluation of nerve repairs was according to the British method. Experimental work proved: 1) The detrimental role of tension at the suture line. 2) The deleterious effect of postoperative stretching on successful functional recovery. 3)

Regeneration axons advanced more easily through nerve grafts of 2cm with two tension free anastomoses compared with a single suture under tension. The epineurium was the primary source of connective tissue, proliferation. **SUMMARY:** Motor recovery for Median nerve: Excellent 40%; Good 40%; Fair 20%. Ulnar nerve recovery: Excellent 38%; Good 40%; Fair 22%. Radial nerve: Excellent 42%; Good 38%; Fair 20%. **CONCLUSION:** Encouraging results were obtained providing certain details of the method are strictly followed.

SIC13-15

ELASTOFIBROMA DORSI

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Elastofibroma Dorsi is a rare benign soft tissue tumour usually located at the lower pole of the scapula, deep to serratus anterior and often attached to the periosteum of the ribs, presenting with long history of swelling and occasionally pain and discomfort. This lesion is usually seen in patients over the age of 50 years and is not uncommonly mistaken as a malignant tumour because of its size and location deep to the periscapular muscles. Review of the Orthopaedic Oncology database of 17,500 patients revealed there were 15 patients with Elastofibroma Dorsi. There were 12 males and 3 females, mean age at diagnosis of 68.4 years [range 51-79 years]. The diagnosis was confirmed by MRI in 3 patients, excision biopsy in 3 patients, trucut biopsy in 8 patients and open biopsy in 1 patient. 8 patients had excision of the lesion which was symptomatic. There have been no recurrences. We highlight the clinical and radiological presentation of elastofibroma dorsi to increase awareness of its existence and management.

SIC13-16

EVALUATION OF MACROAMPUTATIONS OF THE UPPER EXTREMITY IN THE MANAGEMENT OF PRIMARY MALIGNANT BONE AND SOFT TISSUE TUMORS USING THE DASH SCORE

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PURPOSE/BACKGROUND: The purpose of this retrospective analysis was to identify patients with macroamputations of the upper extremity due to malign bone- or soft tissue tumors at a single institution. The DASH score (Disability of Arm, Shoulder, Hand) was obtained in order to measure how patients manage daily activities. **PATIENTS AND METHODS:** Between 1998 and 2005, 1652 patients were operated due to a bone or soft-tissue tumour, 370 of these due to a malign one (22%). The tumour was localised in the upper extremity in 86 cases. These constituted 22 bone and 64 soft tissue tumours. Amputations had to be performed in the lower extremity in 14% (35/246) and in the upper extremity in 7% (6/86). Six patients with macroamputations of the upper extremity were identified and in five of these the DASH score was obtained. **RESULTS:** The mean DASH-score was 75.08. Separated in the parts A (function at daily activities), part B (pain, tingling) and part C (sport, music, work) the patients gained 87.4 (of 105), 32.6 (of 45), and 37.2 (of 40) points - whereas the highest score always represents the worst. In part C only two patients worked again and only one played an instrument. **CONCLUSION:** Despite neo-/adjuvant therapeutic options and modified reconstructive procedures 7% of patients with malign bone or soft tissue tumours of the upper extremity had to undergo an amputation. The DASH score is an appropriate instrument to measure the disability after tumour caused upper limb amputation.

SIC13-17**TIME & COST SAVINGS OF ARTHROSCOPIC SUBACROMIAL DECOMPRESSION, THE USE OF BIPOLAR VS MONOPOLAR RADIOFREQUENCY - A PROSPECTIVE, COMPARATIVE RANDOMIZED STUDY**

Mohammed DIAB, Nicholas FERNANDEZ
Dorset County Hospital (UNITED KINGDOM)

Arthroscopic Subacromial Decompression (ASD) is a well established technique for treatment of chronic impingement syndrome of the shoulder. Resection of the CA ligament and debridement of all soft tissues is the first step and usually accomplished with alternate use of soft tissue shaver and electrocautery device, which is often an inefficient and time consuming component of the procedure. However, there are now multifunctional surgical devices that combine tissue removal and haemostasis in single instrument. Coblation device (bipolar radiofrequency) device was used in this trial. This new technology produces less collateral damage due to its cool tissue ablative process. In this study we report the result of prospective randomized comparative study between bipolar (coblation) radiofrequency vs conventional monopolar diathermy in 40 patients undergoing ASD. The group treated using bipolar RF was associated with an average operative time saving of 8 minutes ($P < 0.0001$) and average cost saving of 150 US\$ ($P < 0.003$) compared to the conventional diathermy group. There were no differences in degree of post-operative pain, the time of post-op. Shoulder recovery and return to work and/or full activity of daily life or in overall patient satisfaction between both groups.

SIC13-18**ARTHROSCOPIC SHOULDER CAPSULAR RELEASE FOR FROZEN SHOULDER: IS IT EFFECTIVE?**

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INTRODUCTION: Idiopathic Adhesive Capsulitis [IAC] of the shoulder is a self limited condition that can cause significant morbidity. Most patients (90%) respond to conservative management and those who fail (10%) undergo manipulation under anaesthesia (MUA). Patients who are refractory to both treatments, benefit from arthroscopic capsular release. **AIM:** To assess the efficacy of arthroscopic capsular release in patients with IAC refractory to physiotherapy and MUA. Also to compare the clinical outcome between arthroscopic capsular release and MUA. **MATERIALS AND METHODS:** We studied 59 patients with IAC, divided into 2 groups. Group A [36 patients] had MUA and Group B [23 patients] underwent arthroscopic capsular release. The mean age was (54 years). The mean follow-up was 21 and 9 months for group A and B respectively. **RESULTS:** We assessed our results according to three parameters: 1) Final outcome using the Constant and Murley score. The improvement in the score averaged 42 and 47 points in group A and B respectively. 2) Early Post operative pain using visual analogue score (VAS) average of 6 and 3 in group A and B respectively. 3) Overall patient satisfaction: 81% in group A and 89% in group B. **CONCLUSION:** Patients with IAC who fail to respond to physiotherapy and MUA do well after arthroscopic capsular release with little operative morbidity. Complete normal functional outcome of shoulder is not a prerequisite for patient satisfaction.

Session 13: Upper limb (III)

Moderators: Antero Mäkelä (Turkey)
Hassan Ouaritini (Morocco)

FREE PAPERS

SIC13-19

TREATMENT OF UPPER LIMB DEFORMITIES WITH EXTERNAL FIXATION

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For the treatment of upper limb deformity and lengthening a modified special external hinge distraction system has been developed, which allows the combined treatment of congenital and acquired complex deformities of the upper limbs. From 1995 to 2006 this new system was used in 105 patients with deferent indications in the upper limbs they presented with upper limb length discrepancies and axial deviations and deformities. The hinges used were the modified system of 'Salamehfix'. RESULTS: The used hinge system allows multiplanar corrections, deferent size of arcs are used makes it more suitable in shape and allows joint movements freely, the insertion of wires and pens in nearly right angles makes the fixation more stable in addition to insertion in less painful regions makes it more tolerable, good correction and X-ray control is easy. CONCLUSION: The new developed hinges are easy to use and allow the treatment of complex deformities of the upper limbs.

SIC13-20

FIXED-ANGLE VOLAR LOCKING PLATE IN CONJUNCTION WITH CORRECTIVE OSTEOTOMY FOR THE TREATMENT OF DORSALLY ANGULATED DISTAL RADIUS MAL-UNIONS: A PROSPECTIVE STUDY

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AIM: To report our experience using a fixed-angle volar locking plate in conjunction with corrective osteotomy with or without cancellous bone grafting for the treatment of distal radius dorsally angulated mal-unions. METHODS: Data was collected prospectively including patient demographics, Disabilities of the Arm Hand and Shoulder (DASH) outcome measures, along with motion and strength values. The final follow-up results are presented. RESULTS: The mean length of follow-up was 14 months (Range 10-19). The mean age was 48 years (range 18-74) and 63% (5/8) were male. Patients had initially been managed by K-wire fixation 75% (6/8), External fixation 12.5% (1/8) and conservative 12.5% (1/8). The mean pre-operative DASH score was 74 (Range 62-88), this improved to 18 (range 16-20). The flexion-extension arc of motion increased by a mean of 19 degrees (range 5-31) to a value of 82% (range 75-100%) of the contralateral side. The pronation-supination arc of motion increased by a mean 10 degrees (Range 0-25 degrees) to a value of 96% (range 90-100%) of the contralateral side. The mean grip

strength increased from 16.4kg (Range 0-32kg) to 29kg (Range 12-43kg), which corresponded to 76% (Range 65-90%) of the contralateral extremity. There were no cases of non-union. **CONCLUSION:** Fixed-angle volar locking plate in conjunction with corrective osteotomy with or without cancellous bone grafting is an acceptable alternative to the traditional techniques of distal radius osteotomy including structural bone grafting and dorsal plate fixation or external fixation.

SIC13-21

SHOULDER AND ELBOW ARTHROPLASTY - CAN WE PREDICT THE NEED OF BLOOD TRANSFUSION?

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INTRODUCTION: To present a scoring system to predict which patients are most likely to benefit from predicting the likelihood of blood transfusion in shoulder and elbow surgery. **METHODS:** The current study represents a retrospective analysis of shoulder and elbow arthroplasties performed at our shoulder and elbow unit by the senior authors from Jan 2000 to Dec 2004. Data of 283 shoulder and elbow arthroplasties was used for analysis. The data was analysed to determine potential variables that were predictive of blood transfusion. A total of 283 procedures were identified. The average age was 72 (39-91). 93 shoulder arthroplasties and 42 elbow replacements were performed for arthritis surgery. 87 procedures were undertaken following trauma (59 shoulders & 28 elbows). In addition, there were 39 complex elbow & 8 shoulder revision procedures. 1 excision arthroplasty of shoulder and 13 reverse polarity arthroplasty of shoulder were also undertaken. **RESULTS:** Statistical methods were used to build an ordinary linear regression model of the blood needs of patient undergoing shoulder or elbow arthroplasty. The variables evaluated included type of arthroplasty (shoulder vs. elbow, primary vs. revision, trauma vs. arthritis) and age, sex, medical co morbidity etc. Preoperative laboratory investigations were also assessed including haemoglobin levels. **CONCLUSION:** Using a simple point scoring system developed from the data in this study recommendations are presented to improve the cost effectiveness of blood transfusion requirements in upper limb arthroplasty surgery.

SIC13-22

LONG-TERM RESULTS AFTER PROSTHETIC REPLACEMENT OF RADIAL HEAD FRACTURES

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AIM OF THE STUDY: The study presents the results of a bipolar metal prosthesis in the treatment of unreconstructable radial head fractures and dislocation fractures of the elbow joint. **MATERIAL AND METHODS:** Thirteen patients were treated with the same bipolar metal prosthesis (Tornier SA, Fr) within a period of seven years (1998-2004). Indications were: isolated radial head fractures in four cases (Mason III; group 1), elbow dislocations with radial head fractures in five cases (Mason IV; group 2), and Monteggia injuries in four cases (group 3). Eleven patients could be assessed radiologically and functionally 2.5-9 years postoperatively. **RESULTS:** There were no radiological signs for stem loosening, prosthetic wear, or severe osteoarthritis of the humeroradial joint in any case. The functional result was assessed according to the Geel and Palmer score (CORR 1992). In group 1 and 2 all patients had excellent results with nearly free function without instability and pain. In group 3 all patients had good results with slight motion deficits

mostly in extension and supination. However, all patients were satisfied with the result and returned to former work and leisure activities. CONCLUSIONS: Prosthetic replacement of radial head fractures warrants primary stability of the elbow joint, thus allowing for early functional treatment. Functional outcome seems to be influenced more by concomitant injuries rather than by the prosthesis itself. The excellent and good long-term results advocate for the liberate use of radial head arthroplasty in severe elbow joint injuries.

SIC13-23

KUDO 5 TOTAL ELBOW REPLACEMENT IN PATIENTS WITH ADULT RHEUMATOID ARTHRITIS

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Total elbow prostheses are broadly classified into linked and the unlinked categories. We have looked at long-term results of unlinked Kudo 5 total elbow replacement used in the treatment of patients with rheumatoid arthritis in 2 hospitals. METHODS: 87 Kudo 5 Total elbow replacements in 70 patients with adult rheumatoid arthritis were performed at Wexham Park Hospital, Slough and City Hospital, Nottingham by 2 specialist elbow surgeons, the senior authors. 16 patients had died and 8 patients were lost to follow-up. 62 elbow replacements in 46 patients were evaluated at a mean follow-up of 79 months [29-137 months] using the Mayo Clinic Performance Index. Postoperative radiographs were also reviewed for loosening using standard anteroposterior and lateral films. RESULTS: Preoperatively 6 had moderate pain and 56 had severe pain. Postoperatively the pain was rated as none or mild by 58 and moderate by 4. The average Mayo Elbow Score improved from 37 preoperatively to 86 postoperatively. The mean arc of flexion/extension improved from 60 to 99 degrees. There were 15 complications including ulnar neuropraxia, fracture, dislocation, triceps rupture and loosening. 5 cases were revised, 3 for aseptic and 2 for septic loosening. Postoperative radiographs showed 5 cases with loosening around the ulna component. CONCLUSIONS: The long-term results using the Kudo 5 elbow prosthesis in patients with rheumatoid arthritis are acceptable and comparable to other series reported of this implant. To date this is the largest series reported with the longest follow-up using this implant.

SIC13-24

TOTAL ELBOW REPLACEMENT IN PATIENTS WITH JUVENILE IDIOPATHIC ARTHRITIS - USING LINKED AND UNLINKED PROSTHESES

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Juvenile Idiopathic arthritis patients with elbow problems are difficult to treat. We have reviewed the results of elbow arthroplasty using the unlinked Kudo 5 and the linked Coonrad-Morrey implants which in our practice have different indications dependent upon bone stock and stability. METHODS: The senior author performed 19 total elbow replacements in 13 patients with juvenile idiopathic arthritis. 13 of these are Kudo 5 and 6 are Coonrad-Morrey implants. The mean age at operation was 39 years. 6 of the elbow replacements had undergone previous surgery, 4 had an interposition arthroplasty and 2 a synovectomy and radial head excision. No patients were lost to follow-up. All were evaluated at a mean follow-up of 61 months [18-96 months] using the Mayo Clinic Performance Index. RESULTS: Preoperatively 7 had moderate pain and 12 had severe pain. Postoperatively the pain was rated as none by 13 and mild by 6. The average Mayo

Elbow Score improved from 26 preoperatively to 81 postoperatively. The mean arc of flexion/extension improved from 85 to 108 degrees. 13 elbow replacements had intra and post-operative complications. 3 elbows have been revised, 1 for malalignment resulting in instability and 2 for aseptic loosening of the ulna component. 1 customised extra small implant has radiographic loosening of both components with minimal pain. CONCLUSIONS: The medium-term results of Total Elbow Replacements in patients with Juvenile Chronic Arthritis are acceptable and comparable to published series.

SIC13-25

SHOULDER ARTHROPLASTY FOR IRREPARABLE ROTATOR CUFF TEAR; INDICATIONS AND TYPE OF PROSTHESIS

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Rotator cuff arthropathy (CTA) is a difficult challenge for the surgeon. Standards and dynamic X-rays of the shoulder is sometimes sufficient to choose the indications (unstable and stable shoulder); an arthro MRI or CTScan assess more precisely the cuff and his trophicity. Hemiarthroplasty is indicated for young patient with a painful shoulder but with a good ROM(>120°) and a stable shoulder after failure of rehabilitation or tenotomy of the biceps(arthroscopy).Reverse shoulder arthroplasty is indicated for pseudoparalytic shoulder, superior and anterior migration of the humeral head (unstable shoulder): Deltoid should be strong and glenoid bone stock sufficient. Hemiarthroplasty is also indicated when glenoid bone is weared and not sufficient to implant a glenoid component.We reported 16 hemiarthroplasties and 25 reversed prosthesis implanted in selected cases of CTA between 1995 to 2000. Constant score were similar 60/100 compared to previously 32 cases of hemiarthroplasty implanted without good selection with 48 rate of constant score.

SIC13-26

THE POSTERIOR INTEROSSEOUS FLAP

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The posterior interosseous flap is a fascio-cutaneous flap designed on the postero-lateral aspect of the forearm to cover soft tissues defects of the elbow and the hand. This flap is vascularised by the posterior interosseous artery, a branch of the trunk of the interosseous artery which itself comes from the ulnar artery. We are reporting twelve posterior interosseous flaps performed in our department with very encouraging results: primary and complete healing in six cases, one total necrosis and one venous congestion. Besides, in all of the eight, the clinical and functional outcomes were very satisfying.

SIC13-27

THE MANAGEMENT OF HUMERAL NON-UNION FRACTURES WITH THE USE OF THE T2™-COMPRESSION INTRAMEDULLARY HUMERAL NAIL

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Humeral fractures are not common and account for 5-8% of all fractures. They can

become a problem if non-union develops. The non-union rates are 13% when managed either conservatively or operatively. When non-union does occur it can be extremely debilitating for the patient and a dilemma to the surgeon who has to treat it. There are many described surgical techniques for the management of non-unions such as plate fixation, intramedullary nailing or external fixation all with their own technical difficulties and potential complications. Despite these types of surgery some cases do remain resistant to treatment and the non-union remains. We describe a novel technique using a new design of nail (Stryker T2™) which has a compression system allowing the closure of the non-union fracture gap. 11 patients underwent compression nailing for established non-union fractures of the humerus and reported excellent to good results with their surgery and had radiological union at average of 4.8 months (range 3-12 months). The mean hospital stay post-operatively was 4.7 days and all patients returned to their normal pre-injury level of activities. We conclude that this technique of intramedullary nailing with a novel compression technique can be beneficial in the treatment of humeral shaft fracture non-union.

SIC13-28

OUTCOME ANALYSIS OF SURGICAL INTERVENTION FOR ROTATOR CUFF DISORDERS: A COMPARISON OF SUBJECTIVE AND OBJECTIVE SCORING TOOLS

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OBJECTIVE: To investigate the comparability of subjective and objective assessment scores of shoulder function in the context of rotator cuff pathology. **METHODOLOGY:** Between 2003 and 2006, 333 consecutive patients (183 female; 150 male) undergoing surgery for rotator cuff disorders were followed prospectively. 220 patients underwent solely subacromial decompression, whereas 113 had additional rotator cuff repair (92 arthroscopic; 21 mini-open). Assessments were made pre-operatively, and at 3, 6, 12, and 24 post-operative months using the DASH and Oxford Scores (OS), as well as the Constant score, as a reference scale. The student's t test was used to establish the probability that the mean score for each subjective tool (DASH and OS scores) at each time point would be the same as that of the objective score (Constant). Correlation coefficients (Pearson's test) were calculated to demonstrate the proportionality of the relationships between the subjective and objective tools for the different interventions. **RESULTS:** Strong correlation was demonstrated between the DASH and Constant scores for each intervention over the whole period of follow-up. Specifically, the Pearson test comparing the Constant with the DASH was statistically significant for the majority of treatment groups (mean $r=0.96$), whilst that for the Oxford was insignificant (mean $r=0.89$). **CONCLUSION:** The DASH is readily comparable with the Constant over several time points. In contrast, the Oxford score does not show similar correlation. Our study supports the use of only the DASH score for follow-up, obviating the need for a trained investigator required to conduct a Constant score.

Session 14: Road traffic injuries (I)

Moderators: Vilmos Vécsei (Austria)
Ahmed Elias (Ethiopia)

CONFERENCES

SICIS14-01

ROAD TRAFFIC INJURIES IN AUSTRIA

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Road traffic injuries are a major but neglected public health challenge that requires concerted efforts for effective and sustainable prevention. Worldwide, an estimated 1.2 million people are killed in road crashes each year and as many as 50 million are injured. In Austria, a total of 40,896 road traffic accidents were reported in 2005, leading to 53,000 injured people. Seven thousand people were severely injured, 41,000 were slightly injured. Around 62% of the injured people were victims of car crashes, 15% had a motorcycle accident and 8% were hurt as pedestrians. Approximately 760 people were killed, 56% by car crash, 18% in motorcycle accidents and 12% as pedestrians. Sixty-seven percent of all fatally injured persons died at the scene of the accident, 18% died within the first 24 hours. Whereas the number of people injured by a road traffic accident remains constantly at around 55,000 people in the last ten years, the number of people killed by an accident decreased significantly from 2,500 people in the beginning of the seventies to 768 people in 2005. Above all, an established set of interventions have contributed to these significant reductions in the incidence and impact of road traffic injuries. This includes the enforcement of legislation to control speed and alcohol consumption, mandating the use of seat belts and crash helmets, and the safer design and use of roads and vehicles. Also the initiation of rescue helicopters and the advancement in health system had a positive influence on the survival rate after road traffic injuries.

FREE PAPERS

SIC14-01

NICE GUIDELINES: CT SCAN FOR HEAD INJURY PATIENTS: FEASIBILITY AT A DISTRICT GENERAL HOSPITAL SETTING

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AIM: To assess the implications of implementation of the NICE Guidelines for indication for CT scan in head injury patients. METHODS AND MATERIALS: A retrospective audit of the patients attending our district general hospital with head injuries over a period of one year from October 2004 till Sept 2005. A total of 3,150 patients attending the A & E during the study period were diagnosed to have head injuries. The study involved review of the case notes and radiology results of the 135 patients requiring inpatient treatment for head injury. RESULTS: Rigid compliance with the NICE Guidelines during the study

tenure would have entailed an additional workload of 36 patients requiring a CT scan, of which 28 patients justified the scan during "out of hours" period. One elderly patient with a fatal intracerebral bleed was found to have justified an early CT scan on the criteria of more than one vomiting episode and a history of unconsciousness. **DISCUSSION:** The implementation of NICE Guidelines was found to be implemented in most cases admitted during "working" hours. A reluctance to perform CT scan was encountered during "out of hours" A strict compliance with the guidelines would entail on an average one additional CT scan every fortnight during the "out of hours" period. Implementation of NICE Guidelines was found to tighten the net (and justify a CT scan) in order not to miss subtle early signs of potentially fatal head injuries.

SIC14-02

TRAUMATOLOGIC AND ORTHOPEDIC ASPECTS OF CAR ACCIDENTS IN LUBLIN REGION. TYPES OF INJURIES, GROUPS OF VICTIMS, METHODS OF TREATMENT

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INTRODUCTION: In Poland car accidents are one of main causes of admittance to traumatology and orthopedic wards. Victims of car accidents usually require complex approach with long-lasting treatment and rehabilitation. **MATERIAL:** On basis on material from Department of Pediatric Orthopedics and Rehabilitation in Lublin/Poland, Emergency Wards in Lublin Region and Janów Lubelski Traumatology Ward, authors present aspects of car accidents with description of types of injuries, groups of victims and methods of treatment. **RESULTS:** In studied material the accidents were caused by: drivers (61%), pedestrians (35%), passengers (4%). Injuries of head occurred in 55% of victims, extremities & abdomen in 45%. 40% of victims required neurosurgical treatment and 60% of both surgical and orthopedic/rehabilitation treatment. Method of treatment and outcomes depend on severity of trauma, complexity of injuries and experience of doctors. **CONCLUSIONS:** 1/ Time gap from the accident to proper care for victims is always most important. Outcomes of treatment are not always satisfactory. 2/ Therefore it is important to introduce prophylactic measures against road accidents: a) People: safe passages for pedestrians, care for proper night vision e.g. reflective markings in clothing (e.g. Norway), proper psychological condition of people especially drivers. b) Vehicles: good technical condition, speed limits, obligatory safety belts, airbags and ABS systems, seats for children in car. c) Roads: well marked road signs, wise infrastructure planning, road restoration with introduction of safe crossroads and drives. 3/ Our information and warnings are sent to local governments, schools and administrative institutions.

SIC14-03

ACUTE KNEE TRAUMA: CAN LATERAL VIEW KNEE X-RAY ALONE BE USED AS A SCREENING TOOL?

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INTRODUCTION: Large number of knee X-rays are done incidentally for patients presenting with knee trauma. Using only one lateral view knee X-ray as a screening tool would reduce the cost by 67% as per A Verma et al, an interesting proposition. **AIM:** To determine the validity of lateral view knee X-rays alone as a screening tool for detecting fractures around the knee in acute knee trauma. **PATIENT AND METHODS:** 102

randomly picked X-rays were reviewed. The AP and lateral views were interpreted by a Consultant Radiologist and the findings used as Gold Standard for the study. The lateral views alone were independently interpreted on two different occasions by the (a) Radiographer (b) Emergency Nurse Practitioner A&E (c) Middle Grade Doctor A&E (d) Consultant Orthopaedic Surgeon. RESULTS: There was significant inter observer variation in sensitivity which ranged from 66% to 86% with the highest sensitivity being achieved by the radiographer. The specificity was generally high with a range from 84% to 97%. Though there was a high validity in the case of the radiographer the sensitivity for the other observers was low. CONCLUSIONS: Though there could be a significant saving in terms of resources and unnecessary radiation by doing lateral views alone as opposed to the routine AP & lateral views as first line X-rays, we do not recommend using the lateral views alone as a safe screening tool in knee trauma because of high inter observer variation in sensitivity.

SIC14-04

FACTORS ASSOCIATED WITH DELAY IN OPERATION THEATRES – HOW CAN WE OVERCOME THIS CHALLENGING PROBLEM?

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The British Orthopaedic Association has recommended that all hospitals should have daily, consultant led, trauma lists. This study aimed to assess the effective use of time in the trauma theatre sessions for the theatre, patient, surgeon and anaesthetist, to identify areas/causes of delay and for possible recommendations to implement. This study covered 30 morning and afternoon trauma theatre sessions, over a two-month period (April-May 2006). It was completed with input from the surgeon, anaesthetist and theatre staff using a survey format. Total No. of Trauma Lists - 30; No. of trauma lists performed - 22; 8 Did not occur; 3 lists - no patients for surgery; 3 lists - patients for surgery were cancelled: Pt referred to other hospital; Operation not required; X-rays not available; 1 list - Bank Holiday; 1 list - Training day. There was an average of 1.68 patients / list that underwent an operation with a postponement of 26% of the patients. The reasons for these postponements are: No theatre time - 8 patients; No sterile set - 2 patients; Patient refused operation - 1 patient; Anaesthetist requested investigations - 1 patient; Low potassium - 1 patient. The theatre is not in use before the first case on average 41 minutes. The morning list will generally start later than the afternoon list (53 minutes Vs 29 minutes). RECOMMENDATIONS: Co-ordination between nurses and Doctors; Co-ordination between anaesthetists and surgeons; Theatre nurse training; Availability and completeness of sets/instruments; Protocol for urgent access to old notes and X-rays; Integrated Care Pathway (ICP) for trauma patients; Increase in anaesthetic staffing.

SIC14-05

TREATMENT OF FRACTURE CONSEQUENCES IN LONG BONES OF THE EXTREMITIES WITH LOCKING PLATES AND NAILS

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AIM: Consequences after fracture of long bones (old, non-united, malunited fractures, pseudoarthrosis) are one of the most common reasons for invalidity. MATERIALS & METHODS: Data of 111 patients, ages from 18-83 years, who underwent osteosynthesis with locking nails & plates, are analyzed. Most often osteosynthesis is performed in the complicated clinical-anatomical situations with the presence of osteoporosis, bone defects, joint contractures, loosened or broken metal plates or nails. In 78 patients osteosynthesis performed (34 - upper limb, 44 - lower limb) with Locking Compression

Plate (LCP). The time of trauma varied from 1 month to 1 year. Re-osteosynthesis is carried out in 10 patients. We used various intramedullary locking nails (33 patients) and LCPlates (Synthes, Switzerland and ChM, Osteomed - Russia). In 4 patients we performed mini invasive osteosynthesis. And in 1 patient, osteosynthesis is carried out successfully with LCP for periprosthetic fracture. In the post operative period, we allowed patients to do functional movements with out blaster bandages. RESULTS: In almost all the patients we got good consolidation of fractures. In 1 patient, we observed stress fracture of the locking plate which is done for the comminuted fracture of the humerus. Rest of the patients, are under observation with good radiological signs of fracture union. The advantages of this type of osteosynthesis we observed are the following:- gives stable fixation in comparison to the traditional osteosynthesis especially during complicated clinical-anatomical situations;- high degree of fixation stability allows activating the patient in the early post operative period with out blaster bandages.

SIC14-06

RESULTS USING TECHNIQUE OF MINIMALLY INVASIVE PERCUTANEOUS PLATE OSTEOSYNTHESIS (MIPPO) FOR FRACTURES OF THE TIBIAL CONDYLE

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Fracture of the tibial condyles is a commonly encountered fracture in orthopaedic practice. Accurate anatomical alignment of these fractures is essential to restore joint congruity and allow early knee mobilization. The conventional technique of open reduction and internal fixation (ORIF) requires wide exposure, extensive soft tissue stripping with subsequent risk of infection. 15 patients with tibial condyle fractures were operated by technique of MIPPO. After reducing the fracture by indirect reduction techniques under image intensifier, a 'T' or 'L' plate was slid subperiosteally along the track made by the periosteum elevator. After confirming the reduction on the image intensifier, the proximal screws (6.5mm) were introduced followed by distal cortical (4.5mm) screws through stab incisions. Mobilization (Knee Range of motion) of the patient was started from 3rd day after inspection of the suture line. Weight bearing was permitted 3 months post-operatively after radiographic evidence of ongoing bony union. Restoration of joint congruity was achieved in 13 patients. No wound infection was encountered. Stable fixation with minimal soft tissue insult allowed for early mobilization resulting in full knee range in 12 patients and good range in the remaining 3 patients. Considering all the above advantages we recommend MIPPO over conventional open reduction and fixation techniques for tibial condyle fracture fixation.

SIC14-07

TREATMENT OF BILATERAL TIBIAL PLATEAU FRACTURES WITH THE USE OF LOCKED PLATE BY A LATERAL APPROACH ONLY

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Department of Orthopedic Surgery "Meir" General Hospital, "Sapir" Medical Center, Kfar-Saba, (ISRAEL)

PURPOSE: Describe our experience with 11 cases of bilateral tibial plateau fractures (Schatzker 5,6) treated only by lateral approach and locked plate. METHODS: 11 patients suffered from bilateral tibial plateau fractures Schatzker 5 and 6, were operated 1-17 days following admission. The patients were operated using lateral approach. After achieving reduction, one or two lags screws parallel and adjacent to the plateau were inserted. A

pre-contoured locked plate with 3-4 locked screws parallel to the plateau was inserted. 3-4 more diaphyseal-metaphyseal locked screws were inserted. The patients were placed in a range of motion splint for 3 months without bearing weight on the operated extremity. RESULTS: All fractures were healed. There were no cases of infections. 5 patients had excellent results, 5 had good results, and 1 patient with poor result. DISCUSSION: The angular stability of the locked plate makes it possible to fix bilateral plateau fractures with lateral approach and only one lateral plate with locking screws reaching and holding the medial condyle. Compared to the bilateral approach there is less exposure and less damage to the contused soft tissue and the blood supply to the bone is preserved. All these factors are contributing to avoid infections and achieving union. The two incisions with double plating were known as the dead bone sandwich with high rate of infections and nonunion. With our one incision and a locked plate we achieved 100% union with no infections. The fixation was stable and we got no cases of loss of reduction.

SIC14-08

THE USE OF HANDS FREE CRUTCH IN PATIENTS WITH MUSCULOSKELETAL INJURIES

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Unilateral musculoskeletal below knee injuries occur with great frequency. Patients who cannot bear weight on an injured limb usually mobilize with standard crutches. However, when the patient also has an upper limb injury, mobilization may be impossible and can result in a lengthy in-patient stay. A randomized control trial was conducted on 80 patients to share our experience with the innovative "Hands Free Crutch" (HFC) and discuss the potential of this device to be used more often in orthopaedic surgery. We present its value in facilitating early discharge in patients with both upper and lower limb injuries. We show the cost benefit of the decreased in-patient stay that the hands free crutch provides.

Session 15: Adult knee disorders

FREE PAPERS (1)

Moderators: Gonzalo Vazques-Vela (Mexico)
Driss Bennouna (Morocco)

SIC15-01

MEDIAL OPENING WEDGE HIGH TIBIAL OSTEOTOMY USING WEDGE OTOGRAFT AND PLATE

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INTRODUCTION: High tibial osteotomy is recommended for varus deformity and medial arthrosis of the knee. In this study we aimed to introduce an easy technique for high tibial osteotomy. **MATERIAL:** 55 operations were performed in 53 patients. 10 patients were male and 43 were females with a mean age of 56.1 years (42-73). Preoperative knee score was 68 (44-77) according to Hospital for Special Surgery (HSS) Knee Score. According to Ahlback 29 patients had grade I, 21 had Grade II and 3 had Grade III arthrosis. **SURGICAL TECHNIQUE:** An oblique osteotomy was done from medial to head of the fibula by using a guide wire with medial incision. Osteotomy site was opened until 10 degrees of knee valgus was obtained. Triangular bone graft from the iliac crest was inserted to the osteotomy site. The stabilization was achieved with use of medial mini plate with two to four screws. Early range of motion exercises were given to all patients. **RESULTS:** The mean follow-up was 25 (14-38) months. The average valgus correction was 17°. And the average loss of correction was 5 degrees and HSS knee score was 83 (64-91) at the 12 months flow up. Loss of fixation was seen in one case. Postoperative cast immobilization was made for 2 patients because of insufficient fixation. **CONCLUSION:** Wedge otograft and mini plate fixation of medial open wedge osteotomy of tibia without severe osteoporosis provides cheap, easy and effective treatment.

SIC15-02

A SHORT TERM FOLLOW-UP OF OPEN WEDGE HIGH TIBIAL OSTEOTOMY USING LOCKING COMPRESSION PLATE®

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PURPOSE: To evaluate the usefulness and surgical technique of open wedge high tibial osteotomy (HTO) using Locking Compression Plate® (LCP®). **MATERIALS AND METHODS:** From May 2003 to January 2005, eleven open wedge high tibial osteotomy using LCP® were performed and the average follow-up period was 17.8 months. We evaluated knee score and function score for clinical results, and the degree of varus deformity, the distance of joint space, the posterior tibial slope and the medial instability for radiographic results. **RESULT:** Knee score improved from 54.8 points to 95.9 points, and function score improved from 57.3 points to 88.2 points. The femorotibial angle was corrected from 4.1° varus to 9.9° valgus. The posterior tibial slope did not show a significant change. The distance of joint space increased from 3.3mm to 4.3mm. The medial instability was not observed. **CONCLUSION:** The open wedge HTO using LCP®

was accomplished gaining corrected angle, decreasing loss of corrected angle, and improving knee function. The operative technique prevented the posterior tibial slope from increasing.

SIC15-03

RESULTS OF MICROFRACTURES TECHNIQUE IN TREATMENT OF ISOLATED CARTILAGE LESIONS OF THE KNEE

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MATERIAL AND METHODS: Between 2001 and 2005, 44 patients with grade IV Outerbridge isolated cartilage lesions of the knee were operated by arthroscopic microfractures technique. Size of the cartilage lesion was 2.5cm² in average (extremes between 1.5-5cm²) and site in all three compartments of the knee (medial condile-28, lateral condile-10 and femoral trochlea-6). The average follow-up time was 28 months (7 to 51 months). The results were evaluated according to Lysholm and ICRS scores, before and at 3 and 12 months after surgery. ICRS score allows a "second look" arthroscopic cartilage repair assessment, as well. The next day after surgery, CPM (continuous passive motion) and walking without weight bearing on the operated leg were encouraged. Weight bearing was forbidden for 8 to 12 months after surgery. In 13 cases a "second look" arthroscopy at 6 to 11 months after surgery was performed. **RESULTS:** Lysholm average score grew from 55 before surgery to 64 at 3 months and 71 at 12 months after surgery. ICRS average score changed from 54 before surgery to 66 at 3 months and 72 at 12 months after surgery. Clinical outcome of the patients has very much improved. Cartilage repair assessment score after a "second look" arthroscopy encountered an average of 8.1 points. **CONCLUSIONS:** Microfractures technique is a simple procedure with a very fast learning curve. It may be performed even by mini arthrotomy (doesn't need any special equipment and training) and offers fair clinical results and a satisfactory coverage of the cartilage defect.

SIC15-04

3.0T MR IMAGING OF POSTTRAUMATIC CARTILAGE DEFECTS OF THE KNEE TREATED BY MICROFRACTURING

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INTRODUCTION: In the last 20 years many a method has been introduced for surgical repair of cartilage defects of the knee joint. We have looked upon 18 patients, who have been treated by microfracturing as described by Steadman et al. These patients went under diagnostic 1 to 3 years post operatively with 3.0 tesla magnetic resonance imaging. The results of this investigation are to be presented. **METHODS:** Using the MOCART (Magnetic Resonance Observation of Cartilage Repair Tissue) Scheme as described by Marlovits and Trattinig radiological scoring was performed on 3.0T MRI. With this observation method MRI rating of cartilage defect areas could be accomplished. This included validation of repair-cartilage surface, filling of the defect area, interface with surrounding hyaline cartilage, structure and adjacent bone marrow. Microfracturing had been carried out according to Steadman on the femoral condyle. **RESULTS:** Using 3.0T MRI we were able to map the cartilage regeneration area and were able to show that the

repair cartilage was duly inhomogenous, although in most cases isointense compared with surrounding hyaline cartilage. This coincides with the fact that microfracturing activates fibrous cartilage tissue filling the defect. It could also be shown that bone hypertrophy is rather common as well as the formation of bone cysts. DISCUSSION: It is acclaimed that microfracturing activates the production of fibrous cartilage in the cartilage defect area. This can be well reproduced using the non invasive 3T MRI. The induction of bone hypertrophy and the formation of subchondral bone cysts could be well documented by the high resolution of 3.0 T MRI.

SIC15-05

THE VALIDITY OF T2 MAPPING FOR THE FOLLOW-UP AFTER MICROFRACTURING - IS THERE A CORRELATION BETWEEN CLINICAL AND MRI FINDINGS?

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INTRODUCTION: Presently three different techniques to directly visualize the molecular structure of cartilage are considered to be of promise: delayed gadolinium-enhanced MRI of cartilage (dGEMRIC), T1rho and T2 mapping. T2 mapping provides information on collagen network organization and concentration. As 3.0 T units become more and more established in clinical routine, the integration of T2 mapping in monitoring of cartilage repair may be useful. MATERIAL AND METHODS: After microfracturing of the knee joint 18 patients have been radiologically scored by 3.0T MRI and T2 Mapping and clinically by the Lysholm Score. Microfracturing was performed according to Steadman's guidelines. The assessment was performed at least one year after operation in order to achieve a final result. We compared T2 values of repair sites and native cartilage with a paired, double tailed t-test. Relative T2 values were calculated for correlation. The Spearman Correlation Coefficient (rs) and unpaired, double tailed t-tests were calculated. $P < 0.05$ was defined as significantly different. RESULTS: Global T2 values of repair sites differed significantly from T2 values of native articular cartilage ($P = 0.001$). We found statistically significant correlation between the Lysholm Score and the global T2 values ($rs\ 0,666$, $P = 0,018$). DISCUSSION: Although microfracturing cannot provide the generation of articular hyaline cartilage, the evaluation of global T2 values appears to be a valuable measurement for the follow-up after microfracturing of the knee joint. As these are preliminary results, the evaluation of a larger population size is necessary for the corroboration of these results.

SIC15-06

DOES EARLY PREOPERATIVE OSTEOARTHRITIS AFFECT OUTCOME AFTER AUTOLOGOUS CHONDROCYTE IMPLANTATION?

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PURPOSE: We attempted to identify whether patients with early evidence of osteoarthritis (OA) on their pre-operative radiographs were associated with poorer outcomes after Autologous Chondrocyte Implantation (ACI). METHODS: We retrospectively reviewed radiographs of 94 consecutive patients who underwent ACI and had already had their knee function assessed according to the Modified Cincinnati Score

2 years following surgery. Changes were graded according to The Kellgren and Lawrence (K&L) and the Stanmore grading system. Two independent observers analysed the films to assess the reproducibility and accuracy of these grading systems for assessment of OA in the knee. RESULTS: Patients were divided into 2 groups; Group A were patients with excellent/good outcome (52 patients), those with fair/poor outcome were Group B (42 patients). 13 patients in Group A and 21 patients in Group B had radiographic evidence of OA ($p < 0.025$). In 34 patients who had OA (mean age 33.6) the increase in Cincinatti score following surgery was minimal (33.5 to 37.5). In 60 patients where there was no evidence of OA (mean age 33.7) the score increased from 40 to 53.4. The inter-observer variation was greater using K&L (Kappa=0.31) compared with the Stanmore grading systems (Kappa=0.72). CONCLUSIONS: Patients with early radiographic evidence of OA are unlikely to gain maximum benefit from ACI. Furthermore, we recommend the use of Stanmore grading system for the assessment of OA as it is more reproducible than the K&L grading system.

SIC15-07

EVALUATION OF THE MODIFIED ELSLIE TRILLAT PROCEDURE FOR PATELLO-FEMORAL DYSFUNCTION

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AIM: The aim of this study was to evaluate the Elmslie-Trillat procedure carried out for recurrent patellar dislocation, patellofemoral pain, or a combination of both. PATIENTS AND METHODS: Between 1997 and 2003, twenty-nine patients underwent an Elmslie-Trillat procedure which consisted of a lateral retinacular release and medialisation of the tibial tubercle for recurrent patellar dislocation, patellofemoral pain or both. All the patients were evaluated subjectively, objectively using the Fulkerson functional knee score and radiologically. RESULTS: The average age of the patients was 36 years. The mean follow-up was 45 months (24 to 74). Subjectively, 19 patients (66%) had excellent or good results and 7 knees (24%) had a fair result. All the patients with a dislocation of the patella had an excellent or good subjective result, whilst only 3 knees (34%) in patients with the primary symptom of patellofemoral pain and 4 knees (44%) with both symptoms had a good or excellent result. The mean Fulkerson's functional knee score was excellent for patients with dislocation only, and fair for those with only pain or both pain and dislocation. The congruence angle was corrected in all the patients by this method. There were no further dislocations in our series. Two patients required removal of metal work. CONCLUSION: We conclude that the Elmslie-Trillat procedure is a good surgical option for treatment of recurrent patella instability, following failed conservative therapy. However, the results are not as favourable for patients with anterior knee pain.

SIC15-08

ARTHROSCOPIC POSTERIOR CRUCIATE LIGAMENT RECONSTRUCTION (2-9 YEAR RESULTS)

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OBJECT: We present two to nine year results of Arthroscopic Posterior Cruciate Ligament Reconstruction using four strand hamstrings. MATERIAL & METHODS: The two tunnel surgical technique was first used in 1994. There were seventeen male patients in this series of which two were lost to follow up. The mean age was twenty-five years. All were isolated Posterior Cruciate Ligament injuries except for two where there was a combined Anterior and Posterior Cruciate Ligament rupture. The patients with

concomitant ligament injuries and Osteoarthritis grade III/IV were excluded. The patients were assessed using IKDC, Lysholm and Tegner score, X-rays and finally tested on KT 1000. A fast track rehabilitation was carried out without a brace. RESULTS: Sixteen patients were reviewed at 4.1 years (2-9). One was lost to follow-up. Good or excellent results were in 90% of patients on Lysholm score. 92% achieved normal or near normal results on IKDC assessment. Less than 2mm of AP translation occurred in 70% of cases on KT 1000. One patient required removal of the femoral staple and developed R.S.D. One developed superficial infection that responded to antibiotics. CONCLUSION: Two-tunnel surgical technique was first used in 1994. We believe that it is possible to provide good medium term results by an Arthroscopic Posterior Cruciate Ligament reconstruction using four strand hamstrings. Over the past twelve months we have now gone on to a three-tunnel technique. The early results of this are promising.

SIC15-09

INTRA-ARTICULAR MIGRATING BONE MARROW EDEMA SYNDROME OF THE KNEE

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Intra-articular migration of bone marrow edema syndrome (BMES) is a very unusual pattern of disease which has been previously described in only a few cases and may raise the suspicion of an aggressive disease. We reviewed 8 patients (4 female, 4 male) with unilateral BMES located in the knee. The patients were aged 39-56 years (mean 50.2). In all the patients bone marrow edema (BME) found in the primary magnetic resonance imaging (MR imaging) migrated within the same joint, i.e. from the medial to the lateral femoral condyle or to the neighboring bone. Conservative therapy including limited weight-bearing for a period of three weeks was provided for seven patients after initial detection of BMES and one patient underwent surgical core decompression twice. MR imaging showed complete restitution in 6 cases and small residual edema in one case. A final MR imaging control was not obtained in one painless patient. In one patient, avascular necrosis of the contralateral hip was evident after 16 months. Improvement of the MR imaging pattern was correlated with the clinical outcome in all patients. All patients became asymptomatic after a mean of 9 months (6-11). Intra-articular migrating BMES is a condition seen very rarely. The disease is self-limited so that conservative therapy can be recommended.

SIC15-10

MANAGEMENT OF TRAUMATIC MENISCAL TEAR WITH SPECIAL SUTURE MATERIAL – AN ALL-INSIDE TECHNIQUE – OUTCOME MEASURED WITH LYSHOLM SCORE COMPARED WITH INSIDE OUT TECHNIQUE

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INTRODUCTION: Different methods and materials are used for Meniscal Repair. We have used the all-inside technique by using special suture all inside technique (type of suture material). This suture material was introduced a few years ago. We have treated 12 patients with this technique. METHOD: Prospective study. Patients were carefully selected with meniscal tears as shown in the MRI scan with red-red or red-white zones. Repairs carried out under tourniquet control using arthroscopic portals and the all-inside technique with Rapid loc. Portals were closed with steristrips and patients were discharged on the next day. Post operatively patients were advised to partially weight

bear for 6 weeks followed by full weight bearing. RESULTS: In our study ten patients suffered Medial Meniscal Injuries and two patients sustained lateral Meniscal injuries. Average operative time was 35 minutes (Tourniquet time). Average age was 34 years with an average follow-up of 18 months. No immediate postoperative complications were seen and results were evaluated using the Lysholm score. Average score was 92.5. DISCUSSION: This is a new and simple technique. Controlled compression is achieved across the Meniscal tear, flexible in fixation with less operative time. Early results are encouraging showing no intraoperative complications. Average Lysholm score was 92.5 and they are comparable with the standard published technique.

CONFERENCES

*Moderators: Jacques Caton (France)
Hassan Mechatte (Morocco)*

SICIS15-01

PATELLAR HEIGHT ABNORMALITIES - PATELLA ALTA-PATELLA INFERA - DIAGNOSIS AND TREATMENT

Jacques CATON

Clinique Emilie de Vialar (FRANCE)

INTRODUCTION: For the diagnosis of patella alta or patella infera it is necessary to know the normal patellar height. There are many techniques to measure patellar height which have been described in the literature but the most common and the easier was the method according to the Caton-Deschamps index. Since 1977 we have been using our assessment index (J. Caton) modified in 1982 (J. Caton - G. Deschamps). The measurement of patellar height is made on the X-ray sagittal view taken between 10 and 80° of flexion. MATERIAL AND METHOD: The patella is high (patella alta) when the Caton-Deschamps index is superior or equal to 1.2 (normal index is 1) and the patella is low (patella infera) when the index is inferior or equal to 0.6. Patella alta is rarely an isolated finding and is most often part of a regional patello femoral dysplasia with functional problems and knee instability. Patella infera is frequently a complication of a lesion of the knee. In the majority of cases patella infera is secondary to iatrogenic mechanical lowering of the patellar tendon. It can also occur as a consequence of a reflex inflammatory sympathetic dystrophy syndrome with a distinctive pathology dominated by pain and knee stiffness mainly in the inflammatory form. TREATMENT: In patella alta the lowering of the patella with a normal index is necessary to obtain a good outcome but if the patella alta is associated with a patello-femoral dysplasia the surgical treatment must absolutely take into account other abnormalities to obtain a satisfactory result: medial translation of the tibial tuberosity, groove osteotomy. - In patella infera the preoperative planning requires assessment of the patellar vertical height but also of the patellar tendon length on MRI (normal length 4.5cm). Surgery is useful when the patellar tendon appears satisfactory longer than 2.5cm. The tibial tubercle is detached and raised according to the distance necessary as described by J. Caton in 1982. When the patellar tendon is retracted ≤ 2.5 cm it is often necessary to perform a patellar tendon lengthening as proposed by H and D Dejour in 1995. RESULTS: 77% in patella alta of patients had a perfect post-operative stability with a very good outcome. The patella infera syndrome of tubercle origin gave 83% excellent and good results with the proximal transfer of the tubercle. Patella infera syndrome of quadricipital origin gave 75% good and very good results; in these cases the treatment is very difficult.

FREE PAPERS (2)

SIC15-11

ARTHROSCOPIC INTERNAL MARSUPIALIZATION OF MENISCAL CYSTS: TECHNIQUE AND OUTCOME

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INTRODUCTION: Meniscal cysts begin with extrusion of synovial fluid through a tear of the meniscus, enlarging probably as a result of a one-way valve effect of the tear flap. We describe a technique of arthroscopic internal marsupialization of meniscal cysts with or without meniscectomy. **METHODOLOGY:** Patients with medial or lateral meniscal cysts confirmed on MRI prospectively underwent arthroscopic marsupialization. A 5mm channel was created in the joint capsule adjacent to the cyst arthroscopically for decompression of the cyst into the joint, thus equalising pressures between the cystic and intra-articular compartments. Only unstable meniscal tears were debrided down to a stable rim while intact meniscii or stable tears were left alone. Patients were monitored for cyst recurrence and clinical evidence of joint arthrosis during outpatient follow-up. **RESULTS:** Eight patients aged 37.2 years (18-49 years, S.D.11.4) with no or minimal trauma presented with lateral (6 knees) and medial (2 knees) meniscal cysts confirmed on MRI. Arthroscopic marsupialization of the cyst was performed in all knees. Associated meniscal tears were present in 6 knees, 4 of which required arthroscopic partial meniscectomy. Associated knee degenerative pathologies were present in 3 knees. Tegner scores averaged 5.4 (3-8, S.D.1.9) pre-operatively and 5.1 (3-8, S.D.2.1) at a mean follow-up of 39.1 months (12-94 months, S.D.26.4). Lysholm scores averaged 94.4 (85-100, S.D.5.4) at last follow-up. No cyst recurred. **CONCLUSION:** Arthroscopic internal marsupialization effectively decompresses meniscal cysts and prevents their recurrence, while preserving meniscal tissue and potentially minimising arthrosis of the knee joint.

SIC15-12

THE STUDY OF MRI FOR THE DONOR SITE CHANGES IN KNEE TREATED WITH OSTEOCHONDRAL AUTOGRAFT TRANSFER

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OBJECTIVES: Osteochondral autograft transfer is recently applied to osteochondritis dissecans (OCD), osteonecrosis of knee (SONK) and early stage of osteoarthritis (OA). We took MRI images of the donor site and followed up its repair condition. **MATERIALS AND METHOD:** This study evaluated 13 patients, consisted of 6 males and 7 females, whose mean age was 45.2 years, with 5 OCD, 4 SONK and 3 OA patients. Mean follow-up period was 14.2 months. MRI was performed postoperatively at 3 months, 6 months and 12 months, and evaluated the MRI findings and backgrounds of the patients. The donor site revealed equivalent signal to the surrounding tissue was regarded as restoration. Presence of patellofemoral osteoarthritis was evaluated on radiographs. **RESULTS:** Average age of the 7 patients with restoration and the 6 patients with non-restoration was 37.4 years and 69.2 respectively. Five patients under 18 years obtained restoration within 6 months postoperatively. Four patients over 65 years did not show any restoration, and patients under 65 years showed good restoration of the donor sites. Patellofemoral osteoarthritis was observed in 2 patients with 2 donor sites more than 9mm. **CONCLUSION:** Patients under 65 years obtained good restoration disregarding number and size of the donor site. Patients over 65 years obtained insufficient

restoration, and radiographs of the patients over the middle age with multiple donor sites more than 9mm showed patellofemoral osteoarthritis. Therefore, harvesting osteochondral plug more than 9mm should not be performed and bone filling may be indicated for such patients.

SIC15-13

RESULTS OF OSTEOCHONDRAL AUTOLOGOUS TRANSPLANTATION IN THE KNEE JOINT - A FOLLOW-UP OF 1-4 YEARS

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The aim of this study was to evaluate the clinical and radiological results of osteochondral autografting in the knee using standardized functional outcome analysis and magnetic resonance imaging. We performed a prospective study and followed up 20 patients with symptomatic osteochondral defects in both medial and lateral femoral condyles in the knee joint 1 to 4 years post surgery. In the study included were 9 men and 11 women. The average age was 39.4 years (age range: 21 to 59 yrs). The grafts were harvested from the ipsilateral, anterior knee region using an insider rinsing diamond bone-cutting instrument (DBCS) and were implanted using press fit technique. The clinical outcome was assessed by the Lysholm score and a subjective evaluation knee form based on the principles of IKDC and KOOS scores. All patients had MRI scans as part of the radiological follow-up. The median Lysholm knee score was 74. Three patients had excellent results, 6 very good, 5 good, 3 satisfying and 3 bad results. Eleven patients were able to perform activities that were not possible pre-operative. Twelve patients returned back to their work environment. The radiological control confirmed the integration of all grafts but revealed incongruence of articular cartilage and inhomogeneity in most of the patients. The radiological outcome did not correlate with the clinical results. The good functional outcome, the pain relief and the overall improved life quality define autologous bone cartilage transplantation as an efficient, alternative operative treatment of traumatic and degenerative lesions of the knee joint.

SIC15-14

TREATMENT WITH HYALOGRAFT C IN THE KNEE: FIRST RESULTS AT FIVE YEARS

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INTRODUCTION: Matrix associated transplantation techniques aim to improve autologous chondrocyte implantation as introduced by Brittberg. At the Medical University of Vienna, Department of Orthopedics matrix associated autologous chondrocyte transplantation is performed with Hyalograft C, a bio scaffold based on hyaluronan. **METHODS:** Between December 2000 and November 2005, 51 patients were treated with Hyalograft C in the knee joint. 29 were male, 22 female, 48 had single defects, 3 had multiple defects. Mean defect size was 4.4cm². 39 cases showed defects on the medial femoral condyle (MFC), 6 cases on the lateral femoral condyle (LFC). 2 had patellar defects, 1 tibial, 1 MFC/LFC, 1 tibial/MFC and in one case multiple defects on the MFC were treated. Clinical follow-up was carried out with three established knee scoring systems: the Lysholm Score, a modified Cincinnati Knee Score and the IKDC Knee

Forms. RESULTS: Before surgery, the Lysholm Score was mean 56.9, the modified Cincinnati Score mean 2.7 and the subjective IKDC Knee Score mean 39.8. At 5 years the Lysholm was mean 83.5, the modified Cincinnati Score mean 7.0 and the subjective IKDC Knee Score mean 62.9. Clinical outcome significantly improved in all scores at all times. Graft delamination occurred in 2 cases, 8 patients underwent a total replacement of the knee joint due to progressing osteoarthritis. DISCUSSION: The outcome after treatment with Hyalograft C seems to be comparable to autologous chondrocyte implantation if used under correct indication. Simpler surgery and lower morbidity can be considered advantages of the technique.

SIC15-15

TWO TO THREE YEAR FOLLOW-UP RESULTS OF AUTOLOGOUS CHONDROCYTE IMPLANTATION (ACI) VERSUS MATRIX-INDUCED AUTOLOGOUS CHONDROCYTE IMPLANTATION (MACI) FOR OSTEOCHONDRAL DEFECTS OF THE KNEE - A MULTICENTRE, PROSPECTIVE, RANDOMISED CONTROLLED TRIAL

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INTRODUCTION: Autologous Chondrocyte Implantation (ACI) is used widely as a treatment for symptomatic chondral and osteochondral defects of the knee. We report the minimum 2-year follow-up results of 217 patients randomised to ACI using porcine-derived collagen membrane as a cover (ACI-C) and matrix-induced autologous chondrocyte implantation (MACI) for the treatment of osteochondral defects of the knee. METHODS: 217 patients (mean age 34.2) were randomised to have either ACI (92 patients) or MACI (125 patients). 1 year following surgery, patients underwent check arthroscopy (with or without biopsy) to assess the graft. Functional assessment was performed yearly by using the Modified Cincinnati Knee score, the Bentley Functional Rating Score and the Visual Analogue Score. RESULTS: In the ACI group the Cincinnati score increased from 45.2 pre-operatively to 56.7, 54.1, and 65.4 at 1 year, 2 years and 3 years respectively. In the MACI group the Cincinnati score increased from 45.5 pre-operatively to 59.9, 58.9, and 63.4. Arthroscopic assessment showed a good to excellent International Cartilage Repair Society score in 91.4% of ACI-C grafts and 76.1% of MACI grafts. Hyaline-like with fibrocartilage was found in biopsies of 48.6% of ACI-C grafts and 30.5% of MACI grafts. CONCLUSIONS: ACI grafts are more likely to produce hyaline-like or mixed hyaline-like cartilage and fibrocartilage with better ICRS grades than MACI grafts. However, this does not translate to better a clinical functional outcome. More importantly, ACI and MACI had similar results that were maintained at 3 years.

SIC15-16

THE USE OF THE SHORT FORM 36 HEALTH SURVEY TO ASSESS OUTCOME AFTER AUTOLOGOUS CHONDROCYTE IMPLANTATION

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METHODS: We prospectively used the SF-36, Modified Cincinnati Score, Bentley Functional Rating Score and the Visual Analogue Score to evaluate 105 patients pre-operatively and 1 year following surgery. RESULTS: The mean age of the patients were 33.6 (range 16 to 51) and there were 58 females and 47 males. The Modified Cincinnati Score increased from 45.4 (range 8 to 85) before surgery to 60.1 (12 to 100) following surgery. The overall SF-36 score increased from 421.7 to 532 post-operatively

(normalised general population score is 660). Physical function (PF = 10.7), bodily function (BF = 12.4), role physical (RP = 29.6) and role emotional (RE = 21.8) were most significant increases within this scoring system. PF, BF and RP correlated very well with the Modified Cincinnati score (Pearson correlation co-efficient = 0.62, 0.63 and 0.71 respectively). CONCLUSIONS: There was an overall increase of SF-36 scores following surgery, reflecting improvements to perceived health. Significant improvements were seen in the physical categories of PF, BF, RP and RE which correlates well with the Modified Cincinnati Score (a functional knee score). We have also demonstrated that emotional and mental well being normalises following surgery (not previously described) and therefore we recommend the use of both a knee function scoring system and the SF-36 for assessment of patients before and after knee surgery.

SIC15-17

THE RELATIONSHIP BETWEEN THE IN VIVO MEASURED STIFFNESS AND THE HISTOLOGICAL STAGE OF DEGENERATION OF HUMAN KNEE ARTICULAR CARTILAGE

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PURPOSE: To determine the relationship between the in vivo indentation stiffness and indices of histopathological degeneration of human knee articular cartilage. **MATERIALS AND METHODS:** Cartilage compressive stiffness was measured in 98 patients during in vivo knee arthroscopies. The age of the patients ranged from 21 to 63 years (mean age 29 years). Male to female ratio of the patients was 37:61. The measurements were performed at eight standard sites. No chondropathic or grade I. Chondropathic surfaces were measured. An indentation instrument, Artscan 1000, was used for in vivo measurements. Four plugs were harvested from each knee for histological analysis. The stage of cartilage degeneration was assessed according to Mankin histopathology score. 16 measurements were performed after ACI. **RESULTS:** Lateral femoral condyle stiffness (mean + SD; $5.12 \pm 1.02\text{N}$) was greater than all other sites and was significantly greater than mean values obtained for medial femoral condyle ($4.8 \pm 1.22\text{N}$); medial and lateral trochlea ($4.2 + 0.92$, $4.6 + 1.27\text{N}$), medial ($3.1 \pm 0.66\text{N}$) and lateral patella ($3.3 \pm 1.01\text{N}$); and medial and lateral tibial condyle for all subjects ($2.4 \pm 1.17\text{N}$ and $3.2 \pm 1.16\text{N}$). The dynamic modulus of the normal or mildly degenerated cartilage correlated negatively with the Mankin score: r (Spearman) = -0.823, $n=348$. Stiffness at the repaired site was similar to normal cartilage at adjacent sites in the knee. **CONCLUSION:** The high negative correlation between stiffness and the Mankin score suggests that the stage of cartilage degeneration can be quantitatively and indirectly assessed with a hand-held instrument during arthroscopy.

SIC15-18

REGIONAL VARIATION OF ARTICULAR CARTILAGE ON T1RHO AND T2 MR IMAGING AND QUANTITATIVE ANALYSIS

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PURPOSE: To investigate the laminar appearance in MR images of patellar cartilage

specimens obtained from pigs. And to quantify the spin-lattice relaxation time in the rotating frame (T1rho) and T2 transverse relaxation time in various regions of porcine patella cartilage. MATERIALS AND METHODS: Patellar cartilage specimens were obtained from 8 pigs treated with intra-articular interleukin-1beta (IL-1beta) and sacrificed 6 hours after injection. T1rho- and T2-maps were obtained on a 7.0 Tesla Varian scanner. Using a home-built analysis program, the cartilage from each sample was manually segmented by drawing regions-of-interest. This segmentation separated the patellar cartilage into superficial, medium, deep, calcified regions, approximately of equal thickness. RESULTS: T1rho values in superficial, medium, deep, calcified regions of cartilage specimens were found as 115, 110, 105, 97 msec in the IL-1beta treated cartilages; 102, 101, 94, 93 in the IL-1beta untreated cartilages, respectively. T2 values in superficial, medium, deep, calcified regions of cartilage specimens were found as 45, 46, 44, 35 msec in the IL-1beta treated cartilages; 40, 50, 43, 37 msec in the IL-1beta untreated cartilages, respectively. T1rho values are no statistically significant differences in different cartilage regions ($p=0.456$), however, T2 values have significant differences ($p=0.001$). CONCLUSION: Preliminary results demonstrate the feasibility of acquiring high resolution three-dimensional images of patellar cartilage specimens at 7.0T scanner. Both T1rho and T2 mapping can be used to quantify the laminar appearance in MR images of articular cartilage, which could be promising in evaluating cartilage degeneration or regeneration.

SIC15-19

THE 'DUVET TEST' TO DIAGNOSE MEDIAL PLICA SYNDROME OF THE KNEE: A PROSPECTIVE STUDY

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BACKGROUND: Clinical diagnosis of pathological medial plica is a matter of much debate and remains poorly defined in the literature. Therefore, arthroscopic diagnosis is considered gold standard. We report of a test ('Duvet test') that can help to diagnose symptomatic medial plica. We wished to carry out this prospective study to check the efficacy of this test to diagnose medial plica syndrome of the knee. **METHODS:** We prospectively studied 48 patients who showed clinical suspicion of symptomatic medial plica. The decision to include these patients in the study was based on the criteria set by us. All patients were subjected to arthroscopy, either to confirm or disprove the clinical diagnosis and, for treatment. **RESULTS:** Of those included in the study, we identified 17 patients with a positive 'Duvet test'. All patients with a positive 'Duvet test' confirmed pathological medial plica at arthroscopy. Taking arthroscopic diagnosis as the gold standard then the duvet test was 38.6% sensitive (95% CI: 24.4%, 54.5%) but 100.0% specific (95% CI: 39.8%, 100.0%) and has a positive predictive value of 100.0% (95% CI: 80.5%, 100.0%) for medial plica syndrome of the knee. **CONCLUSIONS:** We believe that the 'Duvet test' is a simple, easy-to-perform and reliable tool that can help us to diagnose medial plica syndrome of the knee.

SIC15-20

COMPARATIVE RESULTS OF ANGLED CONDYLAR PLATE AND T-PLATE AS A FIXATION TOOL IN HIGH TIBIAL OSTEOTOMY

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AIM OF THE WORK: To evaluate advantages, disadvantages and relevance of using

angled condylar plate in fixation of high tibial osteotomy and improvement in patient functional outcome in comparison with T-plate. METHOD: 40 patients with medial compartment knee osteoarthritis underwent high tibial osteotomy. 22 patients operated using angled condylar plate and 18 patients T-plate used for fixation of osteotomy site. Operations done at Saudi German Hospitals, period between June 2003 and November 2006. Male to female 17:23, age ranged 25-49 years. Varus deformity with obesity in all cases. HSS scoring used to evaluate all patients. RESULTS: Preoperative scoring for all cases ranged between 60-80, postoperatively scoring for cases with angled plate excellent 19 cases, and good one case, poor 2 cases. Postoperative results in cases where T-plate were used: excellent 13 cases, good 2 cases, fair one case, and poor 2 cases. Two cases with angled plate developed peroneal nerve palsy. Implant failure occurred in 3 cases of T-plate. No cases of DVT or infection were recorded. CONCLUSION: Results of angled condylar plate and T-plate as a fixation tool in high tibial osteotomy were almost the same but in obese and muscular patients the implant failure was high in T-plate with delayed union of osteotomy site in comparison with angled plate no recorded cases of implant failure with early weight bearing and return to functional activities.

SIC15-21

ACUTE VS CHRONIC TEARS OF THE ACL, TREATED WITH A FOUR STRAND HAMSTRINGS GRAFT, USING THE OVER THE TOP TECHNIQUE

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PURPOSE: To evaluate the short- to intermediate-term outcome of patients in whom an acute or chronic anterior cruciate ligament reconstruction was performed with a quadruple hamstring tendon graft using the over the top technique. MATERIAL AND METHODS: A total of 40 patients (acute: 21, chronic: 19) who had an arthroscopically assisted ACL reconstruction with a four-strand hamstring tendon graft was retrospectively evaluated at a mean of 44 months. The Tegner Activity Scale, and the modified Lysholm Score were administered to all patients. All patients returned for clinical examination, instrumented ligament laxity testing, isokinetic strength testing, and completion of the IKDC Standard Knee Ligament Evaluation Form. RESULTS: 97% of acute and 94% of chronic knees were classified as normal or nearly normal. The acute group achieved a statistically significant higher score ($P < .005$) on both the applied evaluation systems. The acute group also scored significantly higher ($P < .05$) on IKDC subjective assessment, and IKDC rating for pain. However, no significant differences ($P > .05$) were found between the acute and chronic groups for instrumented laxity, muscle strength, knee motion. CONCLUSION: Four band hamstring tendon applied with the over the top technique is a reliable graft choice for ACL reconstruction in both acute and chronic injuries. According to our results, greater than 92% of all patients can be expected to have a normal or nearly normal knee at short- to intermediate-term follow-up; however, patients in the chronic group achieved an inferior result.

SIC15-22

A PROSPECTIVE RANDOMISED CONTROLLED TO COMPARE SAFETY AND EFFICACY OF INTRAARTICULAR OF SYNTHETIC AND AVIAN HYALURONIC ACID INJECTIONS

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AIM: To see if there are any differences in pain relief and complications with intraarticular Knee injection of avian and synthetic Hyaluronic acid products. METHODOLOGY: After following the inclusion and exclusion criteria, 115 patients [130 Knees] were randomly allocated to two groups, receiving either synthetic or natural Hyaluronic acid injections. Informed consent was sought. Patients were given Western Ontario and McMaster University [WOMAC] questionnaires to be filled before, as well as 48 hours, 6 weeks and 3 months after the injections. They were examined at 3 and 6 months post injections. RESULTS: 110 of these patients promptly responded. Avian product was injected in 66 Knees and synthetic product in 58 Knees. In the avian injection group of 66 Knees, 57 had pain relief at 3 months. In the synthetic injection group of 58 Knees, 48 had pain relief at 3 months. No complications were noted in either of the groups. Using Chi square test and with 95% confidence interval, synthetic injection showed no significant difference with avian injections in pain relief at 3 months [$p=0.724$]. CONCLUSION: Synthetic injections are equally safe and effective and economical than natural ones. Using synthetic products gives pain relief to the patients and will also decrease the financial burden on the organisation.

SIC15-23

THE UTILIZATION OF THE HETEROGENEOUS BONE GRAFTS IN THE TREATMENT OF THE KNEE OSTEOARTHRITIS

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In the last years, in order to satisfy the needs raised by the bone mass deficiency resulted from the osteotomies of valgisation as surgical procedures into knee osteoarthritis, a great number of materials (autologous or homologous grafts, hydroxiapatite, ceramics) were used. Between 2001-2005 we used pig bone grafts (proximal tibia epiphysis) specially prepared into 38 monitored patients and we have obtained very good results regarding the integration of the implants and the consolidation of the osteotomy place. The grafts are cuneiform shape (with an angle between 15-45°) harvested from the proximal metaphyso-epiphysial region of the pig tibia that were anteriorly tested for the specific diseases. Sterilization and despecification were realized through boiling at 110-120°, 30 min, two times at an interval of three days; after these the greffons were conserved in refrigerator in a Ringer solution with antibiotics and fungicides. The integration of the greffes have been evaluated at 45 and 90 days and regarding the quality of life we have applied the KOOS questionnaire in order to monitor the results. The symptomatology and clinical signs also consolidation images and KOOS values have been improved with the addition of an osteoprogenitor mixture. This mixture being obtained from Postero-Superior Iliac Spine (bone marrow aspirate plus humoral factors resulted from the sanguine clot lysis) with the addition of dexamethasone.

Symposium: Current status of Total Knee Arthroplasty

Moderator: Hwa Chang Liu (Taiwan)

CONFERENCES

SICIS17-01

CURRENT STATUS OF TOTAL KNEE ARTHROPLASTY

Hwa-Chang LIU

National Taiwan University Hospital (TAIWAN)

Total knee arthroplasty (TKA) can effectively resolve pain, instability and deformities of the knee. Therefore, osteotomies around the knee is replaced by TKA day by day. Apparently, we need to pay more attention to the science and art of TKA. 1. The usefulness of Navigation System: The procedures of TKA needs accurate alignments and osteotomies, Navigation System definitely contributes a lot on this. But, according to many reports, the accuracy of the system is based on the software designed by the manufacturer and the user's familiarity with it. 2. Minimally Invasive Surgery of TKA: (MIS-TKA). This could reduce the time of recovery and the amount of bleeding. 3. Postoperation flexion degree of the knee: After 2003, thanks to improvements of prosthesis design and well-manufactured operation instruments, flexion up to 130 degrees could easily be obtained postoperatively. Some patients could even squat completely after operation. 4. Prolonged longevity of the polyethylene insert: Cross-linked PE will also improve the longevity of the prosthesis, by estimation, up to three times of a conventional PE has. 5. Reducing postoperation infection: The i.v. antibiotics given two hours before incision is made and the use of antibiotics-loaded cement can reduce postoperation infection effectively down to as low as 0.4%.

SICIS17-02

MIS TKA: MY 5-YEAR EXPERIENCE

Aree TANAVALEE

Chulalongkorn University (THAILAND)

According to our 5-year experience in MIS TKA involving 3 different phases of learning curve (22 knees in the initial phase during 2002-2003, 114 knees in the 2nd phase during 2003-2004 and 425 knees in the 3rd phase during 2004-2006), we have learned from initial mistakes and have developed surgical tips to perform MIS TKA in almost all primary knees except moderated to severe valgus deformity or marked bone defect. In our opinion, to get a successful MIS TKA, we should start with a good patient selection who is the candidate for this approach. Another 3 major factors contributing predictable results are surgical technique, anaesthesia technique and postoperative rehabilitation protocol as shown in the diagram.

SICIS17-03**TOTAL KNEE REPLACEMENT, CAOS OR MIS?**

Chyun-Yu YANG

National Cheng Kung University Hospital (TAIWAN)

The MIS techniques gained the benefits of less pain and earlier recovery. However, the limited exposure may interfere with the operation field and limit the accuracy. The drawback could be overcome by the assistance of CAOS. The study is going to evaluate the impact of CAOS on the implants position of MIS TKR. The TKRs were done via a small skin incision and limited medial para-patella arthrotomy with patella subluxation. The MIS technique was used to do 200 TKRs with e-Motion MB prosthesis. 100 TKRs were performed with MIS technique (Gr.A) without CAOS assistance, and another 100 TKRs were performed with the CAOS assistance, CT-free kinematic navigation (Orthopilot TKR V4.0) (Gr.B). Between the two groups, the length of skin incision, operation time, blood transfusion, narcotics, length of hospitalization and the femoral and tibial components position in AP and Lateral position were recorded. The skin incision in all the MIS TKRs is similar in length. It took longer operation time for MIS CAOS TKR than MIS TKRs. Besides, the CAOS group showed significant better implant position in femoral components in AP and Lateral position and tibial components in lateral position. And less variation and fewer outliers were achieved in the MIS CAOS group. The application of kinematic CAOS could improve the components position of MIS TKR with the expense of longer operation time. Current Navigation system could offer more accurate alignment in TKA than manual ones for its real-time data, but also has its own limitation.

SICIS17-04**SOFT TISSUE MANAGEMENT IN TKA**

Jochen EULERT

Orthopaedische Universitaetsklinik Koenig-Ludwig-Haus Wuerzburg (GERMANY)

The primary objectives of total knee arthroplasty are to reduce pain, maximize the range of motion (ROM), and provide stability through the gait cycle. The restoration of correct soft tissue tension is the key to achieve a successful total knee arthroplasty. Some knee surgeons have emphasized that a good outcome in primary TKA is more dependent on soft tissue management than bone management. Soft tissue balancing and correct bone cuts are both important for a successful procedure and cannot be considered independent. The procedure begins with a correct alignment of the implants and identical flexion and extension gaps. The stability is assessed in full extension as well as 30° and 90° of flexion. Tight structures are released based on their function throughout the whole arc of flexion. Tightening of loose structures is rarely necessary. This presentation describes the clinical characteristics and treatment of mismatched gaps as well as the stepwise soft tissue balancing in different deformities (varus - valgus - flexion and extension contracture, patella malalignment).

Session 16: Knee replacement

Moderators: *Hwa Chang Liu (Taiwan)*
Khalid Larzak (Morocco)

FREE PAPERS

SIC16-01

COMPARISON OF INTRA-OPERATIVE VARIATION IN MECHANICAL AXES DURING NAVIGATED TOTAL KNEE REPLACEMENT

Paraskumar MOHANLAL, Baljinder DHINSA, Sunil JAIN
Medway Maritime Hospital (UNITED KINGDOM)

PURPOSE: To analyse the intra-operative variation in mechanical axes of the lower limb at various stages during navigated total knee replacement. **MATERIALS AND METHODS:** A prospective study was performed to analyse the intra-operative variation in the mechanical axes of the lower limb during navigated total knee replacement. All consecutive patients who underwent navigated total knee replacement were included and patients with inadequate data were excluded from the study. The intra-operative initial, trial and the final mechanical hip-knee-ankle axes were recorded from the navigation system. The differences between these axes were calculated and analysed. There were forty patients, of which 24 were females and 16 males with the age ranging from 37-89 (average 68.4) years. The right knee was replaced in 27 and the left knee in 13 patients. **RESULTS:** The average initial mechanical axes alignment was 0.03° valgus (3° varus to 3° valgus), trial alignment 0.64° varus (3° varus to 1.5° valgus) and final alignment 0.25° varus (4° varus to 4° valgus). Average deviation from initial to trial axes was 0.97°, trial to final axes was 0.74° and initial to final axes was 1.08°. The correlation co-efficient between the initial and the trial axes was 0.25, trial and final axes was 0.43 & initial and final axes was 0.09. **CONCLUSION:** This study highlights a significant variation in mechanical axes between the different stages of navigated total knee replacement. The potential sources of intra-operative errors causing these changes could be soft tissue imbalance, variations in implant placement and possible tracker micro motion.

SIC16-02

ASSESSMENT AND VALIDATION OF CT SCANOGRAM TO COMPARE PER-OPERATIVE AND POST-OPERATIVE MECHANICAL AXES FOLLOWING NAVIGATED TOTAL KNEE REPLACEMENT

Paraskumar MOHANLAL, Dhinsa BALJINDER, Sunil JAIN
Medway Maritime Hospital (UNITED KINGDOM)

PURPOSE: To assess and validate CT scanogram as a post-operative imaging modality to compare mechanical axes after navigated total knee replacement. **MATERIALS AND METHODS:** A prospective study was performed to compare per-operative and post-operative alignment of lower limbs after navigated total knee replacements. All consecutive patients who underwent navigated total knee replacement between May 2006 and December 2006 were included in the study. Patients with inadequate data and patients who refused to participate in the study were excluded. The intra-operative final mechanical axes was recorded from the navigation system. Post-operatively a CT

(Computer Tomogram) Scanogram of lower limbs was performed. Measurement of the mechanical axis was done and comparison made between final and scanogram axes with assessment of their correlation coefficients. Twenty-five patients were initially recruited in the study of which 15 patients had complete set of data. There were four males and 11 females with the age ranging from 57-80 (average 70) years. The right knee was replaced in 12 and the left knee in three patients. RESULTS: The average final intra-operative axes was 0.56° varus (4° varus to 1.5° valgus) and post-operative CT scanogram axes was 0.52° varus (3.1° varus to 1.8° valgus). The average deviation from final axes to CT scanogram axes was 0.12° valgus with a correlation co-efficient of 0.9. CONCLUSION: Our study confirms positive correlation between intra-operative and post-operative mechanical axes after navigated total knee replacement and use of CT scanogram as an imaging modality with reasonable accuracy for measuring mechanical axes despite low radiation.

SIC16-03

EQUIFLEX INSTRUMENTATION TO OPTIMISE FEMORAL COMPONENT ROTATION - A CLINICAL REVIEW

Ranjith Ravindran KUZHUPILLY, Ilias SEFERIADIS, Iain LENNOX
Basildon and Thurrock University Hospitals (UNITED KINGDOM)

INTRODUCTION: There is little dispute that flexion and extension spaces should be rectangular and equal in a knee replacement and that rotation of the femoral component has a bearing on function and outcome. However, there is dispute over what is the "correct" rotation and how best to achieve it. Insall and Scuderi recommended placing a tensor in the knee in flexion and rotating the femoral cutting block so that its posterior edge is parallel to the top of the tibia (Scuderi et al, Orthop Clin. North. America, 20:70-78, 1989). We feel the Equiflex instrumentation designed by Mr Lennox will reliably achieve this. PURPOSE OF STUDY: To evaluate early clinical results and lateral retinacular release rates using Equiflex instrumentation to do TKR. METHOD: We evaluated 209 consecutive knees (31 valgus, 178 varus) done using this technique from 4 April 05 - 19 September 06. Pre and postop American Knee Society and Oxford scores, deformity, ROM, lateral retinacular release rates and complications were recorded. RESULTS: Average inpatient stay - 4.9 days (20% discharged in ≤3 days) if we exclude complications. We could correct alignment and achieve our technical goals in 99% of cases. A lateral retinacular release was required in only 5 knees (2.4%). Our complication rates were well within published data. CONCLUSIONS: 1) The complications are comparable to published data. 2) The equiflex instrumentation does help in equalising flexion-extension gaps, improves patellar tracking and reduces the incidence of lateral retinacular release.

SIC16-04

RADIOGRAPHIC EVALUATION OF RADIOLUCENT LINES UNDER TIBIAL COMPONENT OF CEMENTED TOTAL KNEE PROSTHESIS: NATURAL HISTORY AND CLINICAL SIGNIFICANCE.

William KURTH, Philippe GILLET
CHU Sart-Tilman, Liège (BELGIUM)

INTRODUCTION: Radiolucent lines are radio-transparent lines between bone and prosthesis or cement. Radiolucencies must be distinguished from osteolytic lesions. The aim of the present study was to determine the natural history and clinical significance of radiolucencies in TKA. MATERIAL AND METHODS: A retrospective study of 40 series of digitized X-rays of TKA with a minimum follow-up of 5 years was performed. Radiolucent

lines under the tibial component were studied according to our original analysis model within the Imagika® software based on the AKS radiolucency zones. 20 LCS RP® and 20 CERAGYR® mobile-bearing knee prosthesis were studied. All patients were examined at 5 year follow-up to establish a clinical score. RESULTS: On 60% of x-rays, radiolucencies were present. Their appearance was almost early (first year), they increased until 36 months and then stabilized or decreased. In a given patient, radiolucencies could be progressive, stable or regressive, sometimes even absent. No correlation was shown between the presence of radiolucencies and the patient's sex and age, the size of implant and clinical AKS score. Presence of sclerosis of sub-chondral bone and varus were positive predictive factors for radiolucencies in zone 1 and 2. No case of progressive radiolucency resulting in osteolysis and loosening was observed in our serie. DISCUSSION: Radiolucencies seem to form part of natural history of TKA. Their evolution is unforeseeable and their clinical relevance was not shown by this study. We are currently studying the correlation between progressive radiolucencies and polyethylene wear in a longer-term follow-up.

SIC16-05

RANGE OF MOVEMENTS OF LOWER LIMB JOINTS IN CROSS LEGGED SITTING POSTURE

Bharat MODY

Centre for Knee Surgery (INDIA)

Cross legged sitting posture is integral to activities of daily living in Eastern and Oriental cultures. This posture has not been studied or defined from an orthopaedic view point in any significant detail. The movements of right lower limb joints were measured in cross legged sitting posture in 44 volunteers from the Indian population with no prior history of problems related to the knee or hip joint. Flexion at the hip joint ranged from 82-100 degrees with a mean of 91 degrees. Abduction at the hip joint ranged from 19-57 degrees with a mean of 39 degrees. The external rotation ranged from 42-58 degrees with a mean of 49 degrees. Flexion at the knee ranged from 126-142 degrees with a mean of 135 degrees. Equinus at the ankle ranged from 17-34 degrees with a mean of 29 degrees. The resultant data would be useful in understanding kinematics of the knee and hip in the normal and post total joint arthroplasty population. The data could be used for design features of prosthetic joints, surgical technique and rehabilitation protocols. Such data has not been available hitherto in any relevant published literature.

SIC16-06

CROSSLINKED POLYETHYLENE - AN ADEQUATE MATERIAL FOR TOTAL KNEE PROSTHESES?

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Compared with conventional UHMWPE crosslinked polyethylene (XPE) shows a reduced wear rate in a hip simulator, but the crosslinking process reduces the mechanical properties of UHMWPE. This is achieved by gamma or electronic radiation, followed by heat treatment either above the melting point (remelting) or below (annealing). UHMWPE fatigue occurs more typically in total knee compared with total hip arthroplasty. This is why XPE is still controversially discussed for use in total knee prostheses. QUESTION: Is XPE proven appropriate for the use in total knee prostheses in simulator testing? Does the manufacturing process affect the wear properties? METHOD: In a knee joint simulator 3 inlays made from type A (XPE, manufacturing process: annealing) and 3 inlays made from type B (XPE, remelting) were tested according to the ISO standard. The gravimetric

and volumetric wear rates were measured and the wear mechanism was analyzed by means of a scanning electron microscope. RESULTS: All inlays showed signs of abrasion, scratching and wear polishing, but no traces of fatigue reactions. Both types produced low average gravimetric [inlay A: 0.27 (0.15-0.38) vs. 1.9 (1.5-2.3) mg/year for inlay B ($p < 0.05$)] and volumetric [inlay A: 0.3 (0.16-0.4) vs. 2.0 (1.6-2.44) mm³/year for inlay B ($p < 0.05$)] wear rates. CONCLUSION: XPE are suitable for total knee prostheses. The wear rates vary depending on the manufacturing process. XPE manufactured by annealing seem to produce lower wear rates than those manufactured by remelting, at least when used in total knee prostheses.

SIC16-07

MIDVASTUS V'S MEDIAL PARA-PATELLAR APPROACH IN TKR - TIME TO DISCHARGE

James PRESS

Torbay Hospital (UNITED KINGDOM)

BACKGROUND: It has been shown before that when compared with the medial parapatellar approach, the mid-vastus approach for TKR results in less post-operative pain for patients and more rapid recovery of straight leg raise. As far as we are aware the post-operative length of stay of the two groups of patients has not been compared. We postulated that the reduced pain and more rapid recovery of straight leg raise would translate into an earlier, safe, discharge home for the mid-vastus patients. METHODS: Twenty patients operated on by each of five arthroplasty surgeons were evaluated prospectively with regard to their pre and post-operative ROM, time to achieve straight leg raise post-operatively and length of post-operative hospital stay. Only one of the surgeons performed the mid-vastus approach. Measurements were recorded by physiotherapists who were blinded as to the approach used on each patient. RESULTS: The time taken to achieve straight leg raise post-operatively was significantly less in the mid-vastus group ($p < 0.001$). The mean length of stay was lower for the midvastus patients but difference was not significant ($p = 0.13$). CONCLUSION: This study confirms previous findings that the midvastus approach reduces time taken to achieve straight leg raise, compared with the medial parapatellar approach. On its own it does not significantly reduce length of hospital stay. Reducing the length of postoperative hospital stay after TKR requires a multi-disciplinary approach. This involves patient expectations, GP support, physiotherapists and nursing staff. The mid-vastus approach, in permitting earlier straight leg raising, significantly contributes to this.

SIC16-08

COMPUTER ASSISTED TOTAL KNEE ARTHROPLASTY FOR POSTTRAUMATIC DEFORMITY - RESULTS AND PITFALLS

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INTRODUCTION: Posttraumatic gonarthrosis is often accompanied by severe deformity and axis deviation. In theory, navigated arthroplasty can overcome some of the problems in this setting. We evaluated the navigated technique of total knee arthroplasty (TKA), including technical difficulties, learning curve and the feasibility in bony deformity. PATIENTS: Between 7/04 and 12/05 we treated 50 patients with severe posttraumatic osteoarthritis. 28 patients were male, mean age at TKA was 59 (32-77) years. On average patients had 2.83 previous operations. METHODS: In all cases a navigational

system (PRAXIM, Tronche/France) was used with infrared-tracking and bone-morphing software. The implant was a mobile bearing LCS knee (DePuy/USA). Study setup was prospective, follow-up on average 14.5 months (11-25) including the IKDC. RESULTS: 4 times the procedure was finished in a conventional technique, reasons were decision of the surgeon, a missing femoral cut block and a broken screw of the tracker-fixation. In one case a hinged prosthesis was implanted due to instability. There was no failure of the navigational system. There was a clear learning curve. Preoperative extension deficit was improved from average 7.1° ($0-30^{\circ}$) to 1.67° ($0^{\circ}-10^{\circ}$) postop., flexion contracture improved from av. 95° to 103° . The combined knee society score improved from 83 points preoperatively to 157 points at F/U. CONCLUSIONS: Navigated knee endoprosthesis is a reliable tool for the trauma surgeon with few technical problems. Especially for surgeons with less experience in TKA, planning of implant size and position is very helpful. With posttraumatic deformity the surgeon can gain valuable information and assistance to improve alignment and ligamentous balancing.

Session 17: Knee arthroplasties

Moderators: Jochen Eulert (Germany)
Samir Karrakchou (Morocco)

FREE PAPERS

SIC17-01

OUTCOME SCORES IN KNEE ARTHROPLASTY: WHAT ARE WE REALLY MEASURING?

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El Sahel Teaching Hospital (EGYPT)

BACKGROUND: Oxford Knee Score (OKS) and the American Knee Society Score (AKSS) are the most commonly used outcome measures for reporting results of knee arthroplasty. Although both have been validated, results could vary depending on which score was used to compare different knee prosthesis. **AIM:** To determine independent factors which predict post-operative knee scores in a group of patients two years following knee replacement, and to find out if these predictors change with variations in patients' general health. **MATERIAL & METHODS:** In a previous study together with other researchers, the author found no significant difference between a unicompartmental (Oxford) and total (AGC) knee prostheses using OKS. There was however a significant difference between prosthesis using AKSS. Regression analysis of the same data set was performed to compare the two scores. Patients' health status was graded according to Charnley, and predictors for each score were determined for the whole population and for each subset (A=No medical problems, B=Opposite knee affected or C=Significant health impairment). **RESULTS:** AKSS maintained a strongly significant relation to pain and range of motion (ROM) ($p < 0.0001$) irrespective of health status. For the whole population, OKS showed a strong correlation with AKS function ($p < 0.0001$) and pain scores ($p = 0.0034$). With advancing health impairment, OKS declined solely due to patients' generalized poor mobility and not due to decline in knee condition or pain. **CONCLUSIONS:** AKSS consistently indicated the condition of knee arthroplasty. OKS on the other hand was more affected by the patient's general health and mobility.

SIC17-02

IMPORTANCE OF LENGTH OF SKIN INCISION IN MINIMAL INVASIVE TOTAL KNEE ARTHROPLASTY

Emmanuel THIENPONT
ST. LUC UNIVERSITY HOSPITAL (BELGIUM)

INTRODUCTION: Aim of this study was to analyze the clinical importance of one single factor, the length of the skin incision. **MATERIALS & METHODS:** This was a prospective randomized single surgeon study. All patients were randomized for sex, age, diagnosis and BMI. In 40 consecutive knees, primary total knee arthroplasty was performed with minimal invasive instruments, through a 12cm skin incision and a mini-midvastus approach. After cementation of the components and closure of the arthrotomy, half of the patients (20) were randomized to have their skin incision extended from 12 to 20cm. The following data were assembled by a skin incision blinded study nurse: VAS, use of morphine pump, range of motion, straight leg raising, time to independent ambulation,

time to discharge, wound problems and complications up to 6 weeks postoperative. RESULTS: For all these studied parameters there was no statistical significant difference between both study groups. CONCLUSION: With this study we were able to analyze the functional effect of a larger skin incision in minimal invasive (MI) total knee arthroplasty and the placebo effect for the patient to see a smaller scar. We can conclude that the exact length of the skin incision is a non issue in MI total knee arthroplasty. Patients' benefits are obtained by less soft tissue damage, the avoidance of patellofemoral and tibiofemoral dislocation and optimal patient management. We even believe that performing MI total knee arthroplasty through a comfortable incision could be advantageous. Shorter operating time, less skin bruising and avoidance of skin - implant contact can be obtained.

SIC17-03

DOES SKIN LENGTH MATTER IN MINIMAL INVASIVE TOTAL KNEE ARTHROPLASTY?

Emmanuel THIENPONT

ST. LUC UNIVERSITY HOSPITAL (BELGIUM)

INTRODUCTION: In a previous study minimally invasive (MI) total knee arthroplasty (TKA) was performed through a 12cm incision and only at the end of the operation in half of our patients the incision was extended to 20cm. No differences were found in clinical results. In this study we analyzed potential advantages of performing MI TKA through a bigger incision from the beginning of the procedure. MATERIALS & METHODS: Prospective randomized study. Sixty MI TKA were performed through a 12cm or a 20cm skin incision and a mini-midvastus approach. Data was collected on: Tourniquet time, blood loss, skin bruises, VAS, use of morphine pump, range of motion, straight leg raising, time to independent ambulation, time to discharge, wound problems and complications up to 6 weeks, KSS and alignment. RESULTS: Tourniquet times were significantly shorter, less skin bruises and less outliers of the alignment were observed in the 20cm group. For all the other parameters there was no statistical difference between both groups. CONCLUSION: Minimal skin length is a non issue in MI total knee arthroplasty. A longer incision avoids the many manipulations to use the mobile windows and cutting the tibia in extension. Better tibial alignment is obtained with a sufficient distal incision. Patients benefits are obtained by less soft tissue damage and by avoiding patellofemoral and tibiofemoral dislocation. Performing MI total knee arthroplasty through a comfortable incision is advantageous. Shorter operating time, use of habitual techniques, less skin bruising and avoidance of skin - implant contact can be obtained.

SIC17-04

TOTAL KNEE ARTHROPLASTY IN PATIENTS WITH SEVERE DEFORMITIES IN DEVELOPING COUNTRIES

Hatem G. SAID, Ahmed ABDEL AAL

Assiut University Hospital, (EGYPT)

Severe varus and flexion contractures can present a challenge in total knee arthroplasty. In developing countries the condition is worsened by the late presentation, cultural habits and financial limitations. We present 33 total knee arthroplasties in 24 patients with an average varus deformity of 20 degrees (range 10-38). We describe our approach in managing these difficult cases, while correcting the deformity, and minimizing the use of stems, wedges and constrained prosthesis. Nine knee replacements (27%) had bone grafting and screws to augment the medial tibial condyle. Tibial stems were used in 2 (6%) cases. Our stepwise approach in correction of the deformity and bone grafting is a safe and economic method in managing these cases in developing countries.

SIC17-05**BONE AUGMENTATION USING TRABECULAR METAL IN COMPLEX PRIMARY AND REVISION TOTAL KNEE ARTHROPLASTY - A CLINICAL CASE SERIES**

Sathappan SATHAPPAN

Tan Tock Seng Hospital (SINGAPORE)

In complex primary and revision knee arthroplasty large bone deficiencies often pose a challenge to the adult reconstructive surgery. The usual management options include allograft and metal augments. Allografts are associated with an inherent risk of infection. Metal augments are only useful for focal bone defects. Trabecular metal cones are able to fill and reconstruct large bone deficiencies in both the distal femur and proximal tibia. These metallic constructs have the same stiffness as bone with porosity greater than 80%. They remain as a strong structural scaffold facilitating bone ingrowth. Trabecular metal cones are therefore an alternative to bone grafting and an important addition to the armamentarium of the adult reconstructive surgeon. We have herewith discussed the surgical technique of using trabecular metal cones to address the osseous deficiency in complex primary and revision knee arthroplasty.

SIC17-06**TOTAL KNEE ARTHROPLASTY AFTER FAILED PROXIMAL TIBIAL OSTEOTOMY**

Jacek KOWALCZEWSKI, Dariusz MARCZAK, BartOmiej KORDASIEWICZ, Tomasz OKON, Wojciech ZASACKI

Center of Postgraduate Medicine, OTWOCK (POLAND)

The outcome of total knee arthroplasty (TKA) in patients after failed proximal tibial osteotomy remains controversial. The total knee replacement after failed proximal tibial osteotomy was performed on 10 patients. There were 9 women and 1 man aged from 62 to 80 (average 68.3). Primary Coventry osteotomy was done in 8 knees and 2 in _range_nes. Pain, osteoarthrotic changes and malalignment of mechanical axis of the knee and in two cases tibia nonunion were an indication for surgery. All patients show good and very good early results after TKA according to Clinical Rating System of The Knee Society. Authors discussed the technical problems during TKA to achieve a good mechanical axis of the knee.

SIC17-07**THE ENTRY POINT FOR FEMORAL INTRAMEDULLARY ROD IN TOTAL KNEE ARTHROPLASTY**

Warat TASSANAWIPAS

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The entry point on the anatomical distal surface of the femur has an important influence on its final position in the canal are hence the subsequent cutting angle and alignment of the prosthesis in total knee arthroplasty. The purpose of this study on 20 normal cadavers was to investigate the exact entry point using the articular anatomical surface or distal femur. The entry point on surface of distal femur was calculated after insertion of the sharp tipped intramedullary rod antegradly from shaft of femur to distal articular surface. This study suggests that the location of exact entry point for intramedullary axis is 1.30 + 0.88cm above intercondylar notch and 0.4cm medial to anterior groove of Whiteside and above 1.80 + 0.76cm above epicondylar axis. The clinical relevance of this study will lead the surgeon to start entry point pint correctly for intramedullary alignment during total knee arthroplasty.

SIC17-08**REVISION ARTHROPLASTY FOLLOWING THE ASEPTIC AND SEPTIC LOOSENING WITH MODULAR ENDOPROTHESIS**

Miroslav HASPL, Miroslav SMERDELJ, Domagoj DELIMAR

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AIM: The aim of the study is to analyze results after implantation of revision total knee arthroplasties, endoprosthesis model Kinemax Plus Superstabilizer. **MATERIAL AND METHODS:** Between 2000 and 2005 we implanted 45 modular revision knee endoprosthesis model Kinemax Plus Superstabilizer at the 44 patients. The mean age was 69.22 (57-85) years. The indications for revision knee arthroplasty included pain and aseptic instability in 39 knees. Septic instability of the primary knee endoprosthesis was performed in 6 patients, treated with two-stage revision arthroplasty. Follow-up was 19.27 (6-54) months. **RESULTS:** The mean surgical time was 132 (85-165) min. and blood loss 1566 (620-4000) ml. At 3 knees we performed wound revision because of the haematoma. At 5 patients we had deep infection treated by debridement, liquid drainage and antibiotics. At two of them we removed revision endoprosthesis because infection recurrence and knee arthrodesis performed successfully. One patient had patellar luxation and another had patellar fracture, both treated surgically. One patient needed tibial insert replacement because of knee instability. We lost from follow-up 10 (22.2%) patients. From 35 knees which were followed up, 33 revision knee arthroplasty survive. Next 2 (5.71%) felt because deep infection, followed by arthrodesis. Of this 33 knees no clinical signs of instability of revision endoprosthesis were found during follow-up period, but at 4 (12.12%) knees we found at X-ray radiolucency more than 1mm. **CONCLUSION:** General conclusion is that modular type of the revision endoprosthesis allows solving main problems of complex revision arthroplasty of the knee joint.

Session 18: Spine deformity

Moderators: Mohammed Hassan Darwish (Oman)
M'hamed Chliyah (Morocco)

CONFERENCE

SICIS18-01

RECOMMENDED FUSION LEVELS WITH PEDICLE SCREW INSTRUMENTATION IN ADOLESCENT IDIOPATHIC SCOLIOSIS

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PURPOSE: To define fusion levels in the treatment of AIS using pedicle screw instrumentation. **MATERIALS AND METHODS:** Five major curve types were identified by the criteria of structural curves; single thoracic (ST), double thoracic (DT), double major (DM), thoracolumbar/lumbar (TL/L) and triple curves. Structural major curves were fused. Each type had two subtypes (A and B), determining distal fusion levels. In ST and DT curves, subtype A [gap between neutral vertebra (NV) and end vertebra (EV) was 0 or +1] should be fused NV, and B (NV is 2–3 below the EV) fuse to NV 1. In TL/L, DM and TM curve, subtype A (L3 rotation is less than grade II and L3 across center sacral vertical line) should be fuse to L3 and subtype B (if not) fuse to L4. Ninety-six patients were prospectively treated on the basis of these criteria with a minimum follow-up 2 years. The proposed types for 106 patients were checked to assess reliability by 5 spine surgeons. **RESULTS:** ST curves were corrected from 52% (40–79%) to 13% (76% correction). DT curves were corrected from 38% (27–49%) to 20% (47% correction) in upper thoracic curve and from 58% (40–81%) to 17% (72% correction) in lower thoracic curve. TL/L curves were corrected from 49% (40–61%) to 13% (72% correction). Thoracic and TL/L portions in DM curves were corrected from 49% (32–107%) and 54% (41–105%) to 17% (68% correction) and 19% (66% correction) respectively. There were no patients with coronal translation more than 3cm at final follow-up. Inter/intra-observer reliability was 75% (kappa coefficient 0.796) and 80% (kappa coefficient 0.821) respectively. **CONCLUSIONS:** These criteria were effective in determining the fusion levels of AIS using pedicle screw instrumentation.

FREE PAPERS

SIC18-01

OSTEOPENIA AND OSTEOPOROSIS AMONG SAUDI ARABIAN SCOLIOTIC GIRLS

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King Faisal University, King Fahd University Hospital (SAUDI ARABIA)

BACKGROUND: This prospective study assessed the prevalence of osteopenia and osteoporosis among the Saudi Arabian girls suffering with scoliosis attending King Fahd University Hospital, Al-Khobar, Saudi Arabia. **PATIENTS AND METHODS:** Saudi Arabian girls with Adolescent Idiopathic Scoliosis (AIS) were subjects of this study. Patients had their weight and height measured to calculate their body mass index (BMI). Clinical examination and investigations were done to rule out any other cause of scoliosis. All

had bone mineral density (BMD) measurement of hip area and the spine using DEXA scan, Hologic Inc. Patients with a BMD of < -2.6 was taken as osteoporotic and those between < -1 to -2.5 was taken as osteopenic for analysis. As control subjects, girls with normal spine had their BMD measurement done. RESULTS: We were able to the data of 32 girls with an average age of 18.42 ± 5.71 (14-26) with mean BMI of 17.7 ± 0.69 (16.5-18.5). Analysis of the scans of the hip revealed that 62.5% of the patients were osteoporotic and nine (28.1%) were osteopenic. Analysis of BMD of the spine showed similar results. In comparison to the scoliotics, girls with normal spine had higher BMI and BMD which was statistically significant at $p < 0.001$. T-Score and Z-Score was also lower in scoliotic girls in comparison with girls with normal spine significant at $p < 0.001$. (CI 95%). CONCLUSIONS: Our study indicates that the prevalence of osteopenia and osteoporosis among girls with AIS is higher as compared to girls with normal spine.

SIC18-02

LONG TERM SPINAL AND RESPIRATORY FUNCTION IN EARLY ONSET SCOLIOSIS MANAGED WITH 'LUQUE TROLLEY' INSTRUMENTATION AND SELECTIVE EPIPHYSIODESIS

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A historical prospective study of a series of patients with early onset scoliosis managed by selective anterior epiphysiodesis and posterior 'Luque trolley' growing instrumentation. We identify 51 cases surgically treated with this combined procedure between 1984 and 2001. We achieve long term follow-up in 2 groups, comprising of 34 patients, with early onset scoliosis. Group A: 16 patients 'Immature' (age < 16 yrs at follow-up); B: 18 patients 'Mature' (age > 16 yrs). Clinical assessment & Pulmonary function tests were performed. Functional outcomes were measured (SF-36:SRS-22). RESULTS: 34 patients, who underwent surgery at a mean age of 2.5 years (1.5-6.6) were reviewed with a mean age 15.8 (range 6.5-35) years at follow-up. Clinically 80% of cases were well balanced (< 2.5 cm of truncal shift at follow-up). Group B average loss of height 11.8 cm (range +4 cm to -31 cm) with a mean 6.55% (-15% - +2.5%) loss in standing height. SRS- 22 and SF-36 questionnaires indicated moderate - good functional outcomes in 80% of patients. Spirometric data demonstrates that while patients who were still growing (Group A) had reasonable respiratory function parameters (28% had moderate or severe restrictive deficits at time of follow-up) approximately double that (60%) number had significant deficit when adult (Group B). Most patients required a definitive fusion procedure by maturity.

SIC18-03

AN EVALUATION OF OUTCOMES OF ATLANTO-AXIAL FUSION USING NON-ABSORBABLE TAPE

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INTRODUCTION: There are several problems associated with the use of titanium wires or cables used for atlanto-axial fusion (AAF). The purpose is to evaluate the efficacy and complications associated with AAF using flexible non-absorbable polyethylene tape. METHODS: 18 patients with an average age of 46.1 years were investigated. All patients underwent AAF for atlanto-axial instability (AAI) with an average follow-up of 5.0 years. Group 1 included 5 patients with AAF using tape and transarticular screws. Group 2 included 9 patients with AAF using titanium wires and transarticular screws. Group 3

included 4 patients with AAF using tape. Radiographic parameters included fusion rate, atlanto-axial angle and atlanto-dens interval (ADI) and complications. RESULTS: Fusion rate was 100%. The average post-operative and follow-up atlanto-axial angle were 27.0 degrees and 26.8 degrees in group 1, 26.5 degrees and 26.3 degrees in group 2, and 29 degrees and 25.0 degrees in group 3. The average pre-operative, post-operative and follow-up ADI were 9.0mm, 1.6mm and 1.5mm in group 1, 8.9mm, 2.2mm and 2.2mm in group 2, and 8.8mm, 2.6mm and 5.5mm in group 3. Three cases showed loosening of the titanium wires. DISCUSSION AND CONCLUSION: Group 1 and group 2 demonstrated reliable fusion and spinal correction. Group 2, however, had cases of loosening of the titanium wire and a loss of correction was noted in group 3. AAF using non-absorbable polyethylene tape and transarticular screws was an effective and safe treatment for AAI.

SIC18-04

SPINAL PSEUDARTHROSIS IN ADVANCED ANKYLOSING SPONDYLITIS WITH SAGITTAL PLANE DEFORMITY: CLINICAL CHARACTERISTICS AND OUTCOME ANALYSIS

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REVIEW OF BACKGROUND: There have been several reports describing the clinical findings of spinal pseudarthrosis in AS. However, few have studied the outcomes of surgical treatment of spinal pseudarthrosis with sagittal plane deformity in advanced AS patients. PURPOSE: To review the clinical characteristics and assess the outcomes of surgical treatment of spinal pseudarthrosis in advanced AS patients with sagittal plane deformity. MATERIALS AND METHODS: A total of 19 destructive vertebral lesions in 12 patients were reviewed. We performed Smith-Petersen osteotomy (SPO) at the same level and anterior interbody fusion (AIF) for repair of pseudarthrosis. Pedicle subtraction osteotomy (PSO) was performed additionally at the lumbar spine in severe kyphotic patients. Outcome variables included radiographic and clinical assessment with the review of postoperative complications. RESULTS: Mean time for radiographic union of pseudarthrosis was 4.2 months. Average correction of segmental kyphosis with SPO at the level of pseudarthrosis was 20.9° and 26.3° with lumbar PSO. Mean sagittal imbalance had improved 15.2cm at the last follow-up. All 12 patients had improvement of pain and neurologic deficit. Mean VAS for pain had improved 4.8. Mean SRS score for patient satisfaction at the last follow up was 4.6 out of a possible 5. There was no permanent complication. CONCLUSIONS: SPO at the level of pseudarthrosis was a safe and effective technique to correct sagittal imbalance without vascular complication. Surgical repair of pseudarthrosis with AIF provided successful fusion and clinical results. For patients with lumbar hypolordosis, additional PSO was effective in restoration of sagittal balance.

Session 19: General trauma (I)

Moderators: Kandiah Raveendran (Malaysia)
Mustapha Trafah (Morocco)

FREE PAPERS

SIC19-01

TITANIUM ELASTIC NAIL FIXATION OF DIAPHYSEAL HUMERAL FRACTURE IN MULTIPLY TRAUMATIZED ADOLESCENTS AND YOUNG ADULTS

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Diaphyseal humeral shaft fracture in eighteen multiply injured adolescent and young adult patients were treated with closed intramedullary titanium elastic nailing. Modified antegrade technique was used in 6 patients and retrograde technique was used in 12 patients. Average patient age was 26 years, follow-up duration was 17 months. Follow-up of sixteen fractures showed that fourteen (88%) united primarily at an average of 10 weeks. Functional assessment at six months, using American Shoulder and Elbow Surgeons (ASES) score showed an average of 46 points. Secondary surgery was performed in two patients; one bone grafting for delayed union with eventual healing, and one patient had plating of fracture after development of a gap and soft tissue interposition. There was no deep infection or iatrogenic radial nerve injury. Closed stabilization of humeral shaft fracture by titanium elastic nail provide a stable fixation, yielding overall good clinical and functional outcome in the multiply injured patient and served as simple, safe and fast procedure with minimal morbidity.

SIC19-02

TREATMENT OF THE FRACTURES OF THE DISTAL FOURTH OF HUMERUS WITH TRUEFLEX NAIL - RETROSPECTIVE STUDY

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INTRODUCTION: To determine the effectiveness of intramedullary nailing of the fractures of distal ¼ of humerus and complex fractures extended to this area, 12 according to AO-ASIF classification. **METHODS, MATERIAL:** 23 of 25 patients treated in years 1999-2006 were examined clinically and radiologically in a retrospective study. Twenty five closed fractures of the humerus, where distal ¼ of bone was involved, were treated with intramedullary nail Trueflex at Traumatology Department of Trauma Center Ceske Budejovice. Nail was inserted antegradely, in each case closed reduction of the fracture was performed. After surgery in cases with very small distal fragment of the fracture additional fixation was applied for 4-6 weeks. Objective evaluation criteria were time of fracture healing, complications - neurological, infection rate and restriction of the movement of elbow and shoulder. Functional result was evaluated through DASH score after finished physiotherapy. **RESULTS:** 23 from 25 fractures united at an average of 77 days. 1 case of deep infection was observed. 2 neurological lesions after surgery faded

away one after revision, second spontaneously. In one case nail removal, plate osteosynthesis and autospongioplasty was performed due to the pseudoarthrosis. 2 cases of partially loss of reduction were observed. CONCLUSION: Osteosynthesis of the humeral fractures where distal ¼ of humerus is involved performed by antegrade nailing with Trueflex nail is reliable mini-invasive method to achieve fracture healing. Due to its construction, it provides a very good level of rotational stability and therefore rate of pseudoarthrosis is low, in comparison with other interlocking nails.

SIC19-03

RESULTS OF OPEN REDUCTION AND INTERNAL FIXATION OF FRACTURE CLAVICLE WITH RECONSTRUCTION PLATE

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OBJECTIVES: To study results of ORIF of fracture clavicle with reconstruction plate on the early return to functional activity and union rate. **MATERIAL AND METHOD:** 75 patients with fracture clavicle were studied in the period between January 2004 to January 2007 with follow-up period ranged from 8-24 months. The study carried at Saudi German hospitals KSA. Ages range from 23:49 years, Male : Female 53:22.51 patients were polytrauma, 15 cases presented as solo fracture clavicle, 5 cases malunion of clavicular and 4 cases nonunited fracture clavicle. Cases selected for study either outer or middle third clavicle fracture. 10 cases were associated with fracture scapula. **RESULTS:** The patients were assessed mainly according to range of shoulder motion, return to functional activity and union rate and according to Hill criteria with clinical, functional and radiological assessment. Excellent results in 68 patients with union of fracture between 8-12 weeks, full range of motion of shoulder and return to sedentary activities of shoulder within two weeks. 2 cases implant failure which necessitated refixation and grafting, one case developed infection, 3 cases delayed union which needed bone graft and one case developed limited range of motion of shoulder which was associated with comminuted fracture glenoid. **CONCLUSION:** ORIF of clavicular fracture is a good choice specially in polytraumatized patients which can be an alternative to conservative treatment to decrease the period of decreased activity of shoulder in arm sling and malunion or nonunion of the fracture.

SIC19-04

CLOSED REDUCTION AND ILIOSACRAL PERCUTANEOUS FIXATION OF UNSTABLE PELVIC RING FRACTURES

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OBJECTIVE: To report clinical results of patients treated with closed reduction and percutaneous iliosacral screw fixation for unstable pelvic ring fractures. **MATERIAL AND METHODS:** We performed a retrospective review of the medical files, radiographic images, and clinical assessments with a minimum follow-up of 12 months of all the patients intervened at our center with this technique. Seventy-three patients with a mean age of 40.3 (14-70) years old were operated between July 1998 and December 2005. Only 2 patients were lost to follow-up. Fracture types included 10 AO type B and 61 AO type C injuries. Mean follow-up was 31 months (12-96). Forty-two patients had associated injuries. Some patients required additional anterior stabilization depending on the fracture pattern. **RESULTS:** In 69 patients a satisfactory initial reduction was obtained. Fifteen patients developed late sacroiliac osteoarthritis. Five patients presented screw failure.

Two patients had a transitory postoperative neurological deficit secondary to screw fixation. Functional outcome was evaluated using Majeed's grading score. Good and excellent results were observed in 88.2% of the patients at final follow-up. Five patients obtained a bad result, one due to infection of the anterior pelvic plate and the others due to painful refractory sacroiliac osteoarthritis that required a sacroiliac fusion. Sixty-one (86%) patients returned to their pre-injury occupation. **CONCLUSIONS:** Closed reduction and percutaneous iliosacral screw fixation is a useful method for posterior stabilization in unstable pelvic fractures. It does not require complex instrumentation, and good clinical results with a low rate of complications can be expected.

SIC19-05

PELVIC IMAGING IN THE HIGH-ENERGY TRAUMA PATIENT - AP PELVIC RADIOGRAPH VERSUS CT SCAN

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The purpose of this prospective study was to evaluate the diagnostic value of pelvic radiography in comparison to CT in patients with high-energy blunt trauma. During the last two years all trauma patients underwent AP pelvic radiograph and subsequently CT scan if the radiograph showed a fracture or the radiograph was negative but there was clinical suspicion of a pelvic injury and the patient was stable enough to be transferred to the CT department. CT depicted fractures in 37 patients. Twenty-three of them had concomitant injuries. The radiograph underestimated the severity of the injury in 73% of the cases: in 3 patients the radiograph was negative and in 24 the CT showed 33 additional fractures that were not recognized in the radiograph. All of the fractures that were missed were undisplaced and, although they did change the Tile classification, they did not modify substantially the treatment plan. The sensitivity of the radiograph was excellent for the anterior part of the pelvis, fair for the acetabulum and poor for the ilium and the posterior ring. In conclusion, CT is a valuable tool in assessing the pelvis in high-energy trauma patients when a fracture is recognized in plain radiographs or is clinically suspected since it is much more sensitive in detecting injuries of the ilium and the posterior ring, which may need closer observation. In stable patients who are scheduled to undergo abdominopelvic CT pelvic radiographs may be unnecessary.

SIC19-06

PELVIC FRACTURE TREATMENT USING PERCUTANEOUS SCREW FIXATION

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From January 2001 to December 2005, the treatment was given to 97 patients (51 males, 46 females, aged 19-72 years) with pelvic ring fracture and dislocation. According to the AO (1988) classification, B type were 62, C type were 35 in cases. **SURGICAL TECHNIQUE:** Closed reduction and retention of unstable pelvic injuries (type B and C injuries), in order to restore the form and function of the posterior pelvis by percutaneous iliosacral screw and when necessary antegrad screw fixation of the anterior pelvic ring osteosynthesis, using conventional fluoroscopy. **RESULTS:** 97 patients with a posterior pelvic fracture or fracture dislocation underwent screw fixation with fluoroscopy with 8.0-mm, or 9.0mm cannulated screws, placed in a transiliosacral position in the vertebral

body of SI, and S II. Among these patients, 58 fixed with percutaneous screw in the anterior pelvic ring fracture too. The average operating time was 48 min, the average screening time 3.14 min. Iatrogenic nerve damage was not found. All fractures healed within 3 months. CONCLUSIONS: The technique of percutaneous cannulated screws internal fixation for treating the posterior and anterior portion of the pelvis has the advantages of small trauma, less bleeding stiff fixation, which is an ideal and minimally invasive technique.

SIC19-07

OUR EXPERIENCE IN TREATMENT FRACTURES OF PATELLA ONLY WITH WIRES THROUGH 'SMALL' INCISION

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PURPOSE: The evaluation of the results of treatment patellar fractures with wires only through 'small' incision and the presentation of potential advantages of the treatment. MATERIAL & METHOD: Between 2002-2005, twenty-four (24) patients aged 26-67 years old (average: 42.3 yrs) with fractures of patella underwent open reduction and internal fixation of their fractures with two wires only through 'small' incision. Fourteen (14) patients were males and ten (10) were females. Right patella was fractured in thirteen (13) cases while the left one in eleven (11). 50% of fractures located in the middle, 35% in lower pole and 15% in upper pole. In ten (10) fractures, comminution was present. All patients treated by same surgical team - usually within 24 hours from injury - had early mobilization and were followed up for 11-23 months. 'Clinical grading scale' was used for evaluating the results. RESULTS: All fractures were united without any serious complications. Local irritation/inflammation was noticed in three (3) cases and was successfully treated. In 88% the results were very good/excellent (score CGS:>20). CONCLUSIONS: The above treatment for fractures of patella seems to be reliable (very good/excellent in 88%) and has also some extra advantages.

SIC19-08

DIAPHYSEAL LONG BONE FRACTURES TREATED WITH SOLID INTERLOCKING NAILS AND THE UNIQUE METHOD OF DISTAL LOCKING BY SLOT FINDER IS A MORE COST EFFECTIVE PROCEDURE WITH LESS RADIATION EXPOSURE

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INTRODUCTION: Diaphyseal long bone fractures are commonly managed with Interlocking nails under X-ray control. Much time was wasted in finding a slot and putting distal lock with higher radiation exposure. We have managed these fractures in government general hospital in developing countries by using the Solid nail and the unique method of Distal Locking with a Slot finder. It is a simple procedure and image intensifier is not required for distal locking. It saves operative time, more cost effective and less radiation. PROCEDURE: We have treated Femoral and Tibial fractures with a special type of nail. The Solid nail was passed by standard technique with the help of an external jig. A small skin incision was made at the locking site. The near cortex was drilled with large diameter drill bit. With the help of a slot finder the slot was identified and the far cortex was drilled with smaller diameter drill bit, interlocking screw was applied under direct vision. METHOD & RESULTS: Prospective study treated 40 patients, M:F 32:8, Tibia:Femur 27:13, average age 30 (22-40), average follow-up 18 months (9 to 24). All fractures had radiological union. All patients are back to their occupation.

DISCUSSION: In IM nailing, distal locking is the most difficult and time-consuming and a lot of radiation. With our technique identification of distal slot is very easy as Slot finder aids in accurate locking with out using image intensifier. It is less time consuming, more cost effective and uses less radiation.

SIC19-09

THE FLOATING KNEE - OUTCOME FOLLOWING SURGICAL MANAGEMENT

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BACKGROUND: Floating Knee injuries are complex injuries. The type of fractures, soft tissue and associated injuries make this a challenging problem to manage. We present the outcome of these injuries after surgical management. MATERIALS AND METHODS: 29 patients with floating knee injuries were managed over a 3-year period. This was a prospective study where both fractures were surgically fixed using different modalities. The associated injuries were managed appropriately. Assessment of the end result was done by the Karlstrom criteria after bony union. RESULTS: The mechanism of injury was road traffic accident in 27/29 patients. There were 34 associated injuries. 20/29 patients had intramedullary nailing for both fractures. The complications were knee stiffness, foot drop, delayed union of tibia and superficial infection. The mean bony union time ranged from 15-22.5 weeks for femur fractures and -weeks for the tibia. According to the Karlstrom criteria the end results were Excellent - 15, Good - 11, Acceptable - 1 and Poor - 3. CONCLUSION: The associated injuries and the type of fracture (open, intra-articular, comminution) are prognostic indicators in the Floating knee. Appropriate management of the associated injuries and intra-medullary nailing of both the fractures and post operative rehabilitation are necessary for good final outcome.

SIC19-10

COMPOUND FLOATING KNEE - A CHALLENGE FOR MANAGEMENT

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Series of 14 compound floating knees treated at S.I.O.R in two years. Relatively uncommon injury with extensive soft tissue injury, contamination, bony comminution or loss. 12GR III-B; 2GR III-C Management involved: Stage1: primary debridement and stabilization of bones and soft tissue cover. Stage2: removal of fixators at 8-10 weeks after wound healing. Stage3: delayed reconstruction procedures on bones to achieve union, correct deformities and limb length equalization, using various modalities of fixation, bone grafting and Illizarov-s fixators. All patients were assessed by 1] Karlstrom-Olerud criteria; 2] SIOR's criteria, which was formulated by us and consisted of assessment of all patients on a scale of 3 points based on various parameters like: a) Duration of treatment. b) Number of procedures required. c) Socio economic status of the patient. d) Return to pre injury profession. e) Patient satisfaction. Results were graded as - Good (>10 pts); Fair (5-10); Poor (<5 pts). All patients were followed up for a minimum of one year. RESULTS: 4 were amputated primarily/secondarily. All the ten patients in whom limbs were salvaged had to undergo at least four procedures each and treatment lasted for more than 18 months. Only three cases regained functional range of movements at knee joint. Bony union still not achieved in 3 cases. One patient succumbed to crush syndrome and renal failure. CONCLUSION: Requires early and judicious management at institutional centers. Proper patient counseling with tremendous patience on the part of patient. Patients amputations with prosthetic limb fared better on

our scale than those with limb salvage surgeries over a period of time.

SIC19-11

RESULTS AFTER LOCKED PLATING FOR HIGH ENERGY TIBIAL HEAD FRACTURES

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High energy fractures of the tibial head have a markedly worse outcome than other fracture types. There is a high infection rate and often a certain loss of reduction. We combined a less invasive technique with a locked implant. Wherever possible we performed unilateral plate osteosynthesis. The question was if that would decrease local complications and maintain fracture reduction. Between 2002-2004 we treated 24 patients with a Schatzker type 4, 5 or 6 fracture (All medial B3 or C type fractures (AO)). 17 patients were male, 9 fractures were open, and there was a vascular injury in two cases. The implant used was a locked titanium plate that is fashioned for the tibial-condyle (TiFix ©, Litos, Hamburg/Germany). In 8 cases a long implant had to be used on one side for Schatzker type 6 fractures, in 9 cases bone grafting was performed. We saw two superficial and one deep wound infection. Three patients developed a DVT. Clinical follow-up took place at av. 31.3 months. Details of the results of the Rasmussen Score are given below. We conclude that with locked implant osteosynthesis applied with a soft tissue respecting access satisfying results can be achieved for the treatment of high energy tibial head fractures. The complication rate of this strategy is relatively low compared to established methods. Rasmussen-Score (n): Clinical Score: Excellent 7; Good 13; Fair 4; Poor 0. Radiological Score: Excellent 5; Good 12; Fair 6; Poor 1.

Session 19: General trauma (II)

Moderators: Enzo Meani (Italy)
Bouchaib Zryouil (Morocco)

FREE PAPERS

SIC19-12

VESSEL INJURIES OF THE LOWER EXTREMITY - MANAGEMENT AND PERSPECTIVES

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INTRODUCTION: Sufficient treatment of vessel injuries is a demanding task, especially in polytraumatised patients. Besides the surgical procedure, efficient diagnostic, time-saving trauma management and sufficient intensive care is crucial for a satisfying outcome. **MATERIAL AND METHODS:** Between 1994 and 2006, 33 patients with vessel injury of the lower extremity were treated at our clinic. Retrospective analysis was performed in order to acquire epidemiologic data concerning the incidence of vessel injuries on specific trauma, e.g. dislocation of the knee joint, open or closed fractures of the proximal tibia and others. Furthermore, we investigated the sufficiency of preoperative management and diagnostic. We explored peri- and postoperative complications, such as secondary thrombosis, compartment syndrome, infection and number of revision surgeries and related the data to the final follow-up after 12 months. **RESULTS:** Vessel injury was found in 20% of dislocations of the knee, 60% of open distal femur fractures and in 50% of open proximal tibial fractures. All patients underwent sonography, 4 CTA and 14 angiography. Revision surgery was needed in 7 patients. Fasciotomy was primary performed in 19 patients, secondary in 1. 11 patients were polytraumatised. We lost 8 extremities. **DISCUSSION:** The need of revision surgery is significantly correlated to the number of secondary amputations. Sufficient time management is crucial for the survival of vessel injured extremities, as the time of ischaemia must not exceed 6 hours. Perfect interdisciplinary coordination and the establishment of specific algorithms are needed in order to decrease the risk of complications and amputations of lower extremities.

SIC19-13

26 YEARS EXPERIENCE WITH MISSILE INJURIES OF THE LIMBS

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Usually missile injuries lead to extensive damage, which depends on the velocity, range and the specific gravity of the tissue. A mass casualty, needs, good sorting from the start, to reduce the life loss, special care should be given to the seriously injured. Missing injuries are common, can only be reduced by proper physical examination. Wound excision is the corner stone in the management infection is a real disaster, Bone defect. Vascular injury and nerve injury is a common and pressing problem, needs a critical analysis because it dictates the future of the limb. Limb saving attitude may lead to life loss. A new system for casualty sorting out, wound grading and skin graft using the open

method is described. Promote, and vigorous resuscitation, careful wound inspection, aggressive exploration, liberal debridement, are the principle of the treatment.

SIC19-14

USE OF RAPID PROTOTYPING FOR COMPLEX TRAUMA SURGERY

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The advances in the radiology and computer imaging have made it possible to recreate three dimensional structures of the human body. When combined with rapid prototyping, it enables rapid fabrication of three D models of fracture as well as customised implants. Three D models help in accurately determining the fracture pattern, preoperative contouring and determining the perfect screw trajectory. Also the images can be used to manufacture the customised implants that best suit the fracture anatomy. We report our experience with use of this technology while treating acetabular and complex articular fracture in which the use of this technology reduced surgical time & allowed accurate reduction.

SIC19-15

USE OF GIS TO STUDY TRAUMA EPIDEMIOLOGY: A PILOT STUDY CONDUCTED AT A TRAUMA CARE UNIT

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Geographic Information System (GIS) is a computer based information system used to digitally represent and analyze geographic spatial features. GIS provides integrated analysis of various factors related to road traffic accidents and establishes a link among different streams of data pertaining to the occurrence of accidents. The present study involved 166 trauma cases of all types recorded over a period of six months at a Trauma Care Center located at national highway. After the collection of the data pertaining to trauma cases based on certain criteria's attributes, different thematic maps were created. On analyzing data with GIS software, it was observed that there was a relatively high occurrence of trauma at a particular location which was attributable to certain environmental factors. Following elctification of the problem, no accident cases occurred at that site. GIS offers huge potential as a cost effective technology for georeferencing accident data, guiding of appropriate location for setting up trauma care centers and suggesting measures to reduce the occurrence of trauma in that area.

SIC19-16

TREATMENT OF COMPLEX FRACTURE OF THE TIBIAL PILON: RESULTS OF EXTERNAL FIXATION FOLLOWED BY MULTIDIRECTIONAL LOCKED OSTEOSYNTHESIS PLATE FIXATION

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Aim of the study was to determine the treatment result of severe fractures of the pilon using a two stage treatment plan with a singular implant type. Setting is a level 1 trauma centre, the design a consecutive series with a retrospective data evaluation. Due to anatomical circumstances, soft tissue treatment is extremely important for fractures of the

pilon. After promising results reported about a two staged treatment plan with external fixation and secondary internal fixation, we incorporated this method in our treatment protocol. This consisted in the 2nd stage of internal fixation with a specifically developed locked plate with multidirectional applicable screws. 42 patients with high-energy fractures of the tibial plafond were treated using a two-staged treatment plan: Firstly the fracture was stabilized with an Ex-Fix. Secondly, after stabilization of the soft tissue situation (mean 9.2 days) ORIF with a locked-screw plate was performed. Complications included three cases of superficial wound necrosis, in two cases a DVT occurred. All fractures healed but two patients needed an early bone graft. At follow-up, 6 patients had no deficit in the range of movement of the ankle, 19 patients experienced a deficit of less than one third compared to the opposite side. In 28 cases no or only mild posttraumatic arthritis of the ankle occurred. There was no secondary loss of reduction or need for arthrodesis. The mean AOFAS Score was 71.8. A two-stage treatment plan in severe fractures of the distal lower limb reduces local complications with a good functional result.

SIC19-17

FUNCTIONAL OUTCOME FOLLOWING LOW PROFILE PLATING OF TIBIA FRACTURES (TIBIAL PLATEAU AND TIBIAL PILON FRACTURES)

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OBJECTIVES: To review the short-term functional results of treatment of tibial plateau fractures using low profile plates. **METHODS:** Forty-nine displaced fractures of the tibial plateau in forty-nine patients were treated with open reduction and buttress plate fixation using low profile plate (Zimmer) between 2002-2006. All patients were followed up with clinical assessment and given lowa knee functional outcome questionnaires. The average age was thirty-eight years and the mean follow-up was 25 months, with a range of 12 to 52 months. Twenty-six were classified as Schatzker types I, II, or III, and the remaining as types IV, V, or VI. Forty-six patients had closed injury while three had open fractures. **RESULTS:** 48 of the fractures healed without additional surgical intervention or bone grafting except for one bicondylar fracture, which needed amputation because of deep infection. Thirty-eight patients had follow-up of greater than 2 years. The average time to radiographic callus was 6.2 weeks, and the average time to complete union was 16 weeks. The range of motion of the knee averaged 3° of extension to 120° flexion. The average lowa Knee Score was 88 points (range, 72 to 100 points). 1 patient had malalignment of 4 degrees procurvatum and another with 3 degrees of valgus. There were two superficial wound infections and one deep infection. **CONCLUSIONS:** The use of low profile tibial plates appears to stabilize complex fractures of the tibial plateau with a low incidence of complications whilst maintaining alignment and obtaining union in these high-energy fractures.

SIC19-18

THE GOLD STANDARD IN TREATMENT OF METAPHYSEAL DEFECTS IN COMMUNUTED INTRA-ARTICULAR FRACTURES OF THE DISTAL RADIUS: A PROSPECTIVE STUDY OF AUTOLOGOUS ILIAC BONE GRAFT AND -TRICALCIUM PHOSPHATE

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INTRODUCTION: Autologous iliac bone graft (AIBG) remains the "gold standard" which other bone grafts are compared to. Despite its histocompatibility and non immunogenic properties, the process of harvesting is associated with significant morbidity. Reservation over autograft use has led to the development of synthetic bone grafts. This study is

aimed at comparing the safety, efficacy and relative strength of β -tricalcium phosphate (ChronOSTM - Mathys Medical) and AIBG. METHODS: This randomized prospective controlled study was performed at Hospital Universiti Kebangsaan Malaysia. Patients with closed AO type C fractures of the distal radius were randomized to either ChronOSTM or AIBG. Patients were assessed clinically and radiographically for union, maintenance of fracture reduction, function and complications. RESULTS: Forty-six patients (18 month follow-up) were studied. Fracture union was seen in all patients clinically and radiographically at 6 weeks. Fracture reduction was maintained in both groups ($P>0.05$). One patient from the ChronOSTM group lost reduction. Function of the wrist in patients who received AIBG fared better than the ChronOSTM group ($P<0.05$). Patients who received AIBG were complicated by donor site pain (26%) and aesthetic dissatisfaction (30%). Two patients who received ChronOSTM suffered chronic regional pain syndrome. CONCLUSION: ChronOSTM is comparable to AIBG at maintaining fracture reduction and as a void filler. Patients who received AIBG produced better functional outcome but the morbidity associated with harvesting eg. pain and cosmetic dissatisfaction remains. We conclude that ChronOSTM provides a safe alternative to AIBG in filling traumatic gaps of the metaphysis of the radius.

Session 20: Infections (I)

Moderators: Syed Awais (Pakistan)
Mohammed Benchakroun (Morocco)

FREE PAPERS

SIC20-01

SOFT TISSUE INFECTIONS OF THE EXTREMITIES AND ITS IMPACT IN THE ORTHOPAEDICS DIRECTORATE

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BACKGROUND: Skin and soft tissue infections (SSI) of the extremities are a common cause of admission to the Orthopaedics department. Patients presenting with SSI are usually treated with intra venous antibiotics in hospital. We assessed the economic impact on our directorate. **PATIENT AND METHODS:** SSI admitted to the Orthopaedic department over a period of one year were reviewed. Of the 93 patients analysed, 55 were included in the audit according to the defined criteria. **RESULTS:** There were 45 males and 10 females with most of the patients (27) in 30-60 year age group. 15 were caused by trauma, 8 by insect bite, 4 by injections and in the rest (27) the cause was not known. Leg was the most common site affected (23) and foot was affected least often (5). Majority of cases were of cellulites (51) and there were 2 abscesses and 1 septic bursitis. Almost all cases (52) were treated with intravenous (i.v) flucloxacillin and benzyl-penicillin. Mean duration of i.v antibiotics was 4 days followed by an average of 9 days of oral antibiotics. In total 219 bed-days were utilised with an average of 4.3 days per patient. This amounted to a total cost of £43000 to our directorate. **CONCLUSION:** Many patients with cellulitis can be safely treated at home under a community care home treatment programme. A clinical photograph on the day of attendance can be useful for future comparison. Following the initial 2 doses of antibiotics the patients could be discharged home where i.v antibiotics could be safely administered by community nurses.

SIC20-02

TIMING OF OPEN DEBRIDEMENT FOR SUSPECTED INFECTION

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The decision to perform open debridement in case of a suspected acute periprosthetic infection is a most difficult one in orthopaedic implant surgery. The aim of this study is to evaluate the results of an ad hoc versus a protocolar approach, with regard to the recording of persisting wound drainage after placement of a primary joint prosthesis and the salvage of prostheses in patients with persisting wound drainage. 247 Patients with 250 prostheses formed group I (ad hoc approach) and were observed and treated by an orthopaedic surgeon in the absence of a protocol. In group II (protocolar group), 304 patients with 308 prostheses were observed and treated according to the proposed protocol. The percentage of patients with a registered persisting drainage of the operative wound in group II is almost twofold the percentage of registered patients with persisting wound drainage in group I (11% and 21%, respectively). Yet, the number of open

debridements carried out in group II (17%) was lower than in group I (30%) and the salvage rate of prostheses with persisting drainage in group II (94%) was higher than in group I (85%). However, the main advantage was seen in the percentage of salvaged prostheses that were not debrided, which amounted 98% in group II versus 90% in group I. Protocolar observation and treatment yields a significant increase in the number of persistent wound drainages registered. Besides better registration, a protocolar approach enables more successful election of patients in which open debridement is not necessary.

SIC20-03

GRANULES OF DICALCIUM PHOSPHATE DEHYDRATE, DCPD, AS GENTAMICIN DELIVERY SYSTEM: IN VITRO KINETIC ANALYSIS

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The use of drug delivery antibiotics for local treatments of osteomyelitis is a current and admitted concept with the polymethyl metacrylate (PMMA). The current research tends to use a biodegradable biomaterial to avoid surgical removal which is necessary with the use of PMMA. Here we present an original biomaterial extract from hydraulic calcium phosphate cement, gentamicin loaded. We analyzed in vitro gentamicin kinetic release and the effects, of original gentamicin load and of the quantity of biomaterial tested, on this kinetic to choose the useful optimal formulation. Four different quantities of 3 millimetres granules of DCPD, with three different concentrations of gentamicin sulphate (GS) (10 mg/g, 20 mg/g and 30 mg/g) were tested. The elution of GS, in isotonic phosphate buffered saline solution (PBS) changed completely at intervals of 1 hour, 4 hours and 12 hours and at days 2, 3, 4, 5, 6, 7, 8, 13, 14, 20, 21, 27, 28, 41 and 42, was measured by agar diffusion approach and by immunoenzymatic assay. A microbiologic approach (inhibition zone on agar) was used for measuring the effects of gentamicin on *Staphylococcus aureus* ATCC 25 923 strain, when the pharmacologic dosage (immunoenzymatic assay, EMIT) was used to quantify the release of gentamicin. Two different release profiles were observed: burst release for a short period of time followed by low-level continuous and prolonged release. The 1% formulation showed more progressive kinetic. Combined to high amount of granules, it seemed to be efficient for optimal gentamicin release.

SIC20-04

GRANULES OF DICALCIUM PHOSPHATE DEHYDRATE, DCPD, AS GENTAMICIN DELIVERY SYSTEM IN RABBIT OSTEOMYELITIS MODEL

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We investigated the efficacy of the DCPD, gentamicin loaded, as a local treatment for bone infection. Thirty-six left tibias of adult male New Zealand rabbits were inoculated with *Staphylococcus aureus*. The 27 rabbits, followed at the end of the experiment, were grouped in five Groups, labelled L, H, P, D and U, treated respectively: with 600 mg of

DCPC with 1% of gentamicin, 300 mg of DCPC with 2% of gentamicin, 300 mg of polymethyl metacrylate with 2% of gentamicin, only by debridement and untreated. Before treatment, on day 15, the tibias were harvested and the cultures from the bone debridement were quantified. There were about 6.36 Log CFU per group. The rabbits were monitored for clinical signs of infection and by radiography. After 4 weeks of treatment, cultures numeration were completely sterile in 4 of the 5 rabbits in Group L, 4 of the 6 rabbits in Group H and 3 of the 5 rabbits in Group P. Only 1 of the 6 rabbits in Group D and none of the rabbits in panel-groups U were sterilized. The animals which were still infected in Groups L, H and P showed a significant reduction of infection (respectively 3,48; 3,78 and 3,75 log CFU per gram of bone), when we found 5,59 in group U and 6,28 in group D. DCPD, gentamicin loaded, is a valuable DDS for local treatment of osteomyelitis in this model. Longer-term results may confirm good integration of the biomaterial in bone without relapse of infection.

SIC20-05

AN INSIGHT INTO COMPLEX INTERPLAY OF FACTORS INFLUENCING POSTOPERATIVE ORTHOPAEDIC WOUND INFECTIONS - A PILOT STUDY

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The study involved a prospective cohort of 745 (504 males & 241 females) consecutive patients of all age groups over a 2 year period. All patients admitted for elective, emergency, cold, trauma (simple & early uninfected compound fractures) surgeries formed the study population. They were labeled as infected or uninfected against stringent pre-set inclusion, exclusion & evaluation criteria/protocol and followed up for a minimum of 14 days. All infected patients were followed up until infection was adequately treated or amputation/death. The parameters influencing infection studied were Biochemical nutritional status indicators (Haemoglobin, WBC counts, Total Proteins), Coexistent medical conditions (DM, RA, HIV, TB), Operation theatre environs, pre-op inpatient stay, duration of surgery, peri-op blood transfusion and role & duration of prophylactic antibiotics. Univariate analysis and power was calculated initially for each factor. The overall infection rate (IR) was 2.95% (8 superficial & 14 deep). The most common organism isolated in deep infections was MRSA (40%). 4 subsided on prolonged antibiotics, 4 underwent Ilizarov ring fixator application and 11 warranted wound wash and debridement with/without implant removal. 1 was lost for follow-up and there were 2 deaths. The mortality rate was 9.09%. The Relative Risk (RR) of death was 12.62. The statistically significant factors were duration of surgery, need for peri-operative blood transfusion and duration of inpatient stay. The single most important factor on logistic regression and multivariate analysis was peri-op blood transfusion ($p < 0.004$). The power of study was low for coexistent diseases and Operation theatre environs.

SIC20-06

INFECTED - DEFECTED NON UNION - CLASSIFICATION, STRATEGY AND TREATMENT BY FIX AS

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AIM: When solving infected non union with one defects, beside regaining bone continuity

and length there is a problem of infection, which is the haviest complication in bone-joint surgery. Joints contractures, skin and soft tissues defects, with adherent and celoid scars, after reedited operations in 80% of cases make the condition of the patient worse, treatment results uncertain and secondary amputation more certain. **METHOD:** This work presents possibilities of compression-distraction method by Fix AS (Fixation According Sabic), for solving large bone defects up to of the bone corps - with distraction calus, and without spongious bone transplatation, with closed procedure. Followed by ways at solving contractures, deformations achieving full length of extremity with simultaneous infection santion and non union consolidation in natural ways. **RESULTS:** For the last 20 years, we've successfully treated 435 non unions, which is especially emphasized in this work. This work analyses and presents infected-defected non union, after war injuries, and failed treatment by other methods. **CONCLUSION:** This way, extremity is saved even in haviest cases, unlike other methods (bone graftings, free flap...) which are more expensive and, unfortunately, often end with an amputation.

SIC20-07

MUSCULOSKELETAL MELIOIDOSIS

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Melioidosis that is caused by *Burkholderia pseudomallei*, is a significant public health problem in Southeast Asia and some other tropical countries. It involves many systems, especially the respiratory system. Melioidosis can mimic various common diseases such as tuberculosis or tumors of the bones and joints. Mortality rates and relapse rate are high despite combination drugs therapy. More than 300 cases of bacteriologically confirmed melioidosis have been detected in several hospitals in Pahang, Malaysia. The purpose of this study is to determine the epidemiology, clinical features, bacteriology, outcome and mortality of musculoskeletal form of melioidosis in Pahang, Malaysia. This is a study of twenty-four patients, who had been diagnosed to have melioidosis involving musculoskeletal system, carried out at three major hospitals in Pahang, Malaysia from January 2000 to June 2006. Case records of confirmed cases will be traced and analyzed. The age, gender, ethnic, nature of activity, clinical presentation, bacteriology, response to treatment and mortality obtained from case record. Twenty-four patients (17 male and 7 female) reviewed. 92% has diabetes mellitus. Knee septic arthritis was the most common joint involved (42%, 11 cases), followed by ankle septic arthritis 15% (4 patients). Surgery was performed at least once in 88% (23 patients). Of all patients, 34% died within 6 months of diagnosis. High mortality and poor response to current treatment alarming us for such a dangerous organism and more studies need to be done for faster diagnosis and the best methods to treat this disease.

SIC20-08

IN VIVO RESPONSE TO A CALCIUM HYDROXYAPATITE ANTIBIOTIC CARRIER (PEROSSAL*) USED TO TREAT BONE INFECTION

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INTRODUCTION: Implant materials impregnated with antibiotics have long been used to manage the dead space created by debridement surgery in patients with osteomyelitis or infected arthroplasty. **AIM:** To present our preliminary results and in vivo response of patients to PerOssal used to treat bone infection in the form of either long bone chronic

osteomyelitis or infected arthroplasty. PerOssal is a new synthetic osteoconductive bone substitution material for the reconstruction of bone defects which consists of an entirely synthetically produced nanocrystalline hydroxyapatite and calcium sulphate and can act as a local antibiotic delivery system. MATERIAL/METHODS: We have treated nine patients (4 with long bone osteomyelitis, 5 with infected arthroplasty) with PerOssal which was used following radical debridement surgery. Observations were focused on wound healing and clinical eradication of infection. RESULTS: We had 6 eradication of infection, 1 recurrence of disease, and 2 on-going cases. Declining wound leakage and delayed wound healing was present in 3 cases where PerOssal was used free within soft tissues in amounts equal to or greater than 10 cm³. CONCLUSION: We have so far good in vivo results with respect to infection control. However, wound healing and leakage seems to be affected by the amount of extraosseous PerOssal present in the infection site.

SIC20-09

MANAGEMENT OF SEPTIC COMPLICATIONS IN TUMOUR-PROSTHESES OF THE KNEE JOINT - A REVIEW OF 78 CASES

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Endoprosthetic replacement following oncological conditions has shown to be at higher risk of septic complications due to the use of implants of unusual size, major soft tissue loss and immunosuppression. 373 patients have been treated at our institution for malignant tumours of the bone or soft tissue around the knee with a modular tumour-prostheses of the knee joint since their availability from 1978. Infection or septic complications were identified in 78 patients (20.9%). In 15 cases of superficial wound healing disturbances with a fistula simple excision and revision of the wound was performed. In 48 cases of deep periprosthetic infections, patients underwent one-stage revision with explantation of the total prosthetic material except femoral and tibial stems, extensive debridement of the wound and replantation of the disinfected prostheses throughout one operation. In 8 patients two-stage revision of the prostheses was performed, using an antibiotic impregnated cement spacer and Steinmann nails. In 5 patients amputation of the affected limb was indicated, whereas 2 patients could be treated conservatively. Out of the patients treated by one-stage revision, 16 developed recurrent infection and had to undergo consecutive surgery. After two-stage surgery 4 patients showed signs of septic recurrence. According to our results deep periprosthetic infection of tumour-prostheses primarily can be treated by one-stage revision, in recurrent infections, however, two-stage revision should be performed. We additionally suggest the use of local or pedicled muscle flaps to obtain better soft tissue coverage of the prostheses after infection.

Session 20: Infections (II)

Moderators: *Geoffrey Walker (United Kingdom)*
Hamid Taobane (Morocco)

FREE PAPERS

SIC20-10

INFECTION IN LOWER LIMB ARTHROPLASTY

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AIM: - To find the infection rate in Hip and Knee Replacements and to find correlation retrospectively. - Compare with National Standards. METHODS AND MATERIALS: We evaluated 64 patients who underwent Hip and Knee Replacements between Mar-Sep 2006, identified from clinical audit department records. 24 TKR and 40 THR analysed with case notes review according to guidelines from Health Protection Agency sheet and co-morbid factors checked. RESULTS: Out of 64 patients, 3 had superficial infections. No deep infections. All patients had more than 3 co-morbid factors and Foley's catheterisation with proper antibiotic prophylaxis. The results were 1.5-2% above National Standards in UK in both knee and hip replacements. DISCUSSION: All the factors age, sex, side, BMI, elective or emergency admissions, co-morbid factors, ASA, pre-op blood results, type of anaesthesia, indication for surgery, type of surgery, average hospital stay, duration of surgery, number of blood transfusions, catheterisation, discharge to home, superficial or deep infection checked thoroughly. CONCLUSION & RECOMMENDATIONS: - Average age for THR 61-70 and TKR IS 66-70. Females more common. Most are elective. The infection rate is comparable to National Standards. - Long term follow-up. - Morbidity registers. - Repeat audit with large group patients. OUR PRACTICE: 1. Thorough pre-op evaluation and MRSA screen. 2. Check co-morbid factors & source of infection, proper antibiotic prophylaxis cover for catheterisation patients. 3. Appropriate usage of thromboprophylaxis and prophylactic antibiotic. 4. Early mobilisation and early discharge. 5. Ring fencing beds are proven to control the infection. DRAWBACKS: - Patients operated in last few weeks (6) may still present with infections later. - Small number of patients and short follow-up.

SIC20-11

KNEE ARTHRODESIS AFTER TOTAL KNEE ARTHROPLASTY INFECTION USING AN INTRAMEDULLARY MODULAR TITANIUM STEM

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INTRODUCTION: Usage of an intramedullary modular titanium stem to perform knee arthrodesis allows bridging of long juxta-articular bone defects following arthroplasty infection. Which results can be expected in this salvage procedure? METHODS: Retrospective analysis of 73 (42 ♀/31 ♂) patients, (average age: 66.7 yrs) who received a knee arthrodesis between 2001-2005 following total knee arthroplasty infection using an intramedullary modular titanium stem, consisting of a tibial and femoral cementless stem

component with a connection module over a 1-4 year follow-up period concerning re-infection rate, implant loosening or periprosthetic fractures and patient activity level. Arthrodesis was performed with normalization of WBC and CRP with sterile microbiology results of a preoperative joint puncture. RESULTS: 66/73 patients were followed up showing a stable arthrodesis. Three had a chronic infection. We observed 3 periprosthetic fractures and two aseptic stem loosening with necessity of intramedullary component exchange. One MRSA-reinfection was eradicated by implant exchange after intermediate vancomycin spacer usage. One patient died of cardiopulmonary failure. Average leg shortening measured 2.7 (1.2-5) cm. Overall reinfection-rate was 4.5%. Four patients showed sintering of the femoral component not requiring surgical intervention. Twelve patients were mobilized using one stick, four used crutches. 58 patients quoted a very satisfactory, 8 a fair result. CONCLUSION: Knee arthrodesis following total knee replacement infection is safely achievable using an intramedullary cementless modular titanium stem system. It is especially useful in situations with extensive juxta-articular bone defects. Patient's acceptance is high with early full weight-bearing and low re-infection rates.

SIC20-12

POSTTRAUMATIC SEVERE INFECTION OF THE ANKLE JOINT - LONG TERM RESULTS

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Infection of the ankle joint is a severe complication of surgically treated fractures around the ankle joint. Often these result in destruction of the joint surfaces. Aim of this study was to evaluate when joint function can be salvaged and how the subjective and objective results of patients with and without joint function differ. MATERIAL AND METHODS: Between 1993 and 2003, 155 consecutive patients (57 female, av. age 49.7 years) with severe posttraumatic infection of the ankle were treated. On average these had 3.74 previous operations (1-24). Treatment was adapted to the stage of infection. Follow-up examination was at mean 4.5 years and included clinical examination, scores and radiographs. RESULTS: We found a less severe grade II infection in 22 cases, in the remaining (85%) an infection grade III or IV was found. In 19 of the 22 patients with a grade II Infection it was possible to salvage the graft. In all patients with a higher grade of infection, an arthrodesis was required. In seven cases an amputation was necessary. In patients with remaining joint function, there was arthrosis in the majority of cases, joint movement was restricted in all cases. In the arthrodesis group the main complaint was reduced walking capacity. In about half of both groups the previous occupation could be regained. CONCLUSION: To salvage joint function, early and aggressive intervention is required. Due to posttraumatic arthrosis the clinical and subjective results of joint salvaging treatment do not differ very much compared to arthrodesis.

SIC20-13

ANKLE ARTHRODESIS AFTER POST TRAUMATIC SEPTIC COMPLICATIONS

Jamal Dine EL AHMADI
Polyclinique CNSS (MOROCCO)

We report the study of a homogeneous of 25 cases re-examined on a total of 34 files of septic arthritis of ankle treated between 1983 and 2004. We compare the clinical and radiological results of the 2 methods mainly used: 1. Cancellous graft according to Papineau technique. 2. On lay graft of cortical bone. The fixing of these arthrodesis was entrusted in all cases to an assembly by an external fixation.

SIC20-14

OUR EXPERIENCE IN COMPLEX TREATMENT OF LONG BONES AND SOFT TISSUE INFECTED DEFECTS AND NONUNION

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AIM: The treatment of infected long bones fractures associated with soft tissue and bone diaphysial defects is one of the major problems in orthopedic surgery. METHOD: The study comprised 855 patients, who were treated from 1986 to 2006 with posttraumatic osteomyelites. In GNMC, GSC and Clinic 'Caraps Medline'. 769 were male and 86 female. The average of patients - 40 years. 60% (513) patients with nonunion have got complications after high energy open fractures and 40% (342) after treatment fractures by surgery. 40% of septic complications are localized on the tibia. 221 patients after high energy trauma, had bone and soft tissue defects. Localization: 1) Femur - 55, 2) Tibia - 133, 3) Shoulder - 17, 4) Forearm - 16. Treatment consisted of: radical necrectomy and stabile fixation of the bone nonunion, complex symptomatic therapy. Bone tissue defects before 3cm we treated by bone autografting and compression, more than 3cm defects we treated with bone autografting and free flap (bone-muscle-skin). We treated posttraumatic lympho-venous insufficiency by use of Daflon-500 and osteoporosis by Biphosphonats. RESULTS: Outcome of complex treatment of long bones and soft tissue infected defects showed rationality of radical debridement with stable fixation bone nonunion, good results were obtained in 90%, treatment was effective in 8%, relapse was observed in 2% of cases.

SIC20-15

TWO-STAGE REVISION WITH PRE-FORMED KNEE SPACERS AND MODULAR KNEE PROSTHESIS

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Istituto Gaetano Pini (ITALY)

From year 2001 to 2006, 40 patients, affected by septic knee prosthesis, underwent two-stage revision in our Department according to the same protocol. For the purpose of this study we have considered the first 21 consecutive patients, at a follow-up ranging from 2 to 4 years from revision. In all the cases the infected prosthesis was removed and a preformed antibiotic-loaded spacer was implanted (Spacer K, Tecres Spa, Italy). The spacer was fixed with one or two packs of antibiotic-loaded cement (Cemex Genta, Tecres Spa, Italy). All the patients received a minimum of 6 weeks of organism-specific antibiotics postoperatively. Two to three months after implant, the spacer was removed and the patients underwent reconstruction using cemented modular prosthesis (PFC TC3, Johnson & Johnson-DePuy Inc.). The 21 patients included in this study were followed for an average of 32 months (range, 24-48 months). Two patients were lost to follow-up. The interval between the first-stage and second-stage operations ranged from 8 to 12 weeks (mean 83 +/- 16 days). At the time of the latest follow-up no patient showed clinical evidence of infection recurrence and no patient required revision for any reason. Postoperative complications included: one spacer dislocation; one femoral and tibial fracture; two knee lateral instability. Two patients had side effects during antibiotic treatment, which required temporary withdrawal of antibiotics. Two-stage revision of septic knee prosthesis with preformed articulated knee spacer and modular revision prosthesis allow achieving infection eradication and a significant increase in the joint range of motion.

SIC20-16

PREFORMED ANTIBIOTIC-LOADED CEMENT SPACERS AND CEMENTLESS

MODULAR PROSTHESIS FOR TWO-STAGE REVISION OF INFECTED TOTAL HIP ARTHROPLASTY.

Carlo Luca ROMANO', Paolo TREZZA, Enzo MEANI
Istituto Gaetano Pini (ITALY)

Medium term results of a consecutive series of patients with chronically infected total hip arthroplasty, treated with two-stage revision using pre-formed antibiotic-loaded cement spacers and cementless modular long stem revision prosthesis and prolonged systemic antibiotic therapy after first and second stage are reported. From year 2000 to 2006 90 patients, affected by chronic septic hip prosthesis, underwent two stage hip revision in our Department. For the purpose of this study we have considered the first 46 consecutive patients, at a follow-up ranging from 2 to 6 years from revision. In all the cases the infected prosthesis was removed and a pre-formed antibiotic-loaded spacer (Spacer G, Tecres Spa, Italy) was implanted. Eight to 12 weeks (mean 10.7 + 2.1) after implant, the spacer was removed and the patients underwent reconstruction using cementless modular prosthesis (Profemur, Wright, or S-ROM Johnson&Johnson DePuy) and non-cemented cups. All the patients received systemic antibiotic treatment with two antibiotics for six weeks after the first and the second stage, on the basis of the antibiogram. The 46 patients included in this study were followed for an average of 48 months (range, 24-72 months). Two patients were lost to follow-up. The interval between the first-stage and second-stage operations ranged from 8 to 12 weeks (mean 10.7 + 2.1). At the time of the latest follow-up one patient (2.2%) showed clinical evidence of infection recurrence. Preformed antibiotic spacers and non-cemented hip revision prosthesis appear an effective solution for infected total hip prosthesis.

SIC20-17

TRICALCIUM PHOSPHATE AND TEICOPLANIN-ADDED DEMINERALIZED BONE MATRIX FOR THE TREATMENT OF BONE DEFECTS IN INFECTIONS.

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Local antibiotic delivery via biodegradable bone defect fillers with multifunctional properties for the treatment of bone infections is highly appealing. The present clinical study was carried out to test the efficacy and safety of the use of tricalcium phosphate (Calcibon) associated with bone demineralized matrix (Targobone) for the treatment of bone defects after debridement of bone infections. 22 patients, affected by osteomyelitis of the long bones (15 tibias, 6 femurs, 1 ileum) were prospectively reviewed at a minimum follow-up of 12 months. All had pre-operative positive cultural examination for Gram positive bacteria sensitive to teicoplanin. After accurate surgical debridement, bone defect was filled with calcium phosphate and bone demineralized matrix added with teicoplanin. Segmental bone defects were excluded from the study. All the patients received systemic antibiotic administration for 4 to 6 weeks after surgery. The volume of the treated bone defects ranged 15cm³ to 40cm³. Clinical main outcomes include: persistence of draining after surgery for up to six weeks in 4 patients and the absence of clinical signs of infection recurrence or draining in 20 patients at the final follow-up. Laboratory tests showed mean pre-operative C-reactive protein levels of 6.5 +- 3.5 and post-operative of 0.9 +- 0.5mg/L, at the latest follow-up. Radiographic findings showed at the latest available follow-up new bone formation but incomplete bone substitutes resorption. Tricalcium phosphate and demineralized bone matrix added with teicoplanin appears safe and effective, in the medium term follow-up, for filling cavitary bone defects of limited extent in osteomyelitis.

SIC20-18

THE PATTERN OF PROCALCITONIN IN UNCOMPLICATED TOTAL HIP AND KNEE

ARTHROPLASTY AND ITS IMPLICATION IN PERIPROSTHETIC INFECTION

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INTRODUCTION: The aim of this study is therefore twofold: to illustrate the pattern of PCT in comparison to the routine inflammatory markers and, from this, to show if PCT could have a clinical role in periprosthetic infection. **MATERIALS AND METHOD:** A prospective study over 6 months of fifty-nine patients undergoing either primary total hip or knee arthroplasty was performed. Serum blood samples for PCT, CRP, ESR and WCC were taken pre-operatively and on days 1, 3 and 5 post-operatively. **RESULTS:** The patient with a preoperative PCT of 5ng/ml had a preoperative CRP and ESR value of 56, and a normal WCC. The PCT was 0.5ng/ml on day 5. One of the patients who recorded a PCT of 10ng/ml had a CRP of 263mg/l on day 3 and 280mg/l on day 5. There was no relative abnormality, his ESR and his WCC remained normal. **DISCUSSION:** PCT may be a more reliable indicator of periprosthetic infection given the substantial proportion of patients with unexplained high CRP levels preoperatively. Also, because the surgery doesn't cause PCT to rise indicates that it could be used to monitor high risk patients in the immediate post-operative period. This is further supported by its rapid elevation in infection, and the fact that the CRP, ESR and WCC are still elevated during this period. This would further imply that PCT would be useful in monitoring patients after their revision surgery for periprosthetic infection when it is often difficult to know if the infection has been eradicated.

SIC20-19

RESECTION ARTHROPLASTY FOLLOWING INFECTED TOTAL HIP ARTHROPLASTY - CLINICAL RESULTS

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INTRODUCTION: Persisting infections of the hip joint are regarded as one of the most feared complications following total hip arthroplasty. In some of these cases resection arthroplasty is the ultimate treatment after re-implantation of hip endoprostheses had failed. **METHODS:** 16 patients who had undergone resection arthroplasty according to Girdlestone could be included in this study. In all cases Girdlestone operations had been performed because of persisting infections of the hip joint. Before undergoing resection arthroplasty, all patients had been operated on the infected hip joint between 2 and 6 times before. The mean follow-up was 7.8 years. **RESULTS:** In 13 out of 16 cases (81 percent) eradication of the infection was finally achieved. At the time of re-evaluation 4 patients had no pain, 6 sometimes suffered from moderate pain, 4 from pain during physical activities and 2 patients experienced pain even at rest. At the time of follow-up, 7 patients used a cane, 8 patients needed 2 canes or crutches and in 1 case a wheel chair was necessary. The mean shortening of the leg was 5.5cm (range from 3cm to 14cm). Clinical evaluation using the score according to Merle d'Aubigné and Postel to assess the functional results showed a mean of 7.1 points (range from 2 points to 10 points). 56 percent of our patients were satisfied with the functional results obtained. **CONCLUSION:** In the long run Girdlestone procedure still seems to be a reasonable salvage operation for persisting deep infections following endoprosthesis implantation at the hip.

SIC20-20

SPINAL INFECTIONS - ANALYSIS ON 284 PATIENTS

Saturday, 1 September 2007
Karam 1 Room

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INTRODUCTION: Spondylodiscitis is a serious disease due to delay diagnosis and inadequate treatment. This study analyzes patients having received conservative or surgical treatment. **MATERIAL AND METHOD:** From 1992 to 2005, 284 patients were hospitalized due to spondylodiscitis. 119 were females and 165 males with mean age 56.5 years. The location of the infection was: cervical spine 25 patients, thoracic-95, thoracolumbar junction-15 and lumbosacral spine-149. In 93 patients, Staph. aureus was detected and in 36 TB. In 104 the cultures were negative. The patients were divided into three groups: Group-A: 121 patients had conservative treatment with antibiotics and bracing. Group-B: 64 patients sustained posterior decompression alone. Group-C: 99 patients had anterior debridement and posterior decompression and stabilizations or anterior stabilization. **RESULTS:** During the follow-up 36 died (8 in-hospital). Our 12-month follow-up showed that 9 of group-A patients were operated. On the other hand, 26 of the group-B were revised and 15 from the group-C. One of group-A patients had altered neurology. In group-B, 14 had altered neurology and the operation was beneficial for 7 of them, 5 remained unchanged, 2 were deteriorated. In group-C, 35 had altered neurology, 25 improved, 7 remain unchanged and 3 deteriorate. In 4 patients the altered neurology was not related with the infection. **CONCLUSION:** Spondylodiscitis is a valid diagnose for persisting spinal back pain. The conservative management in selected patients is effective up to 92.6%. The decompression alone had high re-operation rate and for that, we suggest to be combined with anterior debridement-reconstruction and posterior stabilization.

SIC20-21

SEPTIC HIP DESTRUCTION OF CHRONIC INTRAVENOUS DRUG ABUSERS - MANAGEMENT AND THERAPEUTICAL OPTIONS

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INTRODUCTION: The septic destruction of the hip joint of chronic i.v. drug abusers represents a life threatening condition. The joint is either infected by bacterial invasion following juxtaarticular vessel injection or haematogenously. Options of curative treatment include partial or complete resection of the femoral head with subsequent arthrodesis or hip joint replacement. **METHODS:** We investigated 15 chronic i.v. drug abusers retrospectively from 1/2000 until 12/2005 with primary septic hip destruction. Point of interest was the reinfection-rate within 12 months, the revision rate and grade of mobility. **RESULTS:** In 2 patients a partial and in 13 a total resection of the femoral head was necessary. In 6 patients total hip replacement was performed, two patients received a hip arthrodesis. We observed five reinfections of alloarthroplasties leading to prosthesis explantation within 24 months, one resectionarthroplasty was reinfected. Overall revision rate was 47% (83% in the endoprosthesis group). All patients with a girdlestone-arthroplasty were mobilized using a crutch or a shoe orthosis. **CONCLUSION:** Alloarthroplasty of the septicly destructed hipjoint in chronic drug abusers shows a high rate of complications and a low standing time. Therefore total hip replacement with regard to the special medical and social characteristics of chronic drug abusers cannot be recommended. The resection arthroplasty is the safest surgical procedure taken into consideration the worsened functional result due to gluteal insufficiency and reduced weight bearing of the lower extremity. Alternatively arthrodesis of the hip joint should be

considered in young patients with a high grade of mobility, requiring advanced surgical experience.

SIC20-22

SEPTIC ARTHRITIS IN HAEMODIALYSIS PATIENTS: A SEVEN-YEAR MULTI-CENTRE EXPERIENCE

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INTRODUCTION: Patients on haemodialysis for chronic renal failure are at increased risk of developing septic arthritis and the number of patients on this treatment modality is increasing. Despite this, little is known about septic arthritis in this group. **AIMS:** To determine relevant demographics, clinical features and outcomes for this condition. **METHODS:** A multi-centre seven-year retrospective review from 1999-2005. **RESULTS:** This is the largest series in the literature to date with 15 cases identified. Mean age 67 years with 73.3% (11/15) being male. All cases had multiple co-morbidities. Primary sources of sepsis: dialysis access related 80% (12/15), unknown 13.3% (2/15) and unrelated soft tissue sepsis 6.7% (1/15). Clinical presentation: systemic upset with acute mono-articular symptoms in 100% (15/15) and knee involvement in 73.3% (11/15). White Cell Count and CRP elevated in 66.7% (10/15) and 100% (15/15) respectively. Synovial fluid and blood cultures positive in 100% (15/15) and 93.3% (14/15) respectively. Organisms isolated skin commensals in 100% (15/15): staphylococci 86.7% (13/15) and streptococci 13.3% (2/15). Rheumatic joint disease present in 40% (6/15) with 13.3% (2/15) having urate crystals on synovial fluid microscopy. Treatment consisted of antimicrobial therapy (mean 36 days) with arthroscopic debridement in all cases. Outcomes were good with cure of infection 80% (12/15), chronic sepsis in 13.3% (2/15) and sepsis related mortality in 6.7% (1/15). **CONCLUSION:** This is a potentially devastating condition. It occurs in patients with many other potential causes for arthralgia. It is imperative to have a high index of suspicion for sepsis in these patients.

SIC20-23

ADULT NATIVE JOINT SEPTIC ARTHRITIS OF THE HIP: A FOURTEEN YEAR MULTI-CENTRE EXPERIENCE OF 46 CASES

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INTRODUCTION: Septic arthritis of the hip is an Orthopaedic emergency. While common in the paediatric population, it is rare in adults and little is reported on it. **METHODS:** Multi-centre (Leeds General Infirmary, St James's University Hospital & York District Hospital) fourteen year retrospective review from 1991-2005. **RESULTS:** 46 cases identified. Mean age 43years with 80% (37/46) male. Risk factors for sepsis present in 87% (40/46): IVDU in 48% (22/46), DM in 20% (9/46), liver disease in 22% (10/46) and immunosuppressive drugs in 17% (8/46). Rheumatic joint disease present in 28% (13/46): rheumatoid arthritis, gout and psoriatic arthropathy in 13% (6/46), 9% (4/46) and 7% (3/46) respectively. Primary sources of sepsis: IVDU in 48% (22/46), unknown in 39% (18/46), line sepsis in 11% (5/46) and psoas abscess in 2% (1/46). All cases presented with triad of groin pain, constitutional upset and difficulty/inability to weight-

bear. Examination revealed pyrexia in 57% (26/46) and a painfully decreased range of joint motion in 100% (46/46). Laboratory tests revealed raised white cell counts 57% (34/46) and raised CRP's/ESR's 100% (46/46). The most commonly isolated organism was staphylococcus aureus 78% (36/46). Antimicrobial therapy was administered for a mean of 49 days. Surgical treatment consisted of a mean of 1.8 arthrotomy/arthroscopic hip washouts/debridements in consenting cases- 89% (41/46). Outcomes were good with sepsis related mortality of 4% (2/46) and local recurrence of 9% (4/44). DISCUSSION: Septic arthritis of the hip is a potentially serious condition. Timely medical and surgical intervention can lead to good outcome

SIC20-24 TUBERCULOSIS OF SPINE

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A retrospective review of 33 patients with tuberculosis of the spine from January 2000 to April 2002 revealed that the mean age was 36.5 and peak incidence is in the second decade of life (27.3%). There were 24 males and 9 females. The majority of the lesions involved the thoracic spine (30.3%), followed by the lumbar spine (27.2%). Skip lesions was seen in 12.1% of cases. The erythrocyte sedimentations rate was normal in 9.1% of patients. Neurological involvement was seen in 51.5% of patients. Concomitants tuberculosis of the lung was 66.6%. The radical surgical debridement and grafting rate was 39.3%. The preferred surgical procedure was that of radical anterior debridement and fusion, supplemented by anterior or posterior instrumentation if needed. Anti-tuberculous chemotherapy remained the mainstay of treatment. Surgery gives faster relief of pain and neurological recovery but is a major undertaking, and thus selection of patients is vital to avoid morbidity and mortality.

SIC20-25 TREATMENT OF TALAR NECROSIS USING EXTERNAL RING FIXATORS

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Talar fractures are notorious for their disabling bone and soft tissue complications. Aseptic necrosis has been reported in up to 100% of Hawkins type III fractures and resistant infection is not seldom after open reduction and internal fixation surgery. Conventional fusion techniques and isolated talectomy have given unsatisfactory results in many series and amputation may be the only treatment left in patients with advanced infection or repeated failed surgeries. The Ilizarov frame can offer a solution for salvaging such complicated cases. We retrospectively reviewed 6 patients (mean age: 40 years) with unilateral talar necrosis and failed previous surgeries (mean, 3 procedures per foot) treated using a standardized approach of thorough local debridement, talar resection and Ilizarov tibiocalcaneal fusion with simultaneous proximal lengthening to correct for leg length discrepancy. A solid clinical and radiographic fusion was achieved in all cases after an average external fixation time of 36 weeks. Pin tract infection requiring pin/wire removal was seen in two cases. Chopart joint fusion was done in two of the study patients. All patients had improvement in pain and function and were satisfied with the treatment outcome after a mean follow-up period of 93.5 months. The Ilizarov technique is a safe and reliable procedure for obtaining a solid tibiocalcaneal fusion in cases with severe talar destruction. This technique optimally addresses all aspects of pathology without major complications and offers a high rate of fusion and satisfactory functional results.

POSTERS – SIROT**SIR-P01****COMPUTER–SIMULATION-BASED THREE-DIMENSIONAL CORRECTIVE OSTEOTOMY USING A PREOPERATIVELY MODELED HYDROXYAPATITE IMPLANT**

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PURPOSE: We have been attempting a corrective osteotomy using as a bone-graft material a three-dimensionally pre-modeled hydroxyapatite (HA) implant designed after preoperative computer simulation. The purpose of this paper is to evaluate its preliminary clinical results and investigate the feasibility of the method. **MATERIALS:** Five patients with forearm deformities were the subjects of this study. They included two malunited distal radial fractures, two malunited diaphyseal fractures of the radius, and one congenital forearm deformity. **METHOD:** Computer simulation of corrective osteotomy was made using three-dimensional bone models constructed from CT data. We then calculated the exact size and shape of the estimated bone defect after the simulated opening wedge osteotomy. Based on the simulation, an HA block was cut into the shape using a 3D milling machine. A synthetic interconnected porous HA (IP-CHA) that has a high bone tissue induction ability was used. To ensure the precise location of the osteotomy, a custom-designed surgical template was made and used. After the osteotomy, correction, and insertion of the HA, internal fixation was completed with a plate and screws or with Kirschner wires. **RESULTS:** By inserting the preoperatively modelled HA, accurate correction of the deformity was achieved in all cases. The bone-HA interface on X-ray became obscure within four months, and the HA became integrated with the host bone in four patients. **CONCLUSION:** Corrective osteotomy using a pre-modelled HA designed by computer simulation as a graft is an innovative and reliable technique. (This study was supported by Japan Science and Technology Agency.)

SIR-P02**BIOMECHANICAL PROPERTIES OF BONE CEMENT WITH ADDITION OF CEFUROXIME ANTIBIOTIC**

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Infection is the most feared complication in joint replacement surgery. The usage of antibiotics mixed into the bone cement has significantly reduced the incidence of infection in primary joint arthroplasty. We conducted a study to observe the changes in mechanical properties of plain bone cement with gradual addition of Cefuroxime antibiotic in terms of its impact, flexural and tensile strength. In an experimental design, 4 Cefuroxime doses in powder form (0 gm, 1.5 gm, 3.0gm and 45 gm) were added to bone cement (Surgical Simplex P). Specimens were prepared using vacuum mixer to determine the impact, flexural and tensile strength according to STM and ISO standards respectively. For each concentration, 5 samples were prepared for testing. 0 mg specimens served as controls for this study. Addition of 4.5 gm antibiotic significantly reduced the impact strength, flexural strength (both transverse and bending modulus) and tensile strength (both Young

modulus and stress-at-break). Addition of 3.0 gm antibiotic significantly reduced the flexural strength (both transverse and bending modulus). Our results suggest that the maximum amount of Cefuroxime dose to be safely added to 40 gm of Surgical Simplex P bone cement is 1.5 gm using vacuum mixer.

SIR-P03

PREPARATION OF THE FREEZE-DRIED BONE

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The purpose of our study was to carry out the first tests of preparation of the freeze-dried bone. In our work, we used human bone and bovine bone, which have undergone a deproteination and a degreasing by two different methods: the bone was frozen then freeze-dried by a lyophilisator. Then, the osseous fragments were packed and sterilized by ethylene oxide. The macroscopic study of the fragments obtained, showed pieces of bones whites and resistant, of quite visible and released porosity. We carried out a histological study on these freeze-dried fragments, the results showed that the osseous plates were of preserved structure and architecture, delimiting desert small boxes. These last were deprived of cellular elements. We begun by animal experimentation on rabbits, bien evaluating's results are in process. The freeze-dried bone has a structure almost identical to the human bone, it has less risk of transmission of infection, and its storage cost is very weak since it is done at ambient temperature and during long years. All these advantages make it an osseous substitute of choice, which makes it possible for surgeons to increase the therapeutic possibilities in the filling of the losses of osseous substances.

SIR-P04

HIGH DENSITY POLYETHYLENE AS A SUBSTITUTE FOR BONES IN BIOMECHANICAL STUDIES

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INTRODUCTION: The use of artificial bones (Sawbones) has become a popular substitute for cadaveric bones in orthopaedic implant testing. However, other commercially available materials such as stainless steel, aluminium and High density polyethylene (HDPE) may be more suitable for implant testing. **AIM:** We aimed to test the suitability of HDPE, Aluminium and Stainless steel as an alternate material for artificial bones in orthopaedic implant testing. **MATERIALS AND METHODS:** Cylinders of all four materials were made to represent different parts of the human femur, i.e. 50mm x 5mm to represent the proximal diaphyseal cortical bone and 75 mm x 3 mm to represent diaphyseo-metaphyseal junction cortical bone. Intramedullary (IM) nails were custom-made from stainless steel alloys and the proximal end was clamped and connected to a load cell (Instron machine) and apply axial force. Each test was repeated thrice using different type of cylinder material and dimensions. **RESULTS:** In 50mm x 5mm: For every 0.25KN increase in axial force, composite model using HDPE and sawbones had identical force-displacement curves. The IM nail displacement by 0.2mm at 0.25KN, 0.038mm at 0.50KN and 0.055mm at 0.75KN. Stainless steel and aluminium had similar force-displacement curves but variable when compared to HDPE. In 75mm x 3mm: Similarly, for every 0.25KN increase in axial force, composite model using HDPE and sawbones had identical displacement of the intramedullary nail i.e., 0.05mm at 0.25KN, 0.10mm at 0.50KN, 0.17 mm at 0.75KN. **CONCLUSION:** For IM nails implant testing, HDPE is comparable to artificial bones and hence may be used as an alternate material

for biomechanical testing.

SIR-P05

SACRAL STRESS FRACTURE AFTER MULTIPLE-LEVEL LUMBAR FUSION - A CASE REPORT

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Pedicle screw fixation has gained wide acceptance as an adjunct to spinal fusion in the adult. As the length of the fusion increases, so does the risk of complication, notably failure of fusion such as stress fracture at more distal segments. We present the occurrence of a sacral stress fracture at two levels below fusion site, not previously discussed to our knowledge. A 62-year-old woman presented with a chief complaint of progressively increasing low back pain with down both thighs to the calves. Radiographs of the lumbar showed a grade I spondylolisthesis at the L3-4 and L4-5 level. MRI showed severe lumbar canal stenosis at L3-4 and L4-5. After 8 months of nonoperative management, the patient underwent posterior decompression at the L3-L5 level with bilateral foraminotomies, posterolateral lumbar fusion, and pedicle screw fixation from L3 to L5. At 18 months after surgery, the patient developed buttock pain. Plain radiographs revealed a fracture of the sacrum. Bone scans showed vertical uptake in left alae with horizontal component. CT scans of the lumbar spine showed a stress fracture involving the first sacral vertebral body and both alar. She was treated with rigid thoracolumbar spine orthosis brace and pain medications. The patients' symptoms subsequently resolved and plain radiograph obtained after 3 months of bracing showed union of the fracture. Sacral insufficiency fracture should be added to the differential diagnosis for persistent pain status after long spinal arthrodesis. Most fractures do not need any operative intervention and go on to heal with conservative treatment.

SIR-P06

RADICAL EXCISION OF VERTEBRAL TUMORS

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INTRODUCTION: Surgical treatment of vertebral tumours remains an obscure problem. 96% are metastatic, the rest being primary tumours. Controversies exist on the type of surgery and treatment in general. Isolated lesions are often treated palliatively without morphological verification. **MATERIALS AND METHODS:** Radical excision was implemented in 35 patients with malignant tumours; 7 cervical, 12 thoracic, 15 lumbar and one sacral. Metastases consisted of breast 14, kidneys 6, lungs 3, prostate 3 patients, melanoma in 2, uterine sarcoma and cancer of the adrenal glands registered in 1 case. Primary vertebral tumours consisted of one lymphoma, one lymphosarcoma, one neuroectodermal and one giant-cell tumour. Investigation included physical check-up, X-rays, MRI of the spine, blood assay for oncological markers and follow-up for 36 months. Indications for surgery were: clinical symptoms (pain and neural disorders), confined solitary lesions and absence of other tumours. Stabilization by anterior or posterior interbody fusion. In 3 cases we excised both vertebral and primary tumour. **RESULTS:** 68% of the patient's regained full activity without neural deficit, 19% needed follow-up care. 15 patients underwent combined therapy. Two patients died post-operatively. Recidivation in situ was observed in 5 patients, invasion into neighbouring structures in 7 (46%) of which re-intervention plus adjuvant therapy was implemented. One year expectancy was 25%. **CONCLUSIONS:** Early surgery in solitary tumours can avoid compression of the spinal cord and morphologically verify the tumour. Radical excision reduces spread resulting in low recurrences. Invasion into neighbouring tissues calls for

combination therapy.

SIR-P07

POST OPERATIVE VISUAL LOSS FOLLOWING PRONE SPINAL SURGERY - A CASE REPORT AND PREVENTIVE STRATEGIES

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Postoperative visual loss is a rare but disastrous complication that has an estimated incidence of 0.01 to 1 percent after non-ocular surgery. We report a patient who underwent a spinal operation in the prone position for fracture cervical spine with quadriplegia and complained of blindness in one eye post operatively. We considered the potential etiological factors contributing to this unilateral postoperative visual loss and suggest strategies to reduce the incidence of this complication in spinal surgery.

SIR-P08

BIOMECHANICAL ASPECTS OF OCCULT SPONGIOUS FRACTURES IN CHILDREN

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INTRODUCTION: Occult spongy fractures which manifest radiographically as a curvature (3) leads to plastic bowing of long tubular bones with no identifiable fracture lines in children and young adults (2,4). **MATERIAL AND METHODS:** The rarity (1) (2 in 100,000 patients) is reflected in 6 cases of plastic bowing we diagnosed within 7 years. Based on the analysis of our patients we discuss the biomechanical properties, its elastic and plastic behaviour. The patients underwent MRI (1,5 Tesla, Body-Array-Coll, coronal T2-TSF, T1-SF and STIR). **RESULTS:** Fresh endosteal fracture is without cortical fracture signs at the highest convexity. Hyper intense signal alteration was in the medullary space, periosteal and in adjoining soft tissue. We detected longitudinal fracture lines, rather zones of oedema, subperiosteal hematoma and oedema - equivalent changes in the nearby muscles. **DISCUSSION:** Hook's law about restoring force $F=kx$ explains plastic deformation. Equivalent in metallic physics is globular formation of cells. This provides better break stretching than laminar formation. It explains bowing injuries in children and juveniles: hardness and tensile strength of stretching border are proportional and inverse to the break stretching (5). We found controversial to existing literature: 1. No micro fractures in concavity. 2. Radiographically evident callus formations. 3. Remodelling and spontaneous correction in children under 5 years. Over 10 years, no remodelling is expected 4. Radiographically primary occult spongy fractures. **CONCLUSION:** Biomechanical laws and clinical experience show the correlation between age and hardness of the bone, and elastic or plastic deformation and fracture.

SIR-P09

TOTAL HIP REPLACEMENT IN PATIENT WITH HIGH CONGENITAL DYSPLASTIC HIP COMBINED SHORTENING RESECTION OF DISTAL FEMUR

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Patients with high congenital displacement of hip are most serious contingent for total hip replacement. In preoperative period skeletal traction is used. It decreases spasticity of muscles and height of hip displacement. Surgical approach is posteriolateral. Deformity of femoral head, remnants of capsule and fibrous tissue in false acetabulum are noted. After

removing all of them, surgeon starts to prepare acetabulum in true place. If necessary, bone grafting and reinforcing of acetabular roof can be applied. Acetabular cup is fixed by bone cement. Then, operating surgeon prepares femoral canal and puts stem by bone cement. After that the operating team makes attempt to reduce and bring down proximal end of the femur. If it is not possible, a resection and osteosynthesis of distal third of the femur by plate are made. Three weeks of bed rest and rehabilitation with continuous passive motion is used. We have made 14 operations of total hip replacement in patients with high congenital dislocation of the hip using resection of distal femur (3 to 5cm). We think that resection and shortening of femur let to instill acetabular cup in true place, but not in the false one. Our method contributes in prosthesis work-term lengthening and thus treatment results of these complicated cases.

SIR-P10

HIP RESURFACING ARTHROPLASTY - OUR EXPERIENCE

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Resurfacing arthroplasty constitutes an important therapeutic alternative for young patients who present moderate or severe coxarthrosis. Our centre has an important and increasing experience on the technique, being one of the centres with more experience in it of Spain. In this work we analyzed our experience and the functional outcomes with this implant.

SIR-P11

ARTICULAR SURFACE REPLACEMENT OF THE HIP JOINT AND KINEMATIC NAVIGATION

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AIM: The aim of the clinical study was to assess postoperative results of the Articular Surface Replacement (ASR) of the Hip joint together with kinematic navigation (Ci system). METHODS: Between March 2006 and March 2007 we implanted 31 ASR together with kinematic navigation Ci system. Imaging studies: AP, axial X-rays. The group of 31 patients was observed after ACR. Our groups included 19 female and 12 male. Average age 68.2 years. In all cases we use Articular Surface Replacement of the Hip joint (ACR - DePuy) together with kinematic navigation (Ci System) of the Hip joint. RESULT: Our experiences with Articular Surface Replacement of the Hip Joint (ACR - DePuy) powered by Ci navigation system were good, the clinical results - postoperative X-ray, motion, pain are optimistic, but long term follow-up will be continued. CONCLUSIONS: Articular Surface Replacement of the Hip Joint modern design, reproducible instrumentation and kinematic navigation can eliminate the previous cause of early resurface failures and loosening. The patient selection must be strict regarding. The kinematic navigation definite precise position of the components of ACR.MIS procedure reduced hospital stay, less pain, shorter total rehabilitation. A continued long term follow-up is necessary after minimum 10 years.

SIR-P12

ACETABULAR RECONSTRUCTION IN PRIMARY AND REVISION ARTHROPLASTY

George TOMI, Eduard MITROI, Liviu DIACONESCU, Marius VLASE

The reconstruction goals were recovering the rotational centre of the hip and ensuring the stability of the acetabular implant. During 2005 and 2006, 744 THR were performed in our clinic; the acetabular reconstruction was necessary in 15 primary hip replacements and 37 revision arthroplasties. The primary acetabular reconstruction was needed in protrusive osteoarthritis and secondary osteoarthritis due to acetabular fractures (degenerative disease due to DDH was excluded). The bone deficiencies were evaluated with AAOS classification. Restoration of the bone stock and stability were achieved with structural and morcelized allografts and autografts, customized cups (Jumbo, Espace), reconstruction rings and wire the meshes. The results were good; the average Harris score was 88 for primary reconstruction and 82 in revision acetabular reconstruction. There were 2 luxations, 1 early loosening and 4 malpositions (that we also recorded as complications). **CONCLUSIONS:** We found the morcelized/structural autograft (in conjunction with stabilization devices) as the best method of reconstruction, providing the best results and the lowest complication rate.

POSTERS – Trainees' Meeting**TM01-P02****COSTO VERTEBRAL MEDULLAR HYDATID: IMAGING FINDING**

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Hydatidosis affects the bone in 0.5 to 2% of cases, with 44% of these cases involving the spine. We report a case of costo- vertebral- medullar hydatid disease evaluated by MRI. A 31-year-old man presented with paraparesis, paraplegia and sphincter dysfunction. MRI showed a cystic lesion costo-vertebro-epidural with regular contour extending from C6 to C7 with low signal intensity on T1 and high signal intensity on T2. The lesion had compressed the spinal cord without oedema. Histological and parasitic examinations confirmed a diagnosis of hydatid cyst. The patient improved progressively after surgery. Hydatid cyst should be suspected in case of cystic lesion causing cord compression.

TM01-P03**DOES APPLYING THE CANADIAN CERVICAL SPINE RULE REDUCE CERVICAL SPINE RADIOGRAPHY IN ALERT AND STABLE PATIENTS?**

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BACKGROUND: A cautious outlook towards neck injuries has been the norm to avoid missing cervical spine injuries. Consequently there has been an increased use of cervical spine radiography. The Canadian Cervical Spine rule was proposed to reduce the unnecessary use of cervical spine radiography in alert and stable patients. **PURPOSE OF STUDY:** Our aim was to see whether applying the Canadian Cervical Spine rule reduced the need for cervical spine radiography without missing significant cervical spine injuries. **METHODS:** This was a retrospective study conducted in 2 hospitals. 114 alert and stable patients who had cervical spine radiographs done for suspected neck injuries were included in the study. Data on patient demographics, Canadian Cervical Spine rule, cervical spine radiography results and further visits after discharge were recorded. **RESULTS:** 14 patients were included in the high risk category according to the Canadian Cervical Spine rule. 100 patients were assessed according to the low risk category. If the Canadian Cervical Spine rule was applied, there was a significant reduction in cervical spine radiographs ($p < 0.001$) as 86/100 patients (86%) in the low risk category would not have needed cervical spine radiograph. 2/100 patients who had significant cervical spine injuries would have been identified when the Canadian Cervical Spine rule was applied. **CONCLUSION:** Applying the Canadian Cervical Spine rule for neck injuries in alert and stable patients reduced the use of cervical spine radiographs without missing out significant cervical spine injuries. This relates to reduction in radiation exposure to patients and cost benefits.

TM01-P04**PROXIMAL HUMERAL FRACTURES: MIDTERM FOLLOW-UP OF TWENTY PATIENTS TREATED SURGICALLY**

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AIM: To evaluate the functional outcome of patients treated surgically for proximal humeral fractures. **MATERIALS AND METHODS:** Twenty patients of proximal humeral fractures were treated surgically between May 2000 and May 2003, with an average age of 36.7 years. All were evaluated with Neer's 3-view trauma series and CT scan was done in patients with more complex fracture patterns. Ten patients had two parts fracture, 7 had three parts fracture and 3 had four parts fracture with fracture dislocation in 9 patients. Indications for surgery were fractures with displacement more than 1 cm and angulation greater than 45°. Seven patients underwent fixation with plate osteosynthesis: 3 closed reduction and percutaneous pinning with "K" wires: 5 fixations with cancellous screws: 4 tension band wiring and one patient had hemiarthroplasty. Post operatively, all patients were started on 3 phase rehabilitation protocol. **RESULTS:** With an average duration of follow-up of 46.8 (34-64) months, all patients were evaluated for pain, function, range of motion and the results graded by Neer's 100 point rating system. Nine patients had excellent results, six satisfactory, 3 unsatisfactory and 2 had poor results. **CONCLUSION:** Fractures of the proximal humerus may be extremely demanding to diagnose and treat. The options as to the choice of implant depend on the age of the patient, quality of the bone, pattern of the fracture, the patient's goals and the surgeon's familiarity with the technique. An adequate surgical technique with an aggressive rehabilitation programme will ensure an optimal outcome.

TM01-P05

TREATMENT OF COMMINUTED PROXIMAL HUMERAL FRACTURES WITH SHOULDER HEMIARTHROPLASTY: AN ASIAN EXPERIENCE

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INTRODUCTION: Primary shoulder hemiarthroplasty is an accepted treatment, in the management algorithm of complex proximal humeral fractures. However, the reported functional results following this method of treatment are highly varied. The aim of this study was to determine the demographics of our Asian patient population, the prosthetic survival and the functional and radiographic outcomes in a case series from a single institution. **METHODS:** A retrospective study was conducted on a consecutive series of 27 patients who had undergone shoulder hemiarthroplasty for proximal humeral fractures over a six-year period. **RESULTS:** The following outcome variables were reviewed: pain, range of motion, subjective satisfaction scores and functional assessment using the Constant Score. The predictors of good outcome were analysed and used to produce a model that can be used clinically to help select patients and estimate the functional outcome. Post-operative complications were few and included dislocation, superior prosthetic migration and glenoid erosion. **DISCUSSION AND CONCLUSION:** Shoulder hemiarthroplasty for proximal humeral fractures remains a viable option with satisfactory outcome and a low complication rate in a carefully selected patient cohort. **KEY WORDS:** proximal humeral fracture, shoulder hemiarthroplasty.

TM01-P06

PAEDIATRIC DIVERGENT LISFRANC: EARLY OUTCOME FROM A RARE INJURY

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BACKGROUND: Lisfranc joint injuries are complex, often misdiagnosed and rare, especially in children. Clinically, these injuries vary from mild sprains to fracture-dislocations. Radiographs showing diastasis of the normal architecture confirm the presence of a severe sprain and possible dislocation. Correct treatment of a mild to

moderate Lisfranc injury improves the chance of successful healing and reduces the likelihood of complications. We report a case of a divergent Lisfranc injury in a twelve-year-old boy, his operative management and follow-up. **CASE REPORT:** A twelve-year-old boy jumped from a height of 4 m and landed in forced plantar flexion. The foot was deformed and swollen and weight bearing was restricted. On presentation to the emergency department there was marked dorsal swelling, no neurovascular compromise and a restricted range of movement at the tarsometatarsal joint. He had no other injuries. Standard radiographs revealed a divergent Lisfranc fracture dislocation with dorsal and medial displacement of the 1st metatarsal and lateral displacement of the 2nd to 5th metatarsals and associated base and neck fracture of the 2nd metatarsal. Closed reduction was performed under general anaesthesia. The first tarsometatarsal joint was stabilized with two cortical screws and the third to fifth tarsometatarsal joints by percutaneous wire fixation. Discharge occurred after 2 days of observed elevation. All metalwork was later removed to prevent physeal damage. **CONCLUSION:** Divergent Lisfranc injuries are best managed following the best-limited evidence to achieve optimum outcomes. This involves adolescents being managed as adult Lisfranc injuries and children generally being treated by non-operative methods.

TM01-P07

JUNIOR DOCTOR USE OF THE ABBREVIATED MENTAL TEST SCORE IN PATIENTS WITH FRACTURED NECK OF FEMUR

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INTRODUCTION: The mental state of patients with fractured neck of femur is important as a predictor of post-operative outcome. The Hodgkinson Abbreviated Mental Test Score (AMTS) is a validated and simple method of assessing the pre-operative mental state of patients with fractured neck of femur. This survey investigated whether or not Orthopaedic junior doctors (SHOs) appreciated the importance of mental state assessment in patients with fractured neck of femur and whether they were able to recall the questions used in the AMTS. **METHOD:** 47 on-call Orthopaedic and Trauma SHOs from the United Kingdom were randomly contacted by telephone and agreed to answer questions from a standard questionnaire to assess awareness of the 10 question AMTS. **RESULTS:** 96% of SHOs claimed awareness of the importance of mental state assessment. 89% used the AMTS in their practice, of which 26% were aided by a proforma. A mean of 5 (out of the 10) standard questions on the AMTS were correctly identified (95% CI = 0.68). 11% correctly identified all 10 questions. There was no correlation between use of a proforma and correct identification of questions. **CONCLUSIONS:** Patients with fractured neck of femur and low AMTS have higher morbidity and mortality. If the AMTS is to be used as an assessment tool in this setting then SHOs need to be better informed and educated as to its use. Furthermore, the validity of data collection for research and audit purposes is potentially flawed; as data collected using such scoring systems may be inaccurate.

TM02-P01

NEEDLE PLICOTOMY FOR SYNOVIAL PLICA OF THE KNEE - REPORT OF A NOVEL ATRAUMATIC TECHNIQUE

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PURPOSE: To illustrate the technique of needle plicotomy for synovial plica during arthroscopy of the knee. **TECHNIQUE:** With the patient supine, under pneumatic tourniquet control and the use of a single side post, arthroscopy is performed using a standard antero-lateral portal. A systematic examination is carried out for the presence of plica and other pathological conditions. If a plica is visualised, a 19G needle is inserted close to the peripheral attachment of the plica under vision. By combining angular, rotatory and linear movements of the needle, the plica is divided using the sharp bevelled edge of the needle. This is done till the entire width of the plica is divided ensuring loss of tension within. It has been our observation that a symptomatic plica is likely to be relatively firm allowing easier division with a needle, whereas a non-pathological plica is pliable. Also, this technique avoids an additional portal with its potential morbidity and the use of any special instruments. **CONCLUSION:** Needle plicotomy is quick, easy to perform, less traumatic to tissues and obviates the need for special arthroscopic instruments or shavers.

TM02-P02

OUR EARLY EXPERIENCE WITH COMPUTER ASSISTED SURGERY FOR TOTAL KNEE REPLACEMENTS AND AN UP-TO-DATE LITERATURE REVIEW.

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INTRODUCTION: With advances in orthopaedics, most centres are involved in computer assisted total knee arthroplasty. Is there a definite advantage of CAS surgery compared with routine total knee arthroplasty? Difficult to say as various centres have varying reports. Our paper describes our early experience and what is in the literature. **METHOD:** We compared CAS total knee replacements with routine normal knee replacements, sex and age controlled cases. We assessed various parameters including, operative time, tourniquet time, alignment of components of total knee replacement, post operative range of movements, post operative recovery time, post operative haemoglobin, need for blood transfusion and patient satisfaction. **RESULTS:** Operative and tourniquet time was greatly increased in all cases. Most of the other factors did not have any bearing. Alignment of components was better using the CAS. All the data was analysed by SPSS statistics package to check for statistical significance. **CONCLUSION:** Our study showed an improvement in most parameters with the use of CAS for total knee replacements and this is confirmed by current literature and available evidence.

POSTERS – SICOT**SIC01-P01****ULNAR NERVE PALSY AFTER LOWER LIMB ARTHROPLASTY - CASE REPORT AND REVIEW OF LITERATURE**Shanmugasundaram RAJKUMAR², Sherilyn TAY¹¹Queen Victoria hospital, East Grinstead (UNITED KINGDOM), ²Wexham Park hospital, Slough (UNITED KINGDOM)

Neurological complications following lower limb joint replacements are a rare occurrence with an incidence rate of 0.63% affecting lower extremity (0.48% incidence rate) and upper extremity (0.15% incidence rate). Idiopathic cause (47%) as being the most common aetiology followed by traction and compression (20%), direct trauma (19%), bleeding/haematoma (11%), inflammation or a combination of these causes. The residual pain and weakness resulting from this adverse effect can affect the functional outcome and patient satisfaction. The prognosis of patients with upper limb nerve palsy appears to be favourable compared with those with lower limb nerve palsy. Here we report such an occurrence of ulnar nerve neuropraxia following lower limb joint arthroplasty in three patients. POSSIBLE EXPLANATIONS:1] Sub acute ulnar nerve palsy was unmasked after the more painful condition was treated. 2] Safe positioning of the patient was not adequate in theatre – Spinal anaesthetic reduces the awareness of staff towards adequate patient positioning – 3] Neural injuries are more common in obese patients, most likely secondary to increased pressure on contact points and difficulty with safe positioning of the unconscious/sedated obese patient.4] Other causes like brachial plexus neuropathy, postoperative ulnar nerve neuropathy. PREVENTION: Patients should be evaluated routinely for peripheral nerve function in the recovery room. Use of epidural anaesthesia may delay the initial assessment. Careful documentation of sub-clinical cases as well as symptoms detected preoperatively is a must. Careful positioning of the patient and adequate support of the limbs and pressure points is needed to minimise this potentially devastating complication.

SIC01-P02**BIO-ABSORBABLE ANCHORS IN LESS INVASIVE HIP REPLACEMENT SURGERY: A DESCRIPTION OF A NEW APPROACH AND TECHNIQUE**

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The rupture or detachment of the gluteus muscle tendons following hip replacement surgery is associated with abductor muscle weakness, prolonged limping, and functional disability. In this article, we describe a modified, less invasive, anterolateral approach to the hip joint. The anterior third of the gluteus medius insertion and the gluteus minimus insertion are detached from the greater trochanter. The vastus lateralis muscle remains intact and the superior gluteal nerve is preserved. At the time of closure, the aponeurotic flap of the gluteus medius and minimus muscles are reattached to the anterolateral aspect of the greater trochanter using bio-absorbable anchors. This innovative approach and technique allows for adequate exposure to the acetabulum and the femur with a functionally more stable reconstruction of the hip abductors.

SIC01-P04**STEM SIZE INFLUENCE INCIDENCE OF RADIOLUCENT LINE SURROUNDING DISTAL PART TITANIUM CEMENTLESS STEM AT MEAN 12 YEARS FOLLOW-UP PERIOD**

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PURPOSE: The purpose of this study was to investigate factors influencing radiolucent line surrounding distal titanium stem and to clarify long-term stability of stem with distal radiolucent line. **METHOD:** We evaluated 12 years (10-14) followed-up 39 hips in patients with osteoarthritis using cementless Mallory-Head type component. We divided these cases into two groups with (n=18) or without (n=21) radiolucent line surrounding distal portion stem. We evaluated age, body height, weight, and stem size. We assessed cortical index, calcar to canal (CC) ratio, stem proximal and distal canal fill, subsidence and new bone formations surrounding stem (spot welds, cortical hypertrophy, pedestal) through anterior-posterior X-ray photograph. **RESULTS:** Stem size 8.9 in radiolucent (R) group was significantly larger than 7.8 in no radiolucent (NR) group. Cortical index 1.8 in R group was significantly smaller than 2.1 in NR group. There was no significant difference between both groups with regard to patient age (59 vs 54), weight (49, 51), CC ratio (2.0, 2.2), stem canal fill (proximal (77, 78), distal (76, 79) and subsidence (1.6, 1.4). Three items of new bone formations surrounding stem did not relate to radiolucent line. As a result of multivariate logistic regression analysis, only stem size significantly affected appearance of radiolucent line. Size 8 and more stem's relative risk was 14.7 (CI: 2-113). No case in both groups showed stem instability. **CONCLUSION:** Larger stem size influence radiolucent line surrounding distal stem at 12-year follow-up period. Mallory-Head stem with or without radiolucent line at distal portion showed stable fixation.

SIC01-P05**RECOVERY OF MUSCLE STRENGTH AFTER POSTERIOR MINI-INCISION TOTAL HIP ARTHROPLASTY**

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The posterior mini-incision technique, one of the minimally invasive techniques for total hip arthroplasty, involves intentional detachment of the short external rotators. Recent studies using cadavers showed that this technique caused measurable damage to gluteus medius and minimus muscles also. However, recovery of strength of these muscles immediately after surgery has not been studied. We studied muscle strength for abduction and internal rotation early after this technique, and compared their recovery patterns with those for external rotation. **METHODS:** Forty-two hips operated with this technique entered into the study. The posterior capsule and short external rotators were re-attached to the greater trochanter after implanting the components. Muscle strength in isometric exercise of abduction, internal and external rotation was evaluated using an isokinetic dynamometer (Biodex system 3) before surgery, at 3 days, 5 days, 7 days, 14 days and 3 months after surgery. Muscle strength of more than the preoperative value was defined as good. **RESULTS:** Mean of muscle strength for abduction, internal and external rotation was 32.5, 22.2, 22.4 (Nm) before surgery, and was 39.1, 26.7, 13.5 (Nm) at 3 months after surgery, respectively. The ratio of hips having good strength for abduction, internal and external rotation was 17%, 23%, 0% at 3 days, 29%, 26%, 0% at

5 days, 37%, 34%, 0% at 7 days, 40%, 48%, 8% at 14 days, and 68%, 66%, 8% at 3 months, respectively. Recovery of muscle strength for abduction and internal rotation was steady, but that for external rotation was poor after this technique.

SIC01-P06

IMPACT OF FELLOWSHIP TRAINING ON THE LEARNING CURVE FOR TOTAL HIP ARTHROPLASTY BY POSTERIOR APPROACH

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Total hip replacement has emerged as one of the major breakthroughs in modern day Orthopaedics. Although the art of performing total hip replacement has developed to a great extent, yet an optimum approach is still highly debated. In the recent years, there has been an increase in concern over patients having a less favourable outcome, during the surgical 'learning curves' of newly trained orthopaedic surgeons and even more with curtailment of the time spent in patient care during higher surgical training in the UK. We reviewed the outcome of patients with primary total hip arthroplasty performed by posterior approach during the first three years of consultant practice of a newly trained surgical fellow 121 consecutive patients with total hip replacement by posterior approach were reviewed from an initial three year practice of a newly appointed consultant with a fellowship in hip surgery. Complete relief of pain was achieved in 105 patients at one-year follow-up. Sixty-seven patients had normal function while 19 had limp but did not need a walking stick for support. There were no major intra operative complications and most (99/118) patients found the operation very good at one-year follow-up. There were no dislocations until an average follow up of 35.1 months (range 16 to 52 months). We observed that meticulous surgical technique with posterior capsular repair and training received from a dedicated hip fellowship can better the outcome and curtail the surgical 'learning curve' of total hip replacement with posterior approach.

SIC01-P07

LONG TERM STUDY OF CEMENTED FEMORAL STEMS WITH THERMOHYDROGEN TREATMENT "SPHEN"

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INTRODUCTION: In recent years there has been a decline in the use of cemented titanium femoral stems. Firstly due to low durability of titanium to abrasive wear with the cement. However thermohydrogen treatment enables low wear of the titanium stem which in many cases supersedes other alloys like CoCrMo. **MATERIALS AND METHODS:** Between 1999 and 2006, more than 600 femoral stems "SPHEN" were implanted. A follow-up of 83 patients was done over a minimum period of 5 months up to 7 years. Radiographic evaluation was done to study the cement technique as per Barrack, radiolucent lines between cement bone and cement metal were recorded as described by Gruen. Functional results were calculated using the Harris hip score. **RESULTS:** The average Harris hip score was 88. Analysis of the radiolucent lines postoperative and during follow-up as described by Gruen, there was no increase in values. No cases of instability were observed which required revision surgery. **CONCLUSIONS:** Employment of thermohydrogen treated femoral stems has substantially improved the property of titanium alloys, resulting in greater durability compared to other alloys like CoCrMo, moreover they have lower modular resiliency which in turn reduces stress shielding.

SIC01-P08**FEMORAL STEM “IMPLANT-ELIT”: X-RAY EVALUATION AND PATTERN OF FIXATION**

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“Implant Elite” femoral component is a straight anatomical stem made of titanium. As distinct from AML stem, “Implant Elite” has grit blasted distal part with longitudinal riffling, plasma-spray coating of proximal and intermediate part and enhanced metaphyseal part. We studied X-ray changes in “Implant Elite” and AML femoral stems: 90 cases of primary arthroplasty with “Implant Elite” and 20 cases with AML stems. All changes developed in the term of 6–12 months. We have marked 2 types of X-ray changes of periprosthetic zone. The first type (74%) was characterized by resorptive changes in 1 and 7 zones (Gruen) with distal cortical hypertrophy in 3 and 5 zones. Another type (21%) included restructuring of trabecular pattern in zone 7 with supporting column formation under collar. There were no significant changes in distal zones 3 and 5. We consider that the first type of remodelling is the manifestation of distal type of fixation while the second type is evidence of proximal type. In AML group we observed only distal fixation features. “Implant Elit” femoral stem is usually impacted in each part very tight because of its shape and coating. When the secondary biological fixation occurs there is prevalence either distal or proximal type of fixation. This advantageous distinction of “Implant Elit” stem is distinguished by some constructive solutions. In our opinion the relatively low coefficient of elasticity of titanium in comparison with CoCr alloy plays the main role.

SIC01-P09**THE ROLE OF LONG-STEM BIPOLAR HEMI-ARTHROPLASTIES IN PRIMARY AND REVISION HIP SURGERY – A CLINICAL CASE SERIES**

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Long-stem bipolar arthroplasties are uncommon procedures and are usually reserved for select cases with extensive proximal femoral pathology. A consecutive case series of long stem bipolar hemiarthroplasties performed in a tertiary institution by a single surgeon were reviewed. Fourteen consecutive long-stem bipolar hemiarthroplasties were performed, with a mean follow-up of 20 months. Indications for surgery included revision of primary hip implant-related complications (8) and extensive proximal femoral fractures (6). Mean d'Aubigne and Postel score increased from 3.7 to 10.8. Complications include iatrogenic femoral shaft perforation, anterior dislocation and superficial wound infection. In appropriately indicated cases, in the absence of acetabular disease, long-stem bipolar arthroplasty provides optimal hip stability with satisfactory functional outcomes. **KEYWORDS:** bipolar hemiarthroplasty, long stem, implant failure, tumor, proximal femur.

SIC01-P10**THE CHOICE OF THE TYPE OF CEMENTLESS FEMORAL STEM IN PRIMARY HIP ARTHROPLASTY**

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We studied dynamic X-ray changes in different types of the femoral stems for the term of 20-45 months. Group I: Anatomic straight stems "Implant Elite", "AML" - 110 cases. Group II: sphen-shape stems – intermediate fixation type Multucone Cerafit, Alloclassic, ILZA – 160 cases. Group III: proximal fixation type Versys Enhanced Taper – 49 cases. This analysis has showed that the presence of hypotrophy in the 1st and the 7th Gruen's zones coupled with cortical hypertrophy in the 3 and 5 zones was maximally in group I. On the contrary, the hypotrophy in the 1 and 7 Gruen's zones was at most in the group III. There was no distal hypertrophy in this group. In the group II the presence of hypotrophy in the 1 and 7 zones was less than in the 1st group and the distal hypertrophy was slight and rare. These facts suggest that impaction of distal fixed stems leads to the most distinct anatomic changes in periprosthetic zone. This phenomenon may lead to high severities in revision operations. Because of this fact we consider that straight anatomic type of stem is not quite suitable for the primary hip arthroplasty in the young and/or active patients. In such case we prefer the more proximally fixed stem – proximal or intermediate type. Full-fit or distal types of stem are more suitable for primary arthroplasty in elderly and low activity persons. We also consider that it is acceptable to use this type of cementless stem in patients with osteoporosis.

SIC01-P11

FACTORS PREDISPOSING TO DISLOCATION AFTER PRIMARY THR

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BACKGROUND: Total hip replacement is widely considered one of the most reliable operations devised in the 20th century. Dislocation following total hip arthroplasty (THA) is one of the most common complications of that procedure, occurring in 1% to 10% of all cases. **METHODS:** From 2003 to 2006, 1324 primary total hip replacements were done at our clinic. The patients were prospectively followed at regular intervals, and their follow-up data were recorded in an orthorus registry. **RESULTS:** 17 hips (1,3%) in 17 patients dislocated. The 7 dislocated hips had diagnoses of osteoarthritis. The other diagnoses were rheumatoid arthritis (1), avascular necrosis (2), congenital dislocation of the hip (3), and fracture of the femoral neck (4). Factors implicated as causes of instability after THA include: surgical approach, inadequate restoration of soft tissue tension, inadequate offset, component design, orientation of the components, and patient-related factors such as compliance. **CONCLUSIONS:** Adequate identification of the source of instability is necessary for a good outcome after open reduction of a dislocated hip.

SIC01-P12

REPEATED REVISION 10TH SURGICAL PROCEDURE OF TOTAL HIP PERFORMED FOR GUNSHOT FRACTURE OF HIP JOINT

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Patient A (31 years old) was admitted with loosening of acetabular cup after total hip replacement with a great number of foreign metal bodies in soft tissues. Patient complained of pain and 7cm shortening. He got gunshot injury in 1990. Patient was operated 6 times. 7th was total hip replacement. Next one was revision of acetabular cup. During last operation (2002) the surgeon was not able to remove prosthesis. During opening dislocation of femoral head was noted. Acetabular cup was rotated by 180° and removed without any trouble. Because of 7cm shortening of extremity, "long neck", 32

mm diameter and not complete insertion of femoral stem in femoral canal, it was impossible to put acetabular cup in true anatomical place. To remove femoral stem, trepanning of medial and distal femoral shaft was made. During splitting out stem we got fracture of femur. Femoral stem had 4 composing legs, which were under high strain. We noted 35-40% bone defect of superior-posterior wall of true acetabulum. Bone grafting from fibula was made, acetabular cup was fixed by "press fit" with 5 screws. False acetabulum was infilled by bone cement. Femoral fracture was fixed by plate. Femoral stem was fixed by bone cement. Long term bed rest was prescribed. 6 months after operation patient walked without any supporting aids. Function of extremity is completely recovered.

SIC01-P13

BILATERAL TOTAL HIP ARTHROPLASTY IN ONE PROCEDURE

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The strongest indication for bilateral total hip arthroplasty in one procedure is severe disabling bilateral arthritis of the hip in a medically fit patient. Controversy exists regarding the safety of bilateral total simultaneous total hip arthroplasty, because of the potentially higher prevalence of main complications. The advantage of this procedure is the potential for decreased hospitalisation, reduced cost and reduced risk of complications related to anaesthesia. The surgeon, medical consultant and anaesthesiologist must agree that the patient is healthy enough to undergo the operation. Nineteen patients underwent bilateral simultaneous cementless total hip arthroplasty between Jun 2005 and December 2006 at the Orthopaedic department of Military Medical Academy in Belgrade. The average patient age was 51.53 years (range 33-74 years), 9 (47.37%) male and 10 (52.63%) female. The operation for both hips is performed with the patient in lateral decubitus with one set of instruments and posterolateral approach, without drainage. Average hospitalisation was 11.5 days, and average blood substitution was 1284 ml. We had not main complications (luxation, infection, pulmonary embolism). This surgical procedure is a convenience option for the motivated patients with few comorbid conditions. Complications may be reduced when the surgery is done at a dedicated institution with an efficient team and competent anaesthesiologist.

SIC01-P14

LEARNING CURVE IN MINIMAL INCISION TOTAL HIP REPLACEMENT USING DIRECT LATERAL APPROACH IN FREQUENCY OF 90 HIPS FOR 42 MONTHS

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INTRODUCTION: The purpose of this study is to assess learning curve of minimal incision THR (MITHR) using direct lateral approach in four different clinical settings. **METHODS:** In phase I (fiscal 2003), a single surgeon with no previous MITHR experience performed 21 first MITHR. In phase II (fiscal 2004), the surgeon, who shared THR cases with junior surgeon, performed 13 consecutive MITHR. In phase III (fiscal 2005), the surgeon, who did not share THR cases with junior surgeon to study abroad, performed 31 consecutive MITHR. In phase IV (a half fiscal 2006), the surgeon performed 25 last MITHR. The surgeon had performed more than 200 short incisions THR prior to the start of this study. Average incision length (cm) was 7, 6.8, 7.7, and 8.5, respectively. There was no difference in age or BMI. **RESULTS:** Average operation time (min) was 123, 126, 118, and 105, respectively ($p=0.2$). Average intraoperative estimate blood loss (ml) was 712, 913, 637, and 676, respectively ($p=0.19$). Average postoperative estimate blood loss

(ml) was 639, 804, 725, and 375 ($p=0.03$). Average cup abduction angle (degree) was 42.1, 40, 42.9, and 42.8, respectively ($p=0.47$). Four incomplete greater trochanter fractures, 2 transient femoral nerve palsies, 7 distal femoral cracks at the tip of the stem, and 1 anterior dislocation occurred ($p=0.71$). **CONCLUSIONS:** There was no significant difference in four settings except for postoperative estimate blood loss in phase IV. In case a surgeon for THR has already become skillful, steep learning curve may not be found in MITHR.

SIC01-P15

THE RESULTS OF HARRIS FUNCTIONAL SCORE IN PATIENTS WITH RESURFACING T.H.A.

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INTRODUCTION: Biomaterial problems also created many type of chemical containment like: metal to polyethylene, ceramic to ceramic, ceramic to polyethylene. But now, especially during the last decade, metal to metal has been made with a better quality and decreased the chance of wearing. Resurfacing metal to metal Total Hip Joint has a normal seize to patient's Hip Joint, the chance of dislocation will be decreased, the chance of wear also reduced, and remaining the femoral neck in femoral bone stock is another advantage. **MATERIAL AND METHODS:** During 2001 to 2006, we had about 43 cases of Hip Joint disorders which we did metal on metal resurfacing Total Hip Arthroplasty. The average age was about 44 years old. We had 14 cases of A.V.N. of femoral head with some degree of O.A. of Hip Joint and 29 cases of osteoarthritis of Hip Joint with normal femoral neck and also the quality of bone stock were good. There were no cases of C.D.H. or Rheumatoid arthritis in our series. We did for all of our cases postero lateral approach for resurfacing T.H.A. The patients could be able to walk by walker from third day of operation. The mean HHS before surgery was ((31.7±9.2)) which improved to 87.9±11.2 about 7 months after surgery. We had 2 cases of sciatic temporary sciatic nerve palsy due to benet retractor which became normal 3½ months later.

SIC01-P16

THE RESULTS OF USING POROUS-COATED, DISTALLY SLOTTED, FLATED FEMORAL STEM T.H.A SYSTEM

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INTRODUCTION: Revision of THA usually is much more difficult and the results are typically not as satisfactory as primary total hip arthroplasty - Revision requires more operative time and more blood loss and the incidence of infection thromboembolism dislocation nerve palsy and penetration and fracture of the femur are higher - A number of surgeon abandon cement in many revision operations in the other hand satisfactory primary results of cement less primary surgery was done. - Bone deficiency can be treated more appropriately with bone grafting rather than with bulk filling with additional cement.- Animal study and human retrieval data demonstrates that the use of implants with more extensive porous coating. During 2003 to 2006 we had about eleven cases of Revision T.H.A which we did Revision with: porous-coated, distally slotted, fluted femoral stem T.H.A system. The results of our cases were good we had only one cases of

periprosthetic fracture of distal part of prosthesis in femoral shaft which we did ORIF with L.C.P plate and grafts.

SIC01-P17

HIP FUNCTIONAL SCORE OUTCOMES AFTER CEMENTLESS TOTAL HIP ARTHROPLASTY

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OVERVIEW: This study is a comparison of Harris Hip Score (HHS), before and one year after cementless total hip replacement. All patients admitted for primary total hip arthroplasty, between March 2002 till March 2005 in Sina Hospital, without knee or contralateral hip comorbidity and willing to participate in the study, were candidates for total hip replacement with Versis cementless prosthesis. Standard Harris Hip Score was measured just before and after surgery and one year past procedure. Patients who refused to cooperate or did not return for follow-up were excluded. 28 remaining cases included 16(57.1%) men and 12(49.9%) women from 44-49 years of age (mean 57.1 years old). Mean HHS before surgery was 31.7+9.2 (range 22-60) which improved to 87.9+11.2 (range 74-69) one year after intervention.

SIC01-P18

RECONSTRUCTION OF CAVITARY DEFECTS IN REVISION HIP ARTHROPLASTY WITH THE LING TECHNIQUE

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MATERIAL AND METHOD: A retrospective clinical review was done in 54 patients. Radiological analysis: Gross and AAOS Classification, stem position, cement mantle, allograft and evolution (subsidence, resorption, remodelling). Clinical assessment: Harris Hip score. We used bank bone allograft and a polished non-collared stem LD. **RESULTS:** Follow-up: 60.5 months (19.4-152.4). Age: 68.5 (22-85). Gender: 21 females/33 males. Surgical approach: lateral (5.56%)/ posterior (91.4%). Trochanteric osteotomy: 25.9%. Associated acetabular revision: 59.3%. Previous surgeries: 1.9. Preoperative Harris: 35(28-40); postoperative Harris: 81 (50-99). Stem alignment: neutral (44.44%), varus (38.89%), valgus (6.67%). Femur/stem diameter relationship: 1.8(1.2-2.7). No changes in stem alignment in 94.4%. Adequate cement mantle: proximal zone (61.1%), medium zone (27.8%), distal zone (16.7%). Any subsidence: 38.9% (progressive: 12.96%). Complications: 40.7%: periprosthetic fracture: 14.8%; superficial infection: 1.9%; deep late infection: 1.9%; dislocation: 3.7%; and heterotopic ossification: 13%. New stem revision: 16.6%. Clinical and radiological success: 77.78%. **CONCLUSIONS:** Greater incidence of revisions has been found in: stem misalignment, progressive subsidence, Harris increase <20 points, allograft resorption, little diameter stems, and inadequate cement mantle. We recommend hard impaction, and cement mantle of 2 mm at least. Non-progressive subsidence does not increase stem loosening. The technique has been useful in recovering bone stock in a severely defective femur and achieves a stable reconstruction. **LEVEL OF EVIDENCE:** Therapeutic study, Level III-2 (retrospective cohort study). See instructions to Authors for a complete description of levels of evidence.

SIC01-P19**MEASUREMENT OF THE ACETABULAR CUP ANTEVERSION ON THE SIMULATED RADIOGRAPHS**

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The acetabulum anteversion is an important prognostic factor after THR. Widmer reported a protractor to measure it on the plain radiographs. He studied the relationship between anteversion and the short axis (S) and the total length (TL) of the projected cross-section of the cup along the short axis, and approximated with linear regression. We develop our method by approximating the relationship by trigonometric mathematics. We simulate 90 radiographs with different anteversions and inclinations by our software and then measure the anteversion of the acetabular cups on these simulated radiographs by Widmer's and our methods. We compare both results with the error which indicates the difference between the measured anteversion from the assumed angle on the simulated radiographs. The anteversion of the acetabular cups on the simulated radiographs ranged from 5° to 33°. The angles measured with Widmer's protractor ranged from 5° to 33° (mean + SD = 19°±8.7), and our methods, 5° to 31° (18°±8.1). The mean + SD of error by Widmer's protractor is 3.69°±0.59°, and our protractor, 1.03°±0.69° (Student's-test, p<0.0001). Our method has a lower error as compared with Widmer's thus can be extended for a precise measurement of the anteversion.

SIC01-P20**ADVANTAGES OF KERBOULL ACETABULAR REINFORCEMENT RING IN MAJOR ACETABULAR RECONSTRUCTIONS**

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Severe bone loss secondary to acetabular component migration and osteolysis often results in major segmental and/or cavitory defects. There are a lot of implants available but the results of reconstructions are different. It is difficult to analyse them because we don't have a single classification system of acetabular defects. Most North American surgeons are performing hemispheric jumbo cup with screws with or without bulk structural allograft. In Europe reconstruction of the bone stock with allograft protected with reinforcement ring and cemented cup is still a viable option. Between 1999 and 2005 we performed in our department 30 revision hip surgeries. According to Paprosky classification, we had 6 cases of type III. All of them were reconstructed with femoral head allograft protected with Kerboul ring and cemented cup. In the recovery period we started early mobilisation and no weight bearing for three months. After this, progressive weight bearing was allowed and the patients were advised to use a cane for 3 months. The mean follow-up of the series was 2.5 years. Consolidation of the graft was observed at 6 months but remodelling continued for the next 2 to 3 years. The survival rate at 2.5 years was 100%. We believe that Kerboul acetabular reinforcement ring is still a good solution in major bone loss. It is strong enough to protect the bone graft during the consolidation. Due to its anatomic design it allows us to lower the rotation centre near the anatomic position and help us to restore the bone stock.

SIC01-P21**COMPARISON OF TWO ACETABULAR RECONSTRUCTION IN REVISION HIP ARTHROPLASTY USING COMPUTATIONAL METHODS AND FINITE ELEMENTS ANALYSIS**Vlad PREDESCU¹, Stefan CRISTEA¹, Ion DINULESCU²*¹St. Pantelimon Clinical Emergency Hospital, Bucharest, ²Elias Clinical Emergency Hospital, Bucharest (ROMANIA)*

The method to replace the lost bone avoiding the loosening of acetabular components is one of the major and challenging problems in revision hip arthroplasty. A finite element model of the human hip arthroplasty using two revision methods subject to loadings corresponding to normal walking is presented in this paper. In first method, a restoration GAP acetabular cup with screws, bone allograft, and cemented polyethylene cup has been used. Geometrical and mechanical properties of the bone are derived from quantitative computer tomography images of the patient that supported the first method of revision hip arthroplasty. The second method of revision was performed only on the computational model, for comparison purpose, and we used a pressfit cup. The objective of this study is to numerically simulate the biomechanical behaviour of the assembly with respect to the influence of implant design, fixation type, and friction at bone-implant interface for both revision methods. Joint kinematics data for normal walking was acquired using a motion analysis system based on video recorded images of the patient after revision hip arthroplasty. The model was loaded with kinematics data computed above and stress and strain distribution in the joint with arthroplasty was computed for both methods of revision using an explicit dynamic analysis with a specific contact algorithm. The simulation shows the first method of revision hip arthroplasty sustain lower stress value and contact pressure than the second method for the same loading condition, resulting in a better situation for bone ingrowth and prosthetic stability.

SIC01-P22**PRIMARY TOTAL HIP ARTHROPLASTY WITH CEMENTLESS VERSYS FEMORAL STEM: A MINIMUM OF 5-YEAR FOLLOW-UP**Sang-Bum KIM, Sang-Won PARK, Hyung-Joon CHO, Nam-Yeon JUNG, Ki-Won CHOI
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PURPOSE: The purpose of this study is to evaluate the clinical and radiographic results of primary total hip arthroplasty with a non-cemented VerSys Fiber Metal Midcoat stem. **MATERIALS AND METHODS:** Thirty-nine hips in thirty-three patients were followed up for a minimum of five years. The clinical results were evaluated based on the Harris hip scores. A radiographic analysis of the femoral component was performed by evaluations of radiolucent lines, cortical hypertrophy, stress shielding, osteolysis and fixation stability, and a radiographic analysis of the acetabular component was performed by evaluations of osteolysis and fixation stability. **RESULTS:** The average Harris hip score improved from 54.3 points preoperatively to 95.4 points at last follow-up. In the results of radiographic analysis of femoral component, stable bony ingrowth was noted in thirty-eight cases and stable fibrous ingrowth was observed in one case. Non-progressive radiolucencies less than 2 mm in width were observed in eight cases. There were three cases of osteolysis and thirty-six cases of stress shielding. In the results of radiographic analysis of acetabular component, stable bony ingrowth was noted in thirty-eight cases and unstable fixation was observed in one case. There were two cases of osteolysis. **CONCLUSION:** In the results of primary total hip arthroplasty using cementless VerSys femoral stem after a minimum of five-year follow-up, the rate of femoral osteolysis was decreased and the rate of bone resorption by stress shielding was relatively high, and

more long term follow-up is required.

SIC01-23

A NEW TECHNIQUE FOR GREATER TROCHANTER AVULSION FRACTURES/PERI-PROSTHETIC FRACTURES

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Peri-prosthetic and avulsion trochantric fractures pose a difficult problem during revision hip surgery. Here we describe a new and simple technique to reliably fix greater trochanter avulsion fractures and peri-prosthetic fractures using Dal Miles cable system. We have used this technique to treat peri-prosthetic fracture and have achieved good results. **TECHNIQUE:** After the loosened hip prosthesis was revised with a longer one the proximal fracture of trochanter is approximated with Dal Miles cables. First, the cable is passed around the shaft of the femur and the cable ends are passed through the metal box with enough length on either side and cringed after tightening. The ends are passed in a figure of eight manner and around the abductors attached to the tip of greater trochanter. The tips of the cables are passed into the metal box; tightened and cringed. The final configuration of the fixation is shown in the post-op X-rays. The patient was allowed to partially weight bear the next day. Full weight bearing was allowed after 6 weeks and the fracture went on to union at 4 month follow-up. The senior author has used a similar method without the lower metal box in 10 patients with peri-prosthetic fractures and has achieved good results with union in all but one patient. By this simple technique, greater trochanter and peri-prosthetic fractures can be reliably stabilised and the need to use expensive trochantric plates is obviated.

SIC01-P24

A COMBINED TECHNIQUE OF TOTAL HIP REPLACEMENT AND OSTEOSYNTHESIS OF FEMUR

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INTRODUCTION: A presence of femoral fracture or occurrence of fracture during implantation of femoral component of endoprosthesis in total hip replacement almost needs an additional way of fixation to achieve good osteosynthesis. **METHODS AND MATERIALS:** We decide the surgical plan by the character and localization of the fracture. For achieving osteosynthesis we used LCP/LISS – DF (Distal Femoral) modulated preoperatively according to the contra lateral femur in the case of inter tubercular fractures, fractures occurring at the level femoral component of endoprosthesis and during endoprosthetic replacement surgery (8 cases). In the presence of fracture (from lesser tubercle to isthmus – 14 cases) fixation is achieved by long anatomical femoral component of endoprosthesis itself. We used distal femoral intramedullary locking nails in combination with standard femoral component of the endoprosthesis, when the fracture is located at the distal third of femur (9 cases). In 23 cases, we used circular wires for fixing the longitudinal crack of the femur during implantation of the femoral component. **RESULTS:** From these 54 cases, we observed the high efficacy of extra osseous and intra medullary osteosynthesis during total hip replacement. In all the cases we noticed a good radiological and clinical consolidation of the fracture. We didn't observe any aseptic loosening of the femoral component. In 2 cases where the fixation is achieved by circular wires, we observed slipping of femoral component in the femoral canal.

SIC01-P25

THE RMP-MODULE IN THE REVISION ENDOPROTHESIS OF THE HIP

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PROBLEM: The revision-prosthesis of the hip is one of the most delicate procedures due to the reason for the revision e.g. the periprosthetic fracture, the septic hip joint or the loosening of the hip. **STUDY:** We investigated 147 cases of revision prosthesis done with the MRP-revision stem in points of reason for revision, perioperative and postoperative complications and outcome. For better comparison we also scored the results in the Merle d'Aubigné Score. **RESULTS:** We found good to very good results in 94% of the patients, just in 4% of all patients the revision prosthesis has also to be removed. The achieved Merle d'Aubigné Score is 13 points on average. **DISCUSSION:** The MRP-revision stem is a good possibility in the revision prosthesis of the hip. The achieved results show the system competitive to other used techniques.

SIC01-P26

ANALYSIS OF ASEPTICALLY LOOSENED CEMENTED FEMORAL STEMS IN THREE TYPES OF HIP PROSTHESES

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We analyzed 126 plain radiographs of patients who underwent femoral stem revision due to aseptic loosening. The patients were divided into three groups depending on the type of the cemented hip prosthesis: there were 52 stems of Lubinus modular straight stem with collar (Link, Germany), 32 of SL Self Locking (Lima, Italy) and 40 anatomic type SAS (Saphir Active System, M.I.L., France). All were implanted using the transgluteal approach and the second generation of cementing techniques. **RESULTS:** The mean time for the development of aseptic loosening in the SAS prosthesis was 6.1 years; 6.7 for Lima and 7.5 years for Lubinus prostheses. The appearance of aseptic loosening in Lima and Lubinus prostheses was in the range from 2.5 to 14 years, while in patients with the SAS prosthesis the range was narrower and was from 5.3-7 years. The loosening of the stem without accompanying loosening of the acetabulum was observed in 53% of patients in whom Lubinus prosthesis was implanted, 69% in Lima, and only 10% in SAS. The thinnest cement mantle was in the zones 3, 4 and 5, which correspond with the distal part of the stem. The bone resorption was higher in the upper part of the femur (zones 1 and 7) in SAS and Link prosthesis, while in Lima the destruction of the bone was present all around the stem. **CONCLUSION:** The analyzed stems of the same manufacturer, combined with the described surgical technique imply a similar pattern of loosening, including bone resorption.

SIC01-P27

OGILVIE'S SYNDROME: A CASE REPORT

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The authors report a rare observation, of a volvulus of the sigmoid caused by a pelvic protrusion of a total prosthesis of hip at a patient aged 85 years. Very rare incident in

orthopaedic surgery. The treatment consisted in removing the prosthetic fragments in presence of a visceral surgeon, of the enemas evacuators and a glued traction. The continuations were without particularities. The mechanical etiologic ever returned in the literature is discussed in this observation.

SIC01-P28

EARLY RESULTS OF HIP RESURFACING FOR ESTABLISHED AVASCULAR NECROSIS ARE COMPARABLE TO THOSE FOR OSTEOARTHRITIS

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We compared the early clinical and radiological findings of a single surgeon series of ASR hip resurfacings performed for avascular necrosis (AVN) or osteoarthritis. Thirty-seven consecutive hips in 31 patients with a radiological diagnosis of AVN underwent resurfacing (group 1). These were compared with 89 consecutive hips in 81 patients with osteoarthritis (group 2). Average follow-up was 20.1 months in group 1 and 19.6 in group 2. Average age at operation was identical (56.1 years). There were no differences in ASA grade and BMI. Average HHS improved from 48.0 to 97.6 in group 1 and 52.4 to 96.1 in group 2. Average UCLA activity score improved from 3.5 to 7.0 in group 1 and 4.3 to 7.4 in group 2. All patients in group 1 could do the activities they wanted, and all but one were extremely or very satisfied. In group 2, 10 patients reported low satisfaction ratings, and 13 felt they were unable to do the activities they wanted. Radiographs show no evidence of component loosening in any hip. There were 5 revisions including 4 fractures (2 with a notched neck) in group 2. No revisions in group 1. We found no evidence of loosening or an increased risk of failure at an average follow-up of 20 months following hip resurfacing for AVN. These excellent clinical results support the use of this procedure in patients with AVN in the context of a prospective study.

SIC01-P29

HIP RESURFACING IN MEN OVER 60: ARE THE RESULTS GOOD ENOUGH?

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Traditionally, hip resurfacing has been performed in younger patients. We compared the early results of a single surgeon series of ASR resurfacings performed in male patients in this age group and in men over 60 years old. 114 consecutive procedures were performed in male patients. Group 1 consisted of 48 hips in 43 patients aged 60 years and over (average 64.2, 60 to 73). Group 2 consisted of 66 hips in 59 male patients aged below 60 (average 50.4, 31-59). Patients were followed up at a mean of 17.1 months in group 1 and 19.4 in group 2. BMI, ASA grade and proportion of Charnley walking grade A patients was similar. In group 1, average HHS improved from 56.4 to 98.6 and in group 2 from 54.2 to 96.7. Average UCLA activity score improved from 4.3 to 7.2 in group 1 and 4.1 to 7.7 in group 2. There has been 1 revision for neck fracture (group 1). All of the patients in group 1, and 57 of 59 patients in group 2, give a high satisfaction rating. In group 1, one radiograph demonstrates lucency surrounding the acetabular component. There are areas of incomplete lucency around the components of a further 8 hips in group 1 and 10 in group 2. There has been no migration of components. Functional outcome in patients over 60 years appears to be similar to younger patients. Areas of lucency on radiographs will need careful follow-up.

SIC01-P30**FIRST EXPERIENCE MICROINVASIVE ACCESS IN THE HIP JOINT SURGERY**

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In Donetsk scientific research institute of traumatology and orthopaedics a microinvasive access to different parts of the hip joint was developed and introduced into practical treatment in 2005. Its main idea is that an dissection or cutting of the muscle-ligamentous apparatus has been avoided. The given method has been applied to the operations of 15 patients having fractures or dislocation-fractures of the area. They were classified according to the character and type of injury (AO system) and distributed in the following way: A1 type of fractures - 9 patients, A2 and A3 - 1 patient each, B1 and C2 - 1 patient each, C3 type - 1 patient. Treatment results were estimated clinically, roentgenologically including a score calculation according to Harris scale in terms 4, 6, 8, and longer than 8 months. In 11 patients the items of the basic biomechanical parameters were normalized by 8 months after operation. In 3 patients these data were estimated as satisfactory. In 1 patient, the treatment results were defined as unsatisfactory and in 12 months a total hip joint arthroplasty was performed. In 5 patients a positive dynamics on the part of the sciatic nerve had been observed. Thus, the developed method microinvasive access to area of a hip joint gave the possibility to improve essentially anatomic-functional results of the injured area treatment.

SIC01-P31**HIP TSS RESURFACING OR NECK PRESERVING STEMS?**

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Lights and shadows. Why new types of prostheses if the ones currently available perform, according to international case studies, with satisfactory results in over 90% of the cases. In Tissue Sparing Surgery (TSS) the goal is not only working through the smallest incision but also sparing muscles and tendons and especially preserving bone stock. In order to respond to the objective of bone stock conservation (in an attempt to also improve functional results) two kinds of approaches have been developed: the resurfacing of the head of the femur and the neck preserving prosthesis. Both approaches to conservative THR have advantages and disadvantages. In this RELAZIONE (work?) we list advantages and disadvantages of the resurfacing solution. We also report on the copious literature available on the subject offering our observations. We then review the different stems that currently stand out because they allow the preservation of an above average amount of femoral neck and have either a very short distal stem or even no stem at all. For each of these we offer our commentary, highlighting individual assets and liability. Even though the mentioned solutions are mainly meant for young patients with good quality bone, there are some that can be successfully implanted in older people as well. From the critical evaluation of assets and liabilities of each individual type of these prostheses, we intend to then derive and articulate indications and counter indications for use of this type of conservative implant.

SIC01-P32**THE NEW STEMMED CUP IN REVISION ARTHROPLASTY AND CDH: EXPERIENCE IN 307 IMPLANTS**

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Stemmed cup is a cementless implant with a very good primary stability. The Stemmed cup is an evolution of the Ring cup. The iliac stem is positioned in direction of sacro-iliac sincondrosis, in axis with weight-bearing lines. It allows an optimal stability in the iliac bone relieving the stresses from damaged acetabular region. Recently this cup has been modified to make its use safer and easy. We report on 307 stemmed cup implants, 226 for revision surgery and other 81 for CDH as a primary implant (23 bilateral patients). The new stemmed cup has a cannulated stem and a dedicated instrumentation to avoid wrong ways. In CDH, a new cup is now available with a short stem which is indicated in the mild dysplastic hips. In more severe dysplasia morcelized bone graft taken from the patient femoral head has been employed. In severe bone loss cases, (Paprosky grade 3-4), we used auto or homologous impacted bone grafts to fill the bone defect. Average age is 65 years (range 38-87). Mean follow-up is 6.2 yrs (range 6 months–12 years). We had relatively few complications (7.8%) and 4 cases of stem apposition but without loosening. 13 cases were revised in this paper. A methanalysis of this cup will be done. The good mid-term results reported confirm that stemmed cup is a valid solution in revision surgery with mild and severe bone loss but also in CDH when conventional cups are not indicated.

SIC01-P33

OUTCOME OF TRAUMATIC INTRACAPSULAR NECK OF FEMUR FRACTURES IN PATIENTS AGED ABOVE 60 YEARS TREATED BY HEMIARTHROPLASTY

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A retrospective study to assess the outcome of traumatic fracture neck of femur in patients above 60 years, treated by hemiarthroplasty, was conducted in Hospital University Kebangsaan Malaysia. The study period was from 1st January 2000 to 31st December 2004. There were 59 cases of traumatic neck of femur fracture treated with hemiarthroplasty. Patient age of the study group ranged from 60 to 100 years (mean 74.15 years). Most patients were females (45 patients – 76.3%) and a majority was Chinese. The one year mortality rate was 18.9% with an inpatient mortality rate of 12%. Majority of patients were able to self ambulate post operation (44-74.5%) with only 15(25.4%) patients needing a wheelchair. Overall, 9(27.3%) patients obtained a Zuckerman Functional Outcome Score of good (80-100), 13 (39.4%) obtained a score of fair (60-80) and 11 (33.3%) obtained a score of poor (below 60). Good and fair outcome were mostly of ASA 2 and poor outcome were mostly of ASA 3. Patients who were walking independently pre trauma appeared to have a better outcome than those who required walking aid. Uncemented fixation appeared to be associated with a better functional outcome score. In conclusion, hemiarthroplasty is a good option for fracture neck of femur in the elderly with 66% percent of patients obtaining a satisfactory outcome. Poorer outcome was associated with multiple co-morbidities, higher ASA grade, non independent ambulation preoperatively and cemented fixation. Adequate and effective orthopaedic and geriatric cocare offers optimum chance for a good result.

SIC01-P34

PLASMA CYTOKINES AS EARLY MARKERS OF ASEPTIC PROSTHESIS LOOSENING - PRELIMINARY RESULT

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BACKGROUND: The proinflammatory cytokines IL-1 β , IL-8, and TNF- α play a major role in the process of bone resorption during aseptic loosening of large joint prostheses. Our reported data suggest elevated plasma levels of proinflammatory cytokines may be useful as markers of bone resorption in the laboratory diagnosis of prosthesis loosening. **AIM:** The objective was to evaluate if elevated plasma levels of proinflammatory cytokines may be useful as early markers of bone resorption in patients with arthroplasties free from clinical, radiological signs of loosening. **SUBJECTS AND METHODS:** We followed up 50 patients with stable prostheses without clinical and radiological signs of prosthesis loosening. In order to achieve proof that elevated plasma levels of proinflammatory cytokines of IL-1 β , IL-8 and TNF- α ; may be useful as markers of bone resorption we made preliminary clinical and radiological examination of those patients from 2003 to 2006. **RESULTS:** Among 50 patients with stable prostheses five of them had elevated levels of IL-1 β , IL-8, and TNF- α in 2003. During examination in 2006 only one of those patients with stable prostheses had clinical and radiological signs of loosening. We must point out that he had elevated plasma levels of proinflammatory cytokines in 2003. **CONCLUSION:** This preliminary result encourages us to further follow up that group of patients in order to achieve proof that elevated plasma level of proinflammatory cytokines in patients with stable prostheses may be useful as early markers of bone resorption in the laboratory diagnosis of prosthesis loosening.

SIC01-P35

FUNCTIONAL RESULTS OF LARGE HEAD METAL ON METAL ARTICULATION IN TOTAL HIP ARTHROPLASTY: MINIMUM 1 YEAR FOLLOW-UP

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INTRODUCTION: Metal on metal (MOM) hip arthroplasty is not a new concept but was previously abandoned due to poor results. Recent technological advances have improved critical tribologic features of MOM arthroplasty and created renewed interest. Large MOM articulations provide increased range of motion and reduce dislocation rates. Our aim was to assess early functional results of large MOM uncemented hip arthroplasties in patients where hip resurfacing was unsuitable based on proximal femoral characteristics. **METHODS:** Patients undergoing MOM large head uncemented hip arthroplasty with a minimum follow-up of one year were included. Demographics, component sizes and Oxford and Merle d'Aubigne hip scores were assessed. **RESULTS:** 50 patients undergoing 53 procedures were included. The mean age was 57 years (range 30-74) and mean follow-up was 17 months (range 12-26). Indications for surgery were primary osteoarthritis in 60% (32/53), secondary osteoarthritis in 32% (17/53) and inflammatory arthritis in 8% (4/53). Mean component sizes were acetabular cup 54mm (range 44-62) and femoral head 48mm (range 39-56). Mean pre and postoperative Oxford hip scores were 43 (range 28-53) and 14 (range 12-33) respectively. Mean pre and postoperative Merle d'Aubigne hip scores were 7 (range 2-15) and 17 (range 12-18) respectively. Giving a mean improvement of 29 in the Oxford hip score and 10 in the Merle d'Aubigne hip score. **DISCUSSION:** The MOM large head uncemented hip arthroplasty provides excellent short-term functional results that are comparable to those of standard hip resurfacing. This technique is useful in those patients with a high functional demand in whom hip resurfacing is unsuitable.

SIC02-P01**STUDY ON HIP ARTHROSCOPY**

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A retrospective study on the indications for hip arthroscopy and their management outcome was done at the Birmingham Royal Orthopaedic Hospital. The study period was from April 2004 up to August 2006 and included 32 patients. Data regarding patterns of referral, indications, findings, complications and management outcomes were analyzed. Hip arthroscopy was done for both diagnostic as well as therapeutic purposes with no major complications and that significant percentage of patients had satisfactory outcome with regards to management. We conclude that with adequate patient screening and attention to complications specific to the hip joint, hip arthroscopy can be performed safely and effectively.

SIC02-P02**THE SYNOVIAL CHONDROMATOSIS OF THE HIP**

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The synovial chondromatosis of the hip is a primitive metaplasia of synovial leading to the formation of cartilaginous elements which will be ossified. The attack is generally mono-articular. The localization in the hip comes in third position after the knee and the elbow. It is a rather rare infection of the unknown cause, reaches men three times more often than women, between 20 and 50 years, with extreme age of childhood to more than 80 years. Three cases of synovial osteochondromatosis of the hip were treated surgically in our formation. A mechanical pain was present in two cases, with limitation of the articular amplitude in three cases. X-ray posed the diagnosis in two cases, and the IRM in the third case. The treatment was surgical in our three cases, by an initially external way allowing, after dislocation of the hip, a complete ablation of the foreign bodies and the synovectomy. The histology signed the diagnosis of certainty. The clinical evolution was marked by indolence in two cases and the persistence of a moderated pain in one case, with a renewal of normal articular mobility in our three cases. On a six years retreat, marked by clinical controls and IRM of the hip, no signs were observed in favour of necroses femoral head. In this connection, the authors report three cases of synovial osteochondromatosis of the hip, without damage of the vitality of the femoral head, after six years of follow-up. Our results thus corroborate the data of the literature.

SIC02-P03**THE AVASCULAR NECROSIS TANTAL ROD**

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The AVN rod is a relatively new option in treating idiopathic aseptic necrosis of the femoral head. It is a spongy tantal structure with a twofold purpose: mechanical support to the cartilage surface and ingrowth of osteoblasts. We report on 8 AVN rods in 6 patients with a 3-5 year follow-up. There were two early failures which required total hip replacement. The other patients are fine and X-rays show an intact head of the femur.

SIC03-P01

SPONTANEOUS ATRAUMATIC RUPTURE OF BILATERAL ACHILLES TENDON IN A HEALTHY LIFEGUARD: THE BIOMECHANICAL ASPECT

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INTRODUCTION: Bilateral Achilles tendon rupture in absence of risk factors is extremely rare. No case has been reported yet for bilateral Tendo Achilles rupture in healthy individuals without significant trauma. We discuss the important biomechanical issues relating to Achilles tendon and the need of proper selection of the ground and training environment. **METHODS:** The beach sand causes uneven forces to be transmitted across the ankles and the Achilles tendons during running. During normal walking, at the end of the stance phase, the muscle tension through the Achilles tendon is 250% of body weight. The biomechanical force analysis have demonstrated that during running this tension across the Achilles tendon approaches 6-8 times body weight, which is close to the maximum strength of the tendon. The transmission of massive forces across the Achilles tendon due to running and diminution of its shock absorbing capacity due to mal-alignment of foot particularly hyperpronation and cavus could be the reason for spontaneous rupture of Achilles tendons in these two healthy lifeguards. **RESULTS:** End to end repair was performed in both cases. They achieved full ankle and knee movements and also the muscles power. They were able to run and jump and practise sports activity normally at the end of two years. **CONCLUSION:** Knowledge of training environment especially the nature of ground is crucial to the athletes and the trainees for practicing their sports/training. It will alert the physicians, trainers and the athletes to recognize the risk relating to training environment.

SIC03-P02

VALGUS HYPEREXTENSION ELBOW INJURY IN A CRICKET TEST BOWLER

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Elbow throwing injuries are frequent in overhead athletes with valgus hyperextension stress. In cricket bowlers, theoretically the elbow is not supposed to jerk, and hence the potential for overuse similar to baseball pitchers is limited. We report a unique case of a fast bowler of Test match level, who developed signs and symptoms of VALGUS HYPEREXTENSION OVERLOAD syndrome. **CASE REPORT:** 32-year-old male had pain and restricted movement in dominant left arm after a highly strenuous cricket season. He had difficulty in throwing from the deep, although routine bowling was not painful; however, a dull ache used to develop after each match. There was tenderness on the posterolateral aspect of elbow, especially at tip of olecranon, with flexion deformity of 10°, but full flexion beyond this was possible. No obvious instability was noted, although valgus strain elicited discomfort. X-rays revealed a small osteophyte at the tip of the olecranon; MRI showed significant fluid in the olecranon fossa, signs of impingement at the olecranon tip and corresponding supero lateral aspect of olecranon fossa, and minor stretch induced changes in the ulnar collateral ligament. Patient was put on an intensive rehab protocol including local US massage, strengthening exercises and abstinence from throwing and bowling for 3 months. Pain subsided, although the flexion deformity persisted, which did not interfere in bowling. He resumed the same level of international cricket. **DISCUSSION:** This is a cumulative stress disorder which has never been reported previously in cricketers.

SIC03-P03

SURGICAL TREATMENT OF JONES FRACTURES IN ATHLETES: LONG-TERM FOLLOW-UP AND COMPUTERIZED PEDOBAROGRAPHIC ANALYSIS

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INTRODUCTION: Nonsurgical treatment of Jones fractures has high rates of delayed union, nonunion, and refracture so the internal fixation has become the treatment of choice in athletes. The purpose of this study was (1) to review the long-term clinical results of intramedullary malleolar screw fixation of Jones fractures and (2) to perform evaluation of the operated foot by computerized pedobarographic analysis. **METHODS:** 20 patients (1 female and 19 male) with Jones fractures fixed with intramedullary malleolar screws were evaluated by chart review, review of radiographs, physical examination and interview. Functional outcome was assessed by American Orthopaedic Foot and Ankle Society (AOFAS) Midfoot Score. Static and dynamic maximum vertical force and peak plantar pressures were evaluated using a computerized pedobarograph. **RESULTS:** Mean follow-up from surgery to interview was 8.1 years. Clinical healing was 95%, and there has been one refracture (5%) that healed on conservative treatment. Average AOFAS Midfoot Score was 94.6. During the computerized pedobarographic evaluations, 17 patients (90%) presented with varus of the metatarsus and the midfoot, in 3 cases only on the injured side and in 14 cases bilaterally. 1 patient presented with the midfoot varus only, and 2 patients presented with normal plantigrade foot. **CONCLUSION:** The intramedullary malleolar screws can yield reliable and effective healing as evidenced by clinical and functional assessment of Jones fractures in athletes. Varus of the metatarsus and the midfoot are predisposing factors for Jones fractures in population of athletes, and all were recommended to wear orthoses until their competitive careers were completed.

SIC03-P04

INFLUENCE OF VITAMIN SUPPLEMENTATION ON EXERCISE INDUCED OXIDATIVE STATUS IN TRAINED ELITE INDIAN CYCLISTS

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Intense physical exercise is associated with increased free radical production. The body defence systems can combat the deleterious effects, but when the natural defence systems against free radicals are overwhelmed, oxidative stress increases. This study involved the effects of vitamin antioxidant supplements (400 IU vitamin E, 500 mg ascorbic acid for 2 months) on oxidative and enzymatic exercise stress markers during endurance training activity in elite trained cyclists. **METHODS:** Serum concentrations of ascorbic acid, alpha tocopherol, malondialdehyde (MDA), uric acid, superoxide dismutase (SOD) and catalase were measured before supplementation and after completion of 2 months of antioxidant supplementation in 50 trained elite Indian cyclists attending a national camp. **RESULTS:** Antioxidant supplementation led to a significant increase of serum alpha-tocopherol and ascorbic acid from pre-supplementation to post-supplementation stage. Serum MDA and uric acid concentration decreased significantly after 2 months of antioxidant treatment. A significant increase of serum SOD and catalase activities observed after supplementation as compared to prior supplementation. **CONCLUSION:** Our results showed that 2 months supplementation with vitamin E and ascorbic acid increases the levels of alpha-tocopherol and ascorbic acid; this might confers protection against reactive oxygen species. The increase in SOD and catalase

activity and reduction in MDA and uric acid concentration suggests that antioxidant supplementation may strengthen their antioxidant defence system, thus reducing the oxidative stress produced after endurance training in elite Indian cyclists. We recommend routine anti-oxidant supplementation to combat the deleterious effects of free radicals.

SIC03-P05

ARE WORN OUT TRAINERS DETRIMENTAL TO YOUR FEET? A PEDOBAROGRAPHIC STUDY

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BACKGROUND: In the present health conscious society more people are resorting to fitness programmes. Consequently there is an increased risk for foot and ankle disorders. The recommended time for changing trainers is every 250-350 miles. The aim of our study was to assess and compare plantar pressures in new trainers and worn out trainers. **METHODS:** This was a prospective study involving 10 healthy female volunteers with no previous foot and ankle problems. New trainers were provided to the subjects, plantar pressures were measured using the Novel Pedar system while using the subject's new and worn out trainers. Plantar pressures were measured in nine areas of the feet. Demographic data, age of trainers, BMI, peak pressures, pressure-time integral and instant of peak pressure were acquired. Right and left feet were assessed separately. Statistical analysis was done using the paired t test to compare measurements between worn out and new trainers. **RESULTS:** The mean peak pressures were significantly higher in new trainers when compared to worn out trainers on both sides ($p=0.05$). The instant of peak pressure was significantly higher in new trainers ($p=0.02$). The pressure-time integral was significantly higher in the new trainers ($p=0.01$). **CONCLUSION:** Plantar pressure measurements in general were higher in new trainers. This could be due to the lack of flexibility in new trainers. The chances for foot and ankle problems would be more if trainers are changed frequently. We recommend breaking into new trainers using them for mild physical activities, like walking, initially before more vigorous activities.

SIC03-P06

ARTHROSCOPIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION USING QUADRUPLED HAMSTRING TENDON WITH TIBIAL REMNANT-PRESERVING TECHNIQUE

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We evaluated the clinical results of arthroscopic ACL reconstruction using quadrupled hamstring tendon with tibial remnant-preserving technique. Thirty-five cases were evaluated from Feb. 2003 to May 2006. The average interval from injury to surgery was 2.6+/-1.6 months. The cause of injury was mostly sports-related trauma. Associated injuries were lateral meniscus tear in 5 cases and medial meniscus tear in 3 cases. The average follow-up period was 17 months. In all cases, arthroscopic ACL reconstruction with tibial remnant-preserving technique was done using quadrupled hamstring tendon which was fixed using CL EndoButton & Bio-interference screw in femoral tunnel and post-tie fixation & Bio-interference screw in tibial tunnel. Tibial remnant was preserved as much as possible and caution was taken not to damage the remnant during ACL reconstruction. Postoperative rehabilitation was the same as the usual rehabilitation method after ACL reconstruction, except for delaying motion for 2 weeks with an extension locking brace. Clinical evaluation was performed using ROM, Lachman test,

pivot-shift test, anterior displacement measurement using KT-2000 arthrometer, Lysholm score and proprioception measured by single limb standing test. There was no limitation of knee motion without contracture. The Lachman and pivot-shift test were both negative. The side-to-side difference of anterior displacement was improved from 6.7 mm to 2.2 mm. The average Lysholm score improved from 81 to 96. The single limb standing test showed no significant difference from a normal leg. One case re-ruptured after trauma. ACL reconstruction with tibial remnant-preserving technique can preserve mechanoreceptors with proprioception and expect good functional recovery.

SIC03-P07

TIBIOFEMORAL MOVEMENT OF ACL DEFICIENT LIVING KNEE UNDER THE DEEP KNEE BENDING INCLUDING JAPANESE SITTING STYLE "SEIZA" POSITION USING OPEN MRI

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In Japan, people often sit on the floor bending their knees deeply, so called SEIZA style. ACL-deficient patients are often unable to bend their knees to deep flexion or experience pain at the deep flexion of their knees. The purpose of this study was to analyze the tibiofemoral kinematics of ACL-deficient living knees under the deep knee bending including Japanese traditional sitting style SEIZA position using MRI. 11 patients with unilateral rupture of the ACL who had been diagnosed by clinical and MRI findings were examined with open MRI. Relative movements of the medial and lateral femoral condyles to the tibia were measured in both sides at active deep flexion and at passive deep flexion (SEIZA position). In the ACLD knees, we divided the ACL-deficient knees into two subgroups; medial meniscus tear and meniscus intact. Under an active deep flexion (132°), the positions of medial and lateral condyle were not significant between ACL-deficient and normal knees. However, the position of medial condyle of meniscus tear knees was 3.8 mm posterior compared to that of meniscus intact knees or normal knees. Under the SEIZA position (159°), the position of medial femoral condyle of the ACL-deficient knees was 2 mm posterior compared to the normal knees. We conclude that ACL is important for AP stability at not only early flexion but also deep knee flexion, especially for medial compartment of the knee.

SIC03-P08

THE MIDDLE TO LONG FOLLOW UP STUDY OF MENISCECTOMY FOR THE DISCOID LATERAL MENISCUS

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INTRODUCTION: The therapeutic results of patients who had undergone surgery for isolated injuries of the discoid lateral meniscus of the knee joint were evaluated during middle- to long-term observations. **METHODS:** The subjects (mean age, 22: range from 8 to 49 years) included 29 patients (33 knees) with injuries of the discoid lateral meniscus. The surgical procedures were: open meniscectomy (7 knees), arthroscopic meniscectomy (26 knees), partial meniscectomy or meniscoplasty (13 knees), subtotal meniscectomy (15 knees), and total meniscectomy (5 knees). The follow-up periods were ranged from 10 to 17 years (mean 13 years). **RESULTS:** The mean JOA (Japan Orthopaedic Association) score at the final examination was 87 points (with 100 points being perfect): the subjective rating by patients themselves (also with 100 points being

the perfect score) was 35 points before surgery but rose to 85 points at the examination conducted 10 years after surgery. The JOA score was lower for an open meniscectomy but no statistically significant difference was noted. Apropos of the amount of the meniscus excised, the JOA score tended to be lower for a total meniscectomy. The score was significantly lower for those patients who exhibited cartilaginous damage during surgery. **CONCLUSION:** A meniscectomy may assist development of osteoarthritis, although, in general, the surgical outcome was highly appreciated by the patients. It is concluded that meniscectomy is one of the useful surgical procedure for damaged discoid lateral meniscus of the knee joint.

SIC03-P09

CALCANEAL STRESS FRACTURES - CASE REPORT

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INTRODUCTION: A stress fracture is a highly localized modification of the osseus remodeling in a healthy bone following strenuous, unusual, and repeated functional use. It is a common fracture amongst the military and sportspeople. In 95% of the cases, these are found in the lower limbs, of which calcaneal fractures represent 40-50%. **CASE REPORT:** We present the case of two patients without any related medical history, complaining of mechanical heel pain during two months. Clinical examination reveals the same pain with compression. MRI confirms the diagnosis of calcaneal stress fracture. Treatment consisted in avoiding weight-bearing during a month, with favourable clinical and radiological evolution. **DISCUSSION:** Calcaneal stress fractures are second, in frequency, to metatarsal fractures. They are especially caused by sports involving walking, running and jumping. Diagnosis can be inferred from the history of the patient. Radiological signs appear much after the clinical signs. Osseous scintigraphy using ^{99m}Tc diphosphonate remains the gold standard for diagnosis. However, MRI has the advantage of being more specific. Treatment simply consists in stopping high risk activities, and avoiding weight bearing. **CONCLUSION:** Prevention must be insisted on, avoiding any functional excess, adapting physical activity to the physical capacities and preparation of each individual.

SIC03-P10

SURGICAL TREATMENT FOR ACHILLES TENDON RUPTURE

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The controversy between partisans of conservative and surgical treatment for Achilles tendon rupture is proof of the difficulty of the treatment. Non-surgical treatment is simple and avoids surgical risks. Nonetheless, this treatment also has its own complications, especially frequent recurrent ruptures. Our choice for the active population is definitely surgical. For more than a decade, we have preferred the association of the procedures described by Chigot and Lynn. Chigot uses the plantaris tendon as suture material. Lynn takes advantage of the capacity of the plantaris tendon to unfold and uses it to cover the termino-terminal suture of the ruptured tendon. We use other techniques in absence of this tendon. We analyze the results of 51 cases of Achilles tendon ruptures treated surgically. The rupture was caused by minor trauma. Diagnosis was based on pathognomonic clinical signs. Practically all cases were diagnosed late. Only 8 were consulted on the first day. The patients were all operated following the procedures described by Chigot and Lynn. The average immobilisation by boot cast in equinus was 4

weeks. Rehabilitation started immediately after removal of immobilisation. At revision, none of the patients complained of pain. In our series, the tendon always recovered the initial length and strength, and we only noted two cases with limited mobility of the ankle. We reach the conclusion that surgical management must be the first choice in Achilles tendon ruptures seen after the 8th day. This treatment reduces the incidence of recurrent ruptures and guarantees better functional recovery.

SIC03-P11

DIGITAL ENHANCEMENT TECHNIQUES IN ORTHOPAEDIC ULTRASOUND IMAGING

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Digital radiography offers various possibilities of processing and editing to enhance picture quality. Digital image data is also available in sonography, nevertheless only contrast optimization is used for improvement of picture quality. This study analyzes the possibility of different digital imaging techniques on standard shoulder sonography images. Standard sonographic shoulder images were gathered on shoulders of healthy test persons as the standard value. These were then analyzed by a computer with various image editing algorithms. Following methods were used: 1. Contrast optimization; 2. Contrast filters (window technique, distancing of grey scales pixel by pixel, line by line); 3. "Look up table operations" (Via change between the type of density, contrast can be globally optimized). The resulting edited sonographic images were investigated and judged in a ROC-Analysis by 5 independent and experienced examiners. Points were given for image while considering different questions/indications (e.g. judging the border layers or structural homogeneity) in comparison to the original sonographic images. Using the standard method of contrast optimization whilst comparing the edited images with the original images, no distinct image quality improvement could be achieved. There was statistical significant improvement with different digital enhancement techniques. The techniques and the relevant structures are discussed in detail. In conclusion, digital editing of sonographic images is a novel way to enhance image quality and diagnostic reliability. A further evaluation of the determined indicational filters in traumatic and posttraumatic shoulder pathology is a task for future studies.

SIC04-P01

CLINICAL TRIAD FOR DIAGNOSING HIP FRACTURES WITH NEGATIVE RADIOGRAPHS

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INTRODUCTION: Elderly patients who present with hip pain following trauma showing no fractures on X-rays have MRI scans to rule out femoral neck fractures. We have devised a set of three clinical signs, which we believe aids in the reliable diagnosis of femoral neck fractures. **CLINICAL TRIAD:** 1. Inability to straight leg raise 2. Limitation of rotation due to pain 3. Groin tenderness to deep palpation **STUDY DESIGN:** Prospective observational study. **OBJECTIVES:** The critical appraisal of the three clinical signs in the validation of patients with symptoms of hip pain with negative radiographs. **METHODS:** 28 consecutive patients admitted with hip pain following a fall with no evidence of fracture on hip X-ray underwent MRI scanning. Mean age was 78 (range 67 - 88) years.

RESULTS: Of the 28 consecutive patients reviewed, 10 were male and 18 were female. The mean age was 78 (range 67-88). 10 patients who had all three signs positive showed definite fracture of neck of femur on MRI scans with 100% sensitivity. Out of 10 patients who displayed two signs positive, 7 had fractures on MRI scans giving 70% sensitivity. The 8 patients who had one positive sign showed no fracture on MRI scans. Of these, 6 had osteoarthritic changes and 2 had avascular necrosis of the femoral head.

CONCLUSION: We feel that by performing these simple clinical tests, clinicians with no easy access to further imaging facilities (namely Accident & Emergency, peripheral clinics and GP clinics) can reliably diagnose and treat femoral neck fractures.

SIC04-P02

HIP FRACTURES AND PRESSURE SORES

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A neck of femur fracture is known to be a high risk factor for the development of pressure sores with an associated morbidity, mortality and cost. We have attempted to identify risk factors in these patients for the development of pressure sores. 4654 consecutive hip fracture patients were studied and the incidence of pressure sores related to the patient characteristics and method of treatment. The mean age of the patients was 76 years. 75% were female. 3.8% developed pressure sores in the sacral, buttock or heel areas. Factors that were associated with an increased incidence of pressure sores were increased age, male sex, lower mini mental test score, higher ASA score, diabetes mellitus, lower admission haemoglobin concentration and an extracapsular fracture. Among surgical factors related to an increased risk was a delay from fracture to surgery, a fall in blood pressure during surgery and dynamic hip screw fixation. Patients who had cannulated screws were less likely to develop pressure sores. Our study confirms that patients with a neck of femur fracture are at significant risk of developing pressure sores. In addition to standard measures to reduce the occurrence of pressure sores, reducing delay to theatre should reduce the incidence of pressure sores.

SIC04-P03

MIGRATION OF MULTIPLE CANNULATED SCREWS IN THE TREATMENT OF FEMUR NECK FRACTURES

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PURPOSE: To assess the clinical significance and characteristics of the screw migration in the treatment of femur neck fractures. **MATERIALS AND METHODS:** 44 cases (22 males, 22 females) among 66 cases treated by multiple cannulated screws with close reduction between February 1998 and May 2005 were analyzed after at least 18 months follow up reviewing medical records, radiographs retrospectively. 3 mm migration of screws was the guideline for the migration and non-migration group by authors arbitrarily. Complications, screws positions in femoral heads, Garden's classification, anatomical location of fracture, and comminution were compared between migration and non-migration group statistically. Time sequence and distance of migration were evaluated in migration group. **RESULTS:** No significant difference between migration group (27 cases) and non-migration group (17 cases) ($p=0.001$) in complications, screws position in the femoral heads, degree of displacement of fractures using Garden's classification, and anatomic location of fractures was noted, but significant differences were noted statistically in comminution cases. In migration group, screws started migration from 1

month, remarkable migration in 3-6 months. Average distance was 4.23 mm for the first 3 months, and final distance was 6.51 mm. CONCLUSION: In comminuted femur neck fractures with multiple cannulated screws, screw migration and shortening of femoral neck are anticipated in 3 months after operations, and screw migration is not good indicator for prognosis. KEY WORDS: Femur, Neck Fracture, Multiple Cannulated Screw fixation

SIC04-P04

A MINIMALLY INVASIVE TREATMENT FOR TROCHANTERIC FRACTURES

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INTRODUCTION: The incidence of pertrochanteric fracture has significantly increased during the recent times due to the rising age of the population. We present a prospective study of 130 cases of PFN/trochanteric Nail treated at our Institute. MATERIALS AND METHODS: From December 2002 to December 2005 we treated 130 patients with stable & unstable proximal extra capsular femoral fractures with a proximal femoral nail (PFN) & trochanteric Nail (TN). The mean age was 69 years (33-82 years) with eighty four males and forty six females. The preoperative radiographs were classified 46 - A1, 45 - A2, 35 - A3. 4 had a combination of injuries. RESULTS: 88% of patients showed a near anatomical fracture reduction in Postoperative X-rays. The fracture consolidated in 4.5 months. 15 patients developed complications and 6 patients were lost to follow up after eight months. DISCUSSION: The PFN inserted in a minimally invasive manner is biomechanically stronger & better tolerated in the elderly. The stress generated is negligible by being close to the weight bearing axis. It also acts as a buttress in preventing the medialisation of the shaft. CONCLUSION: PFN & TN features the advantages of high rotational stability of the head-neck fragment, an unreamed implantation technique and the possibility of static or dynamic distal locking.

SIC04-P05

EARLY LOOSENING OF AUSTIN-MOORE HEMIARTHROPLASTY - A MANAGEMENT DILEMMA

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INTRODUCTION: A retrospective audit to evaluate the results of Austin Moore hemiarthroplasty conversion to total hip arthroplasty for suspected aseptic loosening. MATERIALS AND METHODS: A consecutive cohort of patients who had conversion of Austin-Moore hemiarthroplasty to total hip arthroplasty performed between August 2000 and May 2006 were included in the study. The total of 41 patients were divided into two groups depending on the duration between the primary hemiarthroplasty procedure and its revision to total hip arthroplasty – (1) Less than one year (16 patients) and (2) More than one year (25 patients). The data collected included: age, sex, classification of the fracture, date of primary operation, surgical approach, inflammatory markers, indication and date of revision to total hip arthroplasty, and the final outcome. RESULTS: The rate of infection after the revision to total hip arthroplasty was found to be 25% (4/16 patients) in patients who underwent the revision operation within 1 year after the primary operation, whereas the infection rate was 8% (2/25 patients) for those who had the revision operation more than a year after the primary operation. The difference in infection rates between the two groups was found to be statistically significant. The other significant complication namely dislocation was equally distributed between the two groups.

DISCUSSION: The patients who have early loosening of the Austin-Moore hemiarthroplasty within the 1 year of the primary procedure should raise a suspicion of occult infection. Despite near normal inflammatory markers, a two-staged conversion to total hip arthroplasty should be seriously considered.

SIC04-P06

IPSILATERAL HIP AND FEMORAL SHAFT FRACTURES – AN EXPERIENCE WITH LONG PROXIMAL FEMORAL NAIL

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INTRODUCTION: Ipsilateral fractures of the femoral shaft associated with trochanteric or intracapsular neck fractures are rare. The aim of this study is to highlight the biomechanical supremacy of Long PFN in the management of these injuries. **MATERIAL AND METHODS:** We carried out a prospective analysis of the data of 21 consecutive patients (17 closed fractures and 4 open fractures) who had the said injury pattern with an Indian made long Proximal Femoral Nail (LPFN) between December 2002 and December 2005. Only in 5 patients we had to resort to limited open reduction. Surgery was carried out under IITV, temporary fixation of femoral neck fracture done followed by nailing of the shaft fracture and fixation of the trochanteric or neck femur fracture & locking it distally in a static or dynamic mode. **RESULTS:** During the follow-up period of twenty-five months (average follow-up of one year) our results were excellent to good in 90% of patients. **DISCUSSION:** Long PFN offers the advantage of a reamed & unreamed implantation technique, high rotational stability of the head–neck fragment, and the possibility of static or dynamic distal locking. The entry portal of the LPFN through the trochanter limits the surgical injury. **CONCLUSION:** Long PFN extends our options in the treatment of Ipsilateral fractures of the hip & femoral shaft. We conclude that Ipsilateral fractures of the hip & femoral shaft, if diagnosed early and treated aggressively, give a better functional result by a single Intramedullary nail.

SIC04-P07

LATERAL FRACTURES OF THE HIP TREATED WITH PROXIMAL FEMORAL NAIL

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INTRODUCTION: Lateral fractures of the hip (LFH) are a common and increasing problem. Endomedullary fixation systems have several advantages over standard lateral devices for their treatment. We present our experience with the use of the Proximal Femoral Nail (PFN) (Synthes) for treating these lesions. **MATERIALS AND METHODS:** Between April 2003 and April 2006, 84 LFH were treated in our centre. A retrospective review of the medical files and radiographs was performed. The series was divided into two groups, forty eight trochanteric (THF) fractures and 36 Subtrochanteric (STHF) fractures. The average age was 75 (38-97) and 57 (23-98) years old respectively, with a mean follow-up of 9 months for the whole group. **RESULTS:** Four patients died during follow-up. In the THF group, bone healing was achieved in all cases in a mean time of 4 months. In this group there were no complications requiring re-operation. In the STHF group, bone healing was observed in a mean time of 5 months. Complications in this group were 3 mal-rotations that required corrective surgery, and one nonunion that was treated with bone grafting. Six patients required hardware removal and no cut-outs were observed. Clinically at final follow up, 30% of the patients had an abnormal gait. **DISCUSSION:** Treatment of LFH with proximal femoral nail is a good alternative. In the

present series, a low incidence of complications was observed and most of them were in the subtrochanteric group due to technical deficiencies and not a result of the endomedullary system.

SIC04-P08 **ROTATOR CUFF RUPTURE OF THE HIP**

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We observed on occasion - during operating on elderly patients with fracture neck of femur - a tear in the tendinous insertion of gluteus medius and minimus into the greater trochanter. We noticed this lesion more in patients above 80 years of age with poor mobility prior to fracture. We ran a prospective study of 70 patients with subcapital fracture neck of femur that is under going hemiarthroplasty. This lesion was found in about 20% of cases (14 patients). 80% (11 patients) of the lesions found in patients above 80 years old, most of them were resident in residential or nursing homes with very poor mobility. The lesion usually seen after the fascia lata is opened as an oval or rounded defect in the conjoint tendon of the gluteus medius & minimus with bare area of the greater trochanter (bald trochanter sign), usually associated with free fluid in the bursa. It is difficult to predict clinically this lesion preoperatively as most patients are coming with fracture neck of femur and difficult to assess the hip. Radiologically the lesion may represent itself as reactive sclerosis over the greater trochanic with some small cyst & bony spurs formation. We found positive radiological findings in 7 of the 14 patients with the tears. We think this lesion carries a lot of similarities with the rotator cuff rupture of the shoulder and that is why it is called rotator cuff rupture of the hip.

SIC04-P09 **OPERATIVE TREATMENT OF TROCHANTERIC FRACTURES**

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The incidence of intertrochanteric and subtrochanteric fractures is about 17-24% in structure of skeletal trauma. The dynamic hip screw and proximal femoral and gamma nails are standard implants for the trochanteric fractures treatment. We reduced indications for dynamic hip screw and widened indications for intramedullary nails in treatment of unstable trochanteric fractures. We treated 173 patients with proximal femoral fractures with the PFN, PFNA and TGN from 2002 to 2006. The mean age was 70.8, 120 were female. We used AO/ASIF classification: 31A1.1-3 – 34, 31A2.1-3 – 107, 31A3.1-3 – 32. The mean blood loss during operation was 150-200 ml, mean operative time – 60.2 minutes. The operations were performed within 3 days of the accident. We used fracture table thus achieving closed adequate reduction under fluoroscopic control in both planes. The long-term results were observed in 78 patients. The evaluation of results was performed using both functional tests and two plane radiographs at the period 3-6-12 months after operation. The excellent and good results were registered in 72 patients. Five patients died in early postoperative period: pulmonary embolism – 3, myocardial infarction – 2. Eight complications were observed during the follow-up period: migration of antirotational hip (pin) screw – 2, fracture of the shaft of the femur – 2, superficial wound infection – 4. The intramedullary interlocking nailing provides stable fixation of all types of inter- and subtrochanteric femoral fractures that allow immediate full weight bearing in early postoperative period in spite of bone quality.

SIC04-P10**STATISTICAL ANALYSIS OF THE OUTCOMES OF PERITROCHANTERIC FRACTURE OF THE FEMUR TREATED WITH INTRAMEDULLARY HIP SCREW SYSTEM**

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OBJECTIVES: Objective of this study was to analyze the statistic postoperative outcomes of peritrochanteric fracture of the femur treated with intramedullary hip screw system. **MATERIALS AND METHODS:** 378 patients, consisting of 106 males and 271 females, whose mean age was 81 years, were the subject. To identify factors influencing the outcomes, various factors including backgrounds of the patients, radiographic findings and complications were analyzed statistically. As a principle, the patients started early weight bearing within a week from the surgery. **RESULTS:** Operating time was 43.6 minutes and intra-operative blood loss was 69.8g in average. Bone union was observed in 373 patients excluding patients with death and transfer. 3 patients of greater trochanteric fracture at the nail insertion and 2 patients of infraction at the locking screw were recognized as intra-operative complication. As post-operative complication, femoral neck fracture was observed in 2 patients, femoral diaphysis fracture in 4 and varus deformity in 1. Jamming was seen in 6 patients and cut-out in 7. One of the 7 cut-out patients required hemiarthroplasty. Identified factors correlated with post-operative walking ability were age, cerebral vascular impairment, and intra- and post-operative complication. **DISCUSSION:** There are some evidences that early surgery reduces systemic complications and mortality, but it does not mean to maintain walking ability. Age and cerebral vascular impairment were inevitable factors influenced post-operative walking ability. Prevention of post-operative complication such as jamming and cut-out was important to obtain satisfactory walking ability postoperatively in patients with peritrochanteric fracture of the femur.

SIC04-P11**PRELIMINARY RESULTS OF A NEW DYNAMIC LOCKING PLATE AND SCREW SYSTEM FOR INTRACAPSULAR HIP FRACTURES**

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The TargonFN (Femoral Neck) Hip Screw has been designed to improve fixation of intracapsular hip fractures. Complications after internal fixation occur in approximately 30-40% of displaced fractures and 5—10% of undisplaced fractures. The new implant consists of a small plate with six locking screw ports. The two distal holes are used to fix the plate to the femur. Three or four screws are passed through the proximal holes and across fracture site. These 6.5 mm screws are dynamic to allow for collapse of fracture along the femoral neck. A jig is used to aid insertion of device with minimal surgical exposure. We present the results of this new implant for the first 30 patients. The mean age of the patients was 77 years (range 46-94), 9(30%) were male. 15 fractures were undisplaced, 4 had minimal displacement and 11 were displaced on both AP and lateral radiographs. Mean length of surgery was 44 minutes (range 25-95) and mean length of anesthesia 56 minutes (range 35-110 minutes). Mean length of hospital stay was 10 days (range 3-32). Three telescoping screws were used in 17 cases and four screws in 8 patients. Follow-up of patients at present is a mean of four months. To date there has been only one case of re-displacement in a displaced fracture. All others show good

fixation, whilst allowing for collapse to occur along the line of femoral neck. We feel this new implant may be a significant advance in the treatment of this difficult and common fracture.

SIC04-P12

OPEN REDUCTION OF IPSILATERAL FEMORAL NECK FRACTURE OF HIGH ABOVE KNEE AMPUTEE WITH ASSISTANCE OF MODIFIED SKELETAL TRACTION

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INTRODUCTION: Fracture of the residual limb in an amputee is not a common occurrence. The displaced ipsilateral femoral neck fracture of high above knee amputee is extremely rare. The open reduction for such kind of patient is difficult due to very short stump for fracture manipulation. We report a technique note to easily open reduce the displaced ipsilateral femoral neck fracture of high above knee amputees. **CASE PRESENTATION:** 50-year-old female patient with high transfemoral amputation due to major trauma 3 years ago. She was fitted with prosthesis and pelvis band, which was very active and walking well. Displaced subcapital femoral neck fracture of the amputated limb was noted due to falling accident. Minimally invasive open reduction and internal fixation with Knowles pinning was easily performed on the traditional fracture table with the assistance of modified skeletal traction. The reduction was perfect and the post-operative course was eventful. She returned to previous activity and working status with good prosthetic fitting 3 months later. **DISCUSSION AND CONCLUSION:** The modified skeletal traction of the distal part of the very short stump made the distal traction and manipulation of femoral neck possible as the regular fracture situation. It offers an alternative reduction method for ipsilateral hip fracture in the residual limb in high above knee amputee.

SIC04-P13

HEMATOLOGICAL INDICES AS A PREDICTOR OF MORTALITY AFTER HIP FRACTURE

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The purpose of this study was to relate the admission hematological parameters of haemoglobin, white cell count, lymphocyte count and neutrophil count as predictors of mortality in patients with fractures of the proximal femur. 858 consecutive patients admitted to one institution were studied and followed up to one year from injury. Overall mortality at one year was 29% (females 25% compared to 32% for males). Increased mortality rates were associated with a lower admission haemoglobin value (<100g/l - 48% mortality, ≤ 115g/l - 36% mortality), and an increased haemoglobin (>160g/l - 33% mortality). Regarding total white cell count, a low admission count was associated with an increased mortality (<4x10⁹ - 50% mortality). Increased mortality was also found for a low lymphocyte counts (<0.5 - 37% mortality, between 0.5 and 0.8 - 33% mortality, between 0.8 and 1.1 - 32% mortality). For those with a count in the normal range (1.4 to 4.8) the mortality was 18%. For the neutrophil count, there was no relationship between this and mortality. This study demonstrated a higher mortality associated with lowered haemoglobin and lymphocyte counts. As these parameters are routinely undertaken at

hip fracture admission and do not suffer from the problems of observer biases, they may be useful in predicting mortality and for case mix adjustment when comparing mortality between different centres undertaking hip fracture audit.

SIC04-P14

PREVALENCE OF SUBCLINICAL THYROID DYSFUNCTION IN AN ELDERLY COHORT OF PATIENTS WITH AN ACUTE HIP FRACTURE

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Thyroid dysfunction, both hypothyroidism and hyperthyroidism, has been associated with loss of bone mineral density (BMD) and increased fracture risk. Although these effects are mediated through the thyroid hormones, there has recently been a report of the direct effect of thyroid-stimulating hormone (TSH) on bone remodelling. Femoral neck BMD is significantly reduced in patients with subclinical thyroid dysfunction. We investigated the prevalence of subclinical hypothyroidism and subclinical hyperthyroidism in elderly patients admitted with an acute hip fracture in our trauma unit. Every patient admitted with a hip fracture had thyroid function test done including serum TSH and free T4 (f-T4). The reference range of TSH for our laboratory was 0.35-5.5. Out of the 24 consecutive patients in the age range of 61-97 (Mean age - 83) 4% had subclinical hyperthyroidism, 21% had subclinical hypothyroidism and 16% were known to have hypothyroidism and were on treatment with levo-thyroxine. Overall, 29.2% of the patients had abnormal thyroid profile. We intend to improve the patient numbers included in this study for the final presentation. Subclinical thyroid dysfunction is thought to be one of the major secondary causes of osteoporosis in the elderly. The high prevalence of thyroid dysfunction in the elderly population means that these patients should be identified and treated by a multidisciplinary approach including the biochemist, ortho-geriatrician and the endocrinologist.

SIC04-P15

PROXIMAL FEMORAL NAILING AS SALVAGE PROCEDURE FOR FAILED D.H.S.

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BACKGROUND: Failure of Dynamic Hip Screw (D.H.S) after fixation of femoral neck fractures is a complicated problem especially in older population. Failure of the D.H.S. fixation is usually a result of an intraoperative technical error or mismatch between the fracture and the implant. This can lead to non union, cut-out, periprosthetic fracture or mechanical failure of the implant. The common solution for a failed D.H.S. is usually a conversion to total hip replacement or the use of a Blade plate with or without osteotomy. We suggest another method for salvage of a failed D.H.S. - the use of Proximal Femoral Nail (P.F.N.). **MATERIAL AND METHODS:** During the last 4 years we used P.F.N. to treat 10 patients (2 males and 8 females, age 69-91 years old) after failed D.H.S. The salvage operation was done between 2 days and 7 months after the first operation. The failed implant was removed and a P.F. nail was inserted with the use of bone graft or bone cement to fill the cavity in the femoral head caused by the D.H.S. The patients were not allowed to bear weight for 6-12 weeks after the operation. **RESULTS:** No fixation failures were observed. All patients started full weight bearing 6-12 weeks after surgery. **CONCLUSIONS:** P.F.N. is a valid option in failure of D.H.S. The use of P.F.N. for failed D.H.S. suggests an easier, shorter, less invasive and cheaper solution.

SIC04-P16

FEMORAL HEAD FRACTURES: CASE SERIES

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Femoral head fractures are rare fractures caused by high-energy trauma. Traumatic dislocations of the hip are associated with damage to the acetabular and femoral head cartilage. Open reduction and internal fixation are attempted, but necrosis of the femoral head and coxarthrosis occur in as much as 50% patients. From January 2003 until December 2005 there were 806 patients treated in our hospital for femoral neck fractures, intertrochanteric and subtrochanteric fractures. During the same period there were 156 patients treated for acetabular fractures and only six patients with femoral head fractures. One of them with Pipkin I fracture, two with Pipkin II and three with Pipkin IV fracture. There were three women and three were men. Average age of the patient was 31 years (16-42). All of the femoral head fractures in our series were caused by motor vehicle accidents. They were treated with open reduction and internal fixation (ORIF) with the titanium screws buried subchondrally. At the same time ORIF of the acetabular fracture was performed. After mean follow-up of only 26 months (20-36), three of them (those with Pipkin IV fractures) were either operated on or scheduled for total hip replacement. Femoral head fractures occur rarely compared to other proximal femur fractures. Acetabular fractures are in less than four percent associated with femoral head fractures. Operative treatment of femoral head fractures Pipkin IV that could ensure successful outcome after longer follow-up remains a challenge.

SIC04-P17

BIOMECHANICAL EVALUATION OF A CEMENTED VS. NON-AUGMENTED GAMMA-NAIL SCREW IN THE OSTEOPOROTIC MODEL OF THE FEMORAL HEAD

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Osteoporotic fractures of the trochanteric area are often treated with a gamma-nail or similar implants utilizing a screw applied into the femoral head. One of the main problems of these techniques is the cut out in the femoral head. We biomechanically evaluated a novel technique of cement augmentation of the bed of the screw in a standardised osteoporotic bone model and its capability to reduce the cut out rate. MATERIAL/METHODS: Utilizing a polyurethane-foam osteoporotic model that has been previously described (specific gravity 0.192g/cm³), a biomechanical testing of a neck of femur screw (TGN, STRYKER, Duisburg, Germany) was performed. The screw was implanted according to manufacturers instruction, the migration characteristics were then biomechanically tested (Zwick testing machine) with a static stepwise load increase (50N). First these tests were performed without, in a second series with the augmentation of a fast hardening biopolymer (Corthoss, Orthovita, USA). Each series was repeated 5 times. The transfer from a stable to an unstable condition was determined. RESULTS: On average the applied load at the moment of failure with critical cut out was 1431N for the non-augmented screws. With augmentation, the average load was 1987N, the difference was statistically significant. DISCUSSION: It appears in biomechanical testing that augmentation of the femoral head can reduce the rate of cut-out failure in osteoporotic bone. We proceed now with further biomechanical testing, grant of the local ethics committee for human testing has been applied for.

SIC04-P18**DEVELOPMENT OF AN ACETABULAR CEMENTED MODULAR CUP FOR FRACTURE HIP ENDOPROSTHESIS IN THE ELDERLY**

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INTRODUCTION: There is a general trend towards total hip arthroplasty for the treatment of femoral neck fractures in the elderly. So far, cemented acetabular cups consist of a polyethylene block without the possibility of different inlays. The concept for the development of the novel system is to gain all well-known profits from the cementless method for a cemented acetabular component replacement technique, a great variety of inlays can be attached. **MATERIAL / METHOD:** We have built a cementable hemispheric metal-cup and configured its material and design to the needs of cementation. Its modularity resulted from the possibility of holding different customized inlays. After cementing these sample-bodies into PU-blocs, we measured the force for pullout and torsion-testings, using a hydraulic testing-machine. **RESULTS:** The results of these biomechanical experiments have proven an extremely high primary stability for the anchorage of this newly developed cup (mean value of traction-force 1695.93 N). In each individual experiment (pullout and torsion) the foam-block was fractured, there was no case of loosening. Torsion testings done in the observed range up to 75 Nm showed no failure of the cup-bone interface. **DISCUSSION AND CONCLUSION:** The advantages of the CMIC-system are versatile as numerous inlays are now available. This facilitates the adjustment to characteristics like patients-age, the individual amount of activity or anatomic varieties. Furthermore, in correction of false-positioned cups with the risk of luxation there is a large amount of flexibility by the use of asymmetric or snap-inlays in order to reduce the risk of hip dislocation.

SIC04-P19**OSTEOSYNTHESIS OF THE A2 PERTROCHANTERIC FRACTURES BY DHS, SUPPORT PLATE AND SCREWS**

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INTRODUCTION: The A2 pertrochanteric fracture has tendency of proximal femoral fragment to dislocate laterally. **METHOD:** By open approach on an extension (also called reduction) table we are able to achieve good reduction. The osteosynthesis is performed by placing Dynamic Hip Screw and its support plate and can be strengthened by two 3.5 mm screws through the support plate, crossing above DHS and aiming to the distal (lower) part of the neck border near the femoral head. **RESULTS:** In preliminary series of 17 patients we achieved good reduction. There were two failures due to short screws which had not penetrated the neck cortical bone. The biomechanic analysis show that construct is stable and allows early weight-bearing. **CONCLUSION:** By our method we achieve good reduction of the A2 pertrochanteric fractures and stable osteosynthesis. Moreover the screws anchored in the supporting plate and distal femoral neck cortex act also like a tension band osteosynthesis of the greater trochanter thus fixing important muscle insertion point!

SIC04-P20
SUBTROCHANTERIC FRACTURE SHAFT FEMUR

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Subtrochanteric Fracture is one of the few “unsolved problems in orthopaedic”. It forms about 10-15 percent of hip fractures and many times it is a part of polytrauma. Its treatment is fraught with high risk of mal-union, delayed union, non union and implant failure due to the high stress and the peculiar anatomy of the region. The treatment of this difficult fracture has evolved over the time the complexities in treating these fractures are compounded by different classification and varied array of ever increasing number of implants. This prospective study was done in Khoulā Hospital (Tertiary care Trauma centre, Muscat, Oman) from 2000–2004. We have analysed 54 cases where non slotted standard and Recon RT nails were used. Simple and reproducible Russell Taylor classification was the basis for treatment protocol. We conclude that non slotted nail is a gold standard for treatment of these severe injuries.

SIC04-P21
MEDICO-SOCIAL IMPLICATIONS OF THE OSTEOPOROTIC PROXIMAL HIP FRACTURES

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This work aimed to study medico-social implications of the osteoporotic proximal hip bone fractures and their efficient treatment by various methods. 193 patients with a given trauma and being treated in emergency hospital unit during 1996-2001 were examined. For treating hip bone neck medial fractures, the operational methods (osteosynthesis with screws and one-sided noncement endoprosthesis of the hip joint) were used. For treatment of fractures in the trochanter area, the skeletal traction or osteosynthesis with a bone plate were used. 20% patients of total number died within study time, 87% of whom died during the first year. Among 155 patients, 20 subjects with medial fractures of femoral neck were treated by conservative methods. Of them, 80% were 70-79-year-old subjects, 20% were persons aged 80 and over. The patients treated by an osteosynthesis with screws made 25%. Good results of treatment were found in 42%, satisfactory in 22%, and unsatisfactory in 36% of patients. The group of patients with one-sided noncement hip joint (fracture) endoprosthesis was composed of 44 patients: 16 men (36%) and 28 women (64%). Good results of treatment were found in 37%, satisfactory in 48%, and unsatisfactory in 15%. In conclusion, the findings of the study indicate serious medico-social implications of the osteoporosis and its gravest complications - the proximal hip fractures.

SIC04-P22
THE PREDICTORS FOR ELDERLY HIP FRACTURE PATIENTS TO GO BACK TO THEIR HOME

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Socially and economically, it is advantageous for the elderly hip fracture patients, who were independent for walking before fracture, to discharge to their home. We designed a cross-sectional study to determine the predictors that the elderly inpatients, who could walk without any walking aid before diagnosed hip fracture, can not discharge to their

home. The subjects are the inpatients who were diagnosed with hip fracture at 30 institutions in Nara prefecture in Japan between January 2005 and June 2006. 1,110 clinical records and X-rays were reviewed and 337 cases were extracted from them for this study. The Walking Independence Score (WIS) is defined as the following, Bedridden: 1 pt, Use wheelchairs: 2 pt, Walk with walkers: 3 pt, Walk with one stick or cane: 4 pt, Walk without walking-aid: 5 pt. 82% (n=275) could discharge to home and 18% (n=62) discharged to other hospital or nursing home. Compared with 92.4% of the patients who maintained or decreased 1 point in WIS, only 34% of the patients who decreased 2 points or more could discharge to home. Decrease more than 2 points in The Walking Independence Score, male, fallen indoor, trochanteric fracture and over 75 years old were the predictors for discharging to other hospital or nursing home.

SIC04-P23

WARFARINISED PATIENTS WITH PROXIMAL FEMORAL FRACTURES: SURVEY OF NATIONAL CLINICAL PRACTICE

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INTRODUCTION: In an aging population, anticoagulation in patients presenting with musculoskeletal injuries is increasingly prevalent. Published experience from North America indicates an absence of consensus concerning the most appropriate management for this group. We aim to test the hypothesis that there is also a similar lack of consensus in the UK with regards to the peri-operative management of patients with hip fractures on long-term warfarin therapy. **METHODS:** A representative group of 400 Consultant orthopaedic surgeons were surveyed by postal questionnaire regarding their and their department's policy on the reversal of anticoagulation in warfarinised patients with fractures of the proximal femur. **RESULTS:** There were 159 respondents (40% response rate). Seventy-five per cent of these had a protocol for the reversal of anticoagulation prior to surgery. The commonest method used was to simply withhold warfarin and wait (70%). Other methods included FFP and low or high dose vitamin K. Some respondents used more than one method. Although nearly all respondents preferred an INR <2.0 prior to surgery, only 55% preferred an INR <1.5. **DISCUSSION:** Hip fracture in the presence of long term warfarin use is associated with significantly increased morbidity. This problem is increasing. Our results demonstrate a clear lack of consensus throughout the UK with regards to warfarin reversal pre-operatively and the acceptable INR at which to operate in this group of patients. We propose a more standardised approach and suggest a protocol for the management of warfarinised patients requiring surgery for hip fractures.

SIC04-P24

PROPHYLAXIC ANTIBIOTIC USE FOR THOMPSON'S HEMIARTHROPLASTY

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INTRODUCTION: Infection following hemiarthroplasty for neck of femur fracture has a high mortality. Antibiotic prophylaxis to reduce infection is routine practice. We present a study to assess the impact of a change in antibiotic policy on surgical infection in our department. **METHODS:** Data from the Surgical Site Infection Surveillance Service was prospectively collected. We compared our infection rates for an 18 month period during which a 3 dose regime of cefuroxime was used, with our infection rates using our current practice of single doses of cefuroxime and gentamicin at induction. **RESULTS:** During the initial 18 month period 331 uncemented Thompson's hemiarthroplasties were

undertaken. There were 19 soft tissue infections (5.7%). In the 12 months after the change in regimen 257 hemiarthroplasties were performed. In this group, there were 9 soft tissue infections (3.5%). This difference was not shown to be statistically significant. DISCUSSION: There remains continuing debate as to the most appropriate antibiotic prophylaxis for patients undergoing surgery for hip fracture. Currently up to 20% of the residential/nursing home population are colonised with MRSA. Any antibiotic prophylaxis regimen must provide adequate cover whilst minimising the risk of Clostridium difficile infection which is associated with significant mortality in this group. We changed our own policy to address these issues. Our results demonstrate that a combined dose of cefuroxime and gentamicin at induction is more effective in minimising infection than 3 doses of cefuroxime alone. Although due to the small numbers involved this reduction was not shown to be statistically significant.

SIC04-P25

OUR EXPERIENCE IN THE TREATMENT OF THE FRACTURE OF COLI FEMORIS WITH TOTAL AND SUBTOTAL HIP PROSTHESIS FROM 2004-2006 YEARS

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In the fracture of the hip in elderly we placed the subtotal endoprosthesis, and in the younger the total. Age 40-50: 1 male, total; 50-60: 3 male, total; 60-75: 11 male, 29 female, total; 75-85: 27 male, 48 female, subtotal (bipolar - 8 and OUSTIN-MOORE - 41). During the period of two years, 2004-2006, in our Department of orthopedic and traumatology, we treated 119 hips operated. In 46 of cases we placed total hip prosthesis, LINCK- LUBINUS and Aesculap. Subtotal endoprosthesis are placed 65 from Type AOSTIN-MOORE. And 8 bipolar subtotal endoprosthesis. We used the lateral surgery approach. COMPLICATIONS: •Two luxations in subtotal endoprosthesis. •DVT we observed in 12 patients. •One infection as a complication of treatment. Total hip prostheses. One protrusion of the stem of femur. CONCLUSION: fracture of coli femoris is more frequently happening from 65-80 years of age and more in female. These treatments allow better quality of life.

SIC04-P26

OUTCOME OF OSTEOSYNTHESIS AFTER FEMORAL NECK FRACTURES – AN AGE CORRELATED INVESTIGATION

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INTRODUCTION: For many years osteosyntheses after femoral neck fractures was favoured. New investigations suggest arthroplasty as the method of choice in the elderly. AIMS: We wanted to know if we have similar results in a group younger than 60 compared to older patients. MATERIAL AND METHODS: Between 1.2000 and 9.2005, 238 femoral neck fractures were treated at our hospital. 77 patients had total hip replacement, 71 underwent hemiarthroplasty. 2 patients had an osteotomy as primary treatment and 4 had a dynamic hip screw. The other 84 patients had a minimal invasive screw fixation after closed reduction. We investigated time and duration of operation, comorbidity, complications, trauma and outcome. All fractures were classified. RESULTS: In the 36 patients younger than 60, 2 patients had infections, 2 non-unions, 1 femoral head necrosis and 1 secondary dislocation. In the 48 older patients we found 1 non-union, 3

head-necrosis, 6 secondary dislocations, 1 secondary osteoarthritis and 2 cutting-outs of the screws. Secondary dislocation does not necessarily occur in higher grades of fracture-instability. Femur head necrosis occurred not only in dislocated fractures. After comminute fractures with poor bone- and reduction-quality and in patients with inability to perform none or partial weight-bearing screw-fixation showed the highest rates of failure. But even dislocated and instable fractures could be treated with good results. CONCLUSION: Even in the elderly screw-fixation is a good, safe and reasonable treatment. If a secure reduction and partial weight bearing is not possible arthroplasty is indicated.

SIC04-P27

ENDOPROTHESIS AFTER FEMORAL NECK FRACTURE - EARLY COMPLICATIONS AND MORTALITY

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AIM: Besides osteosynthesis THA and Hemiarthroplasty are therapeutic options for femoral neck fractures. We wanted to know whether morbidity and mortality of arthroplasty are comparable to screw-fixation. METHOD: Between 1.2000 and 12.2006, 148 patients with femoral neck fractures were operated using a prosthesis. 72 were treated with THA (11 cemented, 37 cementless, 24 hybrid) and 76 with hemiarthroplasty. Mean age was 79 years, 116 were female, and 32 were male patients. RESULTS: Patients with hemiarthroplasty were 12 years older, than those with THA (84 against 72 years). Fracture resulted mostly from low-impact trauma. 43 patients suffered from complications. Complications consisted of hematoma, superficial and deep infection, urinary tract infection, aseptic loosening and joint dislocation. 5 patients died after early infection, 1 because of later infection. Highest early-mortality rate occurred in the group of hemiarthroplasty, but lowest morbidity rate was found in this group. CONCLUSION: The necessity for permanent elderly care arose from exacerbation of cardiopulmonary or neurological disorders and the complications after the operation. A main role plays an infection of the prosthesis. In our collective minimal screw osteosynthesis seemed to have less early morbidity and mortality.

SIC04-P28

THE OUTCOME OF OPERATIVE TREATMENT FOR PELVIC FRACTURES

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INTRODUCTION: The rising number of high-speed vehicular accidents has resulted in an increasing incidence of polytraumatized often with severe concomitant pelvic injuries. OBJECTIVES: 1) To study the pattern of pelvic fractures. 2) To analyse the common causes of pelvic fractures. 3) To study the functional outcome of operative treatment in pelvic fractures. METHODOLOGY: This is a retrospective study, using a combination of case notes and radiographic review plus current clinical assessment, of patients with pelvic fractures who underwent surgical treatment in Hospital Tengku Ampuan Afzan Kuantan, Pahang, Malaysia from 2000 to 2006. Inclusion criteria: Our subjects are patients who had undergone surgical treatment of pelvic fractures from 2000 to 2006 at HTAA with complete clinical notes (notes and X-ray). Exclusion criteria: All the patients with pelvic fractures who received conservative treatment are excluded from our study. RESULTS: 80 patients admitted for pelvic fractures were reviewed. 40 cases were operated with open reduction and internal fixation. DISCUSSION: Good and excellent

results were achieved in 38 cases, 1 case had a fair result and 1 case was noted as having Avascular necrosis of the head of femur. Open reduction and internal fixation had a significantly higher functional outcome score.

SIC04-P29

PRIMARY VALGUS REPOSITIONING OSTEOTOMY IN FEMORAL NECK FRACTURES IN ADULTS

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BACKGROUND: Nonunion occurs due to shear forces in vertical fractures of the neck of the femur. Valgus reduction alone may not be sufficient for improvement of the mechanics and the shear forces continue to act leading to loss of reduction and nonunion. **PATIENTS AND METHODS:** Twelve adult patients with recent vertical femoral neck fractures were included in this prospective clinical study. Age ranged between 20 to 48 years. All patients were operated upon within the first week after injury. All patients were assessed preoperatively and a decision of valgus osteotomy was made when Pawl's angle is more than 50 degrees. Preoperative planning was done in all patients. Closed reduction of the fracture and temporary fixation with multiple guide wires was done before the subtrochanteric osteotomy. The subtrochanteric osteotomy was done to convert the shear forces to compression force with Pawl's angle 25 degrees. Repositioning osteotomy plate, an angled blade plate, was used for fixation of the femoral neck fracture and the subtrochanteric osteotomy. Follow-up was continued till fracture union and full weight bearing. **RESULTS:** All fractures were united with full weight bearing. Average time to union was 12 weeks. The osteotomy was healed in all patients. Penetration of posterior cortex of the neck by the blade of the implant occurred once. During follow-up period (ranged from 6 to 48 months) we did not report a case of avascular necrosis up till now. **CONCLUSION:** Primary valgus repositioning osteotomy in femoral neck fractures is a useful but technically demanding procedure.

SIC04-P30

VARUS DEFORMITY OF THE PROXIMAL FEMUR - BIOMECHANICAL PROBLEM AND SOLVING BY FIXAS

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INTRODUCTION: Post-traumatic deformity of hip joint with extremity shortening is also often a consequence of insufficient treatment especially with unstable fractures. This is especially often a problem with heavy war injuries, always followed by bone defects. Primary thing is fight for life of organism and extremity, and the fracture is regularly healing by lessening of the CCD angle and extremity shortening (over 5 cm). **METHODS:** We were successfully using Ilizarov's C-D method despite poor comfort of apparatus, especially with bed patients. The last 15 years we've been using our own fixator construction, FixAS (anatomical stable and accommodation successful treatment). Simultaneous solution for both problems is provided by FixAS device. Apparatus application and corticotomy were always performed without opening (closed prosidge), and fixation of small proximal fragment with X-rays control. Post-operatively, first, a correction deformity is performed, and then prolongation up to full length. **RESULTS:** We have been treating 41 cases, average age of 37 years (19 to 58), 35 male and 2 female, with average angle of 105° (75° to 115°), and average shortening of 5.5 cm (3 to 8 cm). In all these cases, after treatment the angle has been reduced up to 120° and more, and shortening corrected fully and controlled during the treatment by a metal meter. This fully

satisfies the principle minimum metal, maximum stability and comfort.

SIC04-P31

SLIPPED CAPITAL FEMORAL EPIPHYSIS MANAGEMENT AND SEQUALE

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The objective of this study was to evaluate treatment outcomes and complications. MATERIALS AND METHODS: During the period 1995 till 2004, we retrospectively and prospectively reviewed the records of fourteen patients (twenty-eight hips). Eighteen (18) hips were operated at orthopaedic department at Aljalla Hospital. RESULTS: Peak patient age was 13 (range 10-16) years, of the 18 hips treated with in situ fixation, 11 hips rated normal with full range of motion, and, of these, 10 were mild and one with moderate slipping. Of these 11 hips, five hips fixed with one Asnis screw, four hips fixed with one AO non-cannulated screw, one hip fixed with two AO non-cannulated screws and one hip fixed with 3 Knowles pins. Penetration of Knowles pins reported in one hip with moderate slipping Chondrolysis reported in three hips (16.6%). Two hips with mild and moderate slipping fixed by one Asnis screw developed after 6-7 months. One hip with moderate slipping fixed by two AO screws developed after 6-8 months. Avascular necrosis developed in two hips 11.1% one hip with mild slipping in which the hip was fixed by one cancellous non-cannulated AO screw and the other hip with sever slipping was fixed by one cancellous non-cannulated AO screws. Early removal of the implants done in two patients (two hips) 11% between 3-8 months due to Avscular necrosis and chondrolysis. Broken implant reported in two hips 11%.

SIC04-P32

TREATMENT OF INTER AND SUBTROCHANTERIC FRACTURES WITH EXPANDABLE INTRAMEDULAR NAIL - OF TYPE FIXION - SHORT TERM RESULTS

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AIM: Evaluation of short term results from the use of expandable intramedular nail - type Fixion for the treatment of inter and subtrochanteric hip fractures. MATERIAL - METHOD: 11 men and 25 women were treated with expandable intramedular nail. Their mean age was 78.3 years and the follow-up was over six months. The results were evaluated postoperatively using the Functional Independence Measure Scale (F.I.M) and the Karlstom and Olerud criteria. We evaluated the pain with the Visual Analogue Scale, the technique of placing, the need of transfusion, the days of hospitalisation and the time to bone union, as well. RESULTS: The mean time of surgery, the mean fluoroscopy and hospitalization time were 32.95 minutes, 40.7 sec and 6.7 days, respectively. 13 patients were transfused with 1.14 blood units on average. 6 months postoperatively the pain according to the V.A.S. was on average 0.14 and the motion and cognitive function according to the F.I.M .was 74.85 and 34.28 on average respectively. According to the Karlstom and Olerud criteria there were 17 patients with excellent, 11 with well, 6 with acceptable and 2 with poor results. The union of the fractures was between 2 and 3 months. Two patients died during the first month postoperatively and two others developed superficial wound infection. CONCLUSIONS: The expandable intramedular nail reduces the time of surgery and can be easily placed technically. It is a reliable choice for the treatment of inter- and subtrochanteric hip fractures and the patients have a good postoperative progress.

SIC04-P33

OUR EXPERIENCES IN THE TREATMENT OF TROCHANTERIC FRACTURES - DECISION MAKING, AFTERTREATMENT - ANALYSIS OF 334 CASES

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The strategy of the trochanteric fractures treatment is presented. Between 1997 and 2003 there were 334 patients with trochanteric fractures treated in the Orthopaedics and Trauma Clinic Collegium Medicum Jagiellonian University Cracow Poland. The average age was 75.7 (21-98 years old). There were 2.7 times more females than males in this group. In the decision making process the following factors were considered: age, general state of health, type of fracture according to AO CCF. About 50% of patients were operated ahead of 12 hours since the injury. The delayed surgery was usually caused by general state of health. In such cases patients were immobilized on direct traction. In all cases standard antithrombotic prophylaxis with low-molecule heparines was introduced as well as standard antibiotics prophylaxis. The following types of fixation were used in presented group of patients: blade plate, DHS, DHS with trochanteric plate, DCS, intramedullary nails of 2nd generation with modular system of proximal locking and PFN. Choice of implant was based on type of fracture and its biomechanics. The aim of the treatment was restoration of supporting function of lower extremity. Programme of rehabilitation was introduced in second day after surgery. It was matched individually depending on general state of health and patients cooperation. The main points of this programme was bringing patient to vertical position, teaching of walking with partial or without weight bearing. Analysis of presented group of patients confirmed the usefulness of intramedullary implants in unstable peritrochanteric fractures and effectiveness of DHS in stable fractures.

SIC04-P34

SHORT TERM OUTCOME OF SUBTROCHANTERIC FRACTURES TREATED WITH THE NEW SYNTHES PROXIMAL FEMORAL NAIL ANTIROTATION (PFNA)

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INTRODUCTION: The PFNA device was developed to address problems of rotational instability in proximal femoral fractures whilst simultaneously employing a single femoral neck element. The PFNA makes use of a helical blade that compresses rather than destroys osteopaenic cancellous bone. **STUDY DESIGN:** Prospective cohort. **METHODS:** All subtrochanteric fractures admitted to the department were treated with the PFNA (AO 31A3). Demographic and clinical data during admission was recorded and formal post-operative X-rays performed. **OUTCOME MEASURES:** 4-month follow-up appointment with clinical and radiological assessments, VAS, SF36, Jensen Social Function Score and Parker Mobility Score. **RESULTS:** From April to December 2006, 46 patients were included in the study. 4-month follow-up has been completed in 17 of 23 patients. The average age was 78. 11 short and 7 long nails were inserted. Four patients required open reduction and internal fixation. There were no significant intra-operative or immediate postoperative complications. 1 short nail fractured through the site of the distal locking bolt during the follow-up period and required revision. At follow-up, all fractures had united and only 2 patients regained their pre-operative mobility status. The mobility and social function scores were significantly reduced at follow-up compared to pre-operative status ($p=0.003$ and $p=0.001$ respectively). All domains of SF36 were low compared to

normative data. The mean VAS was 3/10. CONCLUSIONS: Patients with subtrochanteric fractures do not return to pre-fracture function at 4 months post injury. The PFNA appears to work well although there may be concern about bone hold of the distal locking bolts.

SIC05-P01

POSTOPERATIVE COMPLICATIONS OF T-SAW LAMINOPLASTY

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INTRODUCTION: T-saw laminoplasty has been reported to be a safe and easy technique for managing cervical myelopathy and has a low rate of complications. This study further investigated the safety of T-saw laminoplasty. METHODS: Postoperative complications in 124 consecutive patients with cervical myelopathy undergoing T-saw laminoplasty between October 2000 and December 2006 were retrospectively examined. There were 88 men and 36 women with an average age of 66 years (range, 35 - 89 years). Pathogenesis of myelopathy was cervical spondylosis in 78 patients, ossification of the posterior longitudinal ligament in 35, and cervical disc herniation in 11. Average preoperative scores of the Japanese Orthopaedic Association scoring system was 9.7 points (range, -2.0 - 16.5). RESULTS: The incidence of postoperative complications was 13.7%. Of these, surgical complications occurred in 9.6% of the patients, and involved cerebrospinal fluid leakage in seven patients (5.6%), muscle weakness in four (3.2%), and deep infection in one (0.8%). Delirium occurred in two (1.6%), and aspiration pneumonia, drug-associated enterocolitis, and ileal necrosis occurred in one patient (0.8%) each. All patients except one recovered with appropriate treatment. However, the patient with ileal necrosis, who received hemodialysis, died three days postoperatively. DISCUSSION: Some papers reported there were no postoperative complications in patients undergoing T-saw laminoplasty. In our series, the incidence of postoperative complications was not low. We concur that this technique is easier; however, we do not consider it safer than other laminoplasty techniques.

SIC05-P02

COMPARISON OF SURGICAL RESULTS BETWEEN KUROKAWA'S PROCEDURE AND SPINOUS PROCESS-SPLITTING CERVICAL LAMINOPLASTY WITH PRESERVATION OF POSTERIOR ELEMENTS

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INTRODUCTION: Kurokawa's procedure is spinous process-splitting laminoplasty for cervical myelopathy and associated with a satisfactory clinical outcome. However, excessive loss of cervical lordosis often occurred. METHODS: A total of 31 patients were treated with Kurokawa's procedure until February 2005. From March 2005 another 28 patients were operated using our technique which consisted in preservation of posterior elements. Our procedure enables us to preserve the C2 insertion of semispinalis cervicis and re-attachment of spinous process and extensor musculature from C3 to C7. Patients were clinically evaluated using the Japanese Orthopaedic Association (JOA) scoring system for cervical myelopathy and postoperative axial pain. Radiological evaluation of cervical alignment and cervical range of motion (the difference between lordotic angle at maximum extension and at maximum flexion) performed pre and postoperatively. RESULTS: The mean follow-up period was 36 and 8 months, respectively for Kurokawa's and our procedure. Although, there were not significant differences between Kurokawa's and our procedure when comparing the recovery rate through the JOA score, the decreasing rate of cervical range of motion, and the rate of postoperative axial pain.

However, the average postoperative lordotic angle increased 1.8 degrees in our procedure while in Kurokawa's procedure it decreased 4.1 degrees, respectively. CONCLUSION: Preservation of the C2 insertion of semispinalis cervicis as dynamic stabilizer and posterior ligamentous complex as static stabilizer in our procedure, lead to an effective cervical alignment.

SIC05-P03

EVALUATION OF PROGNOSTIC FACTOR AND CLINICAL OUTCOME IN ELDERLY PATIENTS IN WHOM EXPANSIVE LAMINOPLASTY WAS PERFORMED FOR CERVICAL MYELOPATHY

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PURPOSE: The purposes of this study are to evaluate the efficacy of expansive laminoplasty in elderly patients with cervical myelopathy and to analyze the effect of preoperative prognostic factors on outcome. METHODS: Sixty patients who underwent spinous process-splitting laminoplasty were investigated. The patients were divided into two groups of 30 elderly patients older than 70 years old and 30 younger patients less than 70 years old. Patients were clinically evaluated using the Japanese Orthopaedic Association (JOA) scoring system for cervical myelopathy. RESULTS: There was no significant difference in the recovery score (the difference between post and preoperative JOA score) between elderly and younger groups. There were not significant differences between the patients with lumbar canal stenosis (20 patients) and without it (10 patients), between the patients with osteoarthritis of the knee (12 patients) and without it (18 patients) when comparing the recovery score of motor function of lower extremity in elderly patients. However, both the duration of symptoms and the severity of canal stenosis significantly affected the clinical outcome in elderly patients. CONCLUSION: Surgical decompression for cervical myelopathy was beneficial even in elderly patients. Significant predictive factors for clinical outcome in the elderly patients were the duration of symptoms and the severity of stenosis, which may involve the static factor causing the cervical myelopathy. To improve the elderly patients' disability, surgery must be performed as early as possible before irreversible changes in the spinal cord develop.

SIC05-P04

POSTERIOR SHIFT OF THE SPINAL CORD AFTER SPINOUS PROCESS-SPLITTING CERVICAL LAMINOPLASTY

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PURPOSE: The purpose of this study is to investigate the posterior shift of the spinal cord (PSS) after cervical laminoplasty to clarify the indication of posterior cervical enlargement for extensive ossification of the posterior longitudinal ligament (OPLL). METHODS: We performed spinous process-splitting laminoplasty in 60 patients with cervical myelopathy. PSS was the average between from C3 to C7 at inferior edge of vertebral body measured by magnetic resonance imaging. The relationships between PSS and clinical result, PSS and cervical alignment were analyzed, respectively. The clinical result was recorded by the Japanese Orthopaedic Association (JOA) scoring system. All patients were divided into three groups by cervical alignment. Lordotic group (23 patients) was more than 10 degrees of lordotic angle, neutral group (24 patients) was less than 10 degrees of lordotic angle and less than 5 degrees of kyphotic angle, and kyphotic group (13 patients) was more than 5 degrees of kyphotic angle. RESULTS: There was no correlation between PSS and the recovery rate of JOA score. The average PSS was 3.2 mm in lordotic group

and 3.2 mm in neutral group. However, the average PSS in kyphotic group was 1.6 mm and statistically decreased compared to other groups. **CONCLUSION:** In the case of OPLL with lordotic or neutral cervical alignment and less than 3 mm compression of spinal cord, posterior cervical enlargement is indicated. In the case of OPLL with kyphotic cervical alignment and more than 1.5 mm compression of spinal cord, anterior operative procedure is indicated.

SIC05-P05

DEEP VEIN THROMBOSIS IN MAY-THURNER SYNDROME PATIENT AFTER OPERATIVE TREATMENT OF ACUTE CAUDA EQUINA SYNDROME

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May-Thurner syndrome, compression of left common iliac vein by right common iliac artery, or intimal hypertrophy of the vein resulting from chronic pulsatile force of right common iliac artery, may result in deep vein thrombosis on left lower extremity. We have experienced a patient who had deep vein thrombosis caused by May-Thurner syndrome, and showed post operative fever, pain and tenderness over left leg in severe lumbar disc herniation with acute cauda equina syndrome. This syndrome should be considered as one of causes of deep vein thrombosis in spine patients.

SIC05-P06

DEGENERATIVE SCOLIOSIS, RESULT OF SURGICAL TREATMENT

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This is an analysis of 62 cases of degenerative lumbar scoliosis that underwent surgical treatment during 1995-2004. The surgical procedure included decompression of the central and lateral canals involved, postero-lateral fusion and pedicle fixation. Fifty-four cases were available for follow-up longer than 2 years. They consisted of 44 females and 10 males. The Oswestry index improved from 55(+/-18.8) to 35(+/-17.7). The most common levels of fusion were L2-L5 and T12-L5. The significant factors that influenced long term result were post-op postural balance and associated Parkinsonism.

SIC05-P07

POSTOPERATIVE RADIOGRAPHICAL CHANGES FOLLOWING POSTERIOR LUMBAR INTERBODY FUSION USING THREADED CYLINDRICAL CAGES PACKED LOCAL BONE GRAFT AND PEDICLE SCREWS

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INTRODUCTION: In order to alleviate bone donor site pain, two threaded cylindrical cages (TCCs) packed with local bone graft have been used per intervertebral space in PLIF. Postoperative radiography shows new bone formation around implants without bone grafting, strong fusion and changes in adjacent levels. **METHODS:** PLIF was performed using TCCs on 62 patients who were periodically followed for 3 years. Subjects were examined at 3, 6 and 9 months after surgery for the first year and every 6 months thereafter. Peri-implant new bone formation (PINBF) was classified into 4 groups: Group A, crosslinking on both anterior and posterior sides of the implant; Group B, crosslinking only on posterior side of the implant; Group C, no crosslinking, but no peri-implant radiolucency, and no instability apparent on kymography; and Group D, peri-

implant radiolucency, and instability apparent on kymography. RESULTS: PINBF breakdown was as follows: Group A, n=19; Group B, n=41; Group C, n=2; and Group D, n=0. Bone fusion was achieved in all patients. For Groups A and B, crosslinking was first observed at a mean of 16 months after surgery. Both percentage slip and slip angle improved, and intervertebral alignment achieved by surgery was maintained. Intervertebral narrowing in adjacent levels was seen in 32 patients, spondylolisthesis in 15 patients. Reoperation was performed on 2 patients with spondylolisthesis of the adjacent level. CONCLUSIONS: The present study clarified that, in PLIF, if strong fixation can be achieved using pedicle screws, sufficient bone fusion can be achieved using TCC bone grafting alone.

SIC05-P08

CLINICAL OUTCOMES FOLLOWING LUMBAR TOTAL DISC REPLACEMENT USING PRO-DISC II: A PROSPECTIVE STUDY WITH A 2-YEAR MINIMUM FOLLOW-UP

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This study evaluates the clinical outcomes following lumbar total disc replacement in the surgical management of degenerative disc disease. To our knowledge, this is the largest prospective series of total disc replacement using prodisc in the U.K. 37 consecutive patients meeting inclusion criteria were evaluated prospectively according to the Oswestry Disability Index(ODI), Visual Pain Analogue Score(VAS), and the SF-36 Health questionnaire. At a minimum of 2-year follow-up, our results show a significant reduction in ODI and VAS scores ($p<0.001$). We also found an improvement in functional outcome as assessed by the SF-36. Our excellent clinical and functional outcomes are comparable with those of international studies and supports total disc replacement as a valid option in the treatment of degenerative disc disease.

SIC05-P09

COMPLEMENTARY TREATMENT FOR DISCAL LUMBAR HERNIA WITH INTERESPINOUS LIGAMENOTPLASTY

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SUMMARY: To evaluate the postsurgical evolution of the patients submitted to lumbar disectomy and interspinous and supraspinous ligamentoplasty with synthetic ligament of polyester Dallos type, based on the evidence that the lumbar discal hernia is mainly secondary to mechanical instability which increases by realizing posterior disectomy. We included patients surgically intervened at the Hospital General Pachuca from the Secretaria de Salud in a period from July 2000 to June 2006 in which it was corroborated the diagnosis, clinical by magnetic resonance image and electromyography; by X-rays we proved segmental lumbar mechanical instability and in the postsurgical the transnational mobility and by MRI the evolutive characteristics. We performed a study of 35 patients with discal hernia between L4-L5 and L5-S1, up to 3 years, proving by the dynamic postsurgical at 6 and 12 months in 3 years, and by 3 years of postsurgical by MRI with rehydratation images at the surgical intervened disc and decrease of lumbalgia. CONCLUSIONS: There is a decrease of the abnormal range of motion of the affected segment, adequate healing in the disc-ligament zone, which has limited the loss of intersomatic height. And by it better clinical evolution, which is a technique necessary to avoid complications decreasing the referred parameters.

SIC05-P10**DEGENERATIVE DISEASE OF CERVICAL SPINE**

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BACKGROUND: Degenerative disorders in the spine often affect the economically active population with repercussions in world productivity. MRI defines the diagnosis easily with high specificity allowing the most adequate treatment to be initiated. **METHODS:** Prospective study of 100 patients having MRI imaging of cervical spine during a 24-month period. Plain sequences (T1 and T2) were used on axial and sagittal in all cases with MR equipment (1,5 tesla), evaluating the degenerative modification of the cervical region. **RESULTS:** The mean age was 40 years; all patients have a neck pain, radiculopathie in 45%, tetra paresis in 25% and tetra plegia in 10%. MRI showed as a primary diagnosis desydratation disc in 70%, intervertebral spondylosis associated with posterior osteophytes in 70%, disk herniation in 60%, disk protrusion in 40%, cord compression in 60% associated with spinal cord oedema in 20%. Canal stenosis was observed in 40%, foraminal stenosis in 30%. Most of the radiological finding was located in the vertebral segments C4-C5, C5-C6 and C6-C7. **CONCLUSION:** Diagnostic value of MRT in the study of degenerative cervical spine disease offers reliable evaluation with high sensitivity and specificity, in order to make appropriate therapeutic decisions.

SIC05-P11**VERIFICATION OF TWO FUSION METHODS FOR DEGENERATIVE SPONDYLOLISTHESIS**

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OBJECT: As the operative management of patients with degenerative spondylolisthesis, we have performed arthrodesis alone and arthrodesis combined with instrumentation in addition to decompression. The purpose of this observational study is to clarify the results of two operation techniques and to evaluate our decision on how to use the spinal instrument. **MATERIALS AND METHODS:** Twenty-five cases were included in this study from 1997 to 2005. We have performed laminectomy + posterolateral fusion (no instrumentation) in the case without instability (PLF group), or laminectomy + pedicle screw fixation in the case with instability (PS group). Clinical results were evaluated by the JOA score and recovery ratio. Radiological measurements were also evaluated. **RESULTS:** Concerning X-ray measurements, decrease of the cranial adjacent disk height and increase of the L2-5 lordosis are significant in the PLF group at the follow-up. In the PS group, there is significant increase of flexion-extension gap of %slip at the cranial adjacent level. There is not a significant difference in all X-ray measurements and clinical data between the two groups. **DISCUSSION:** In the X-ray, it showed that the progression of intervertebral degeneration at the adjacent vertebral level in both groups. However, there is not a significant difference between the groups. We cannot find any evidence to change the decision threshold to use spinal instrumentation. **CONCLUSION:** It is not necessary for us to change the present decision method to use spinal instrumentation for lumbar degenerative listhesis.

SIC05-P12**ASSESSMENT OF THE LEARNING CURVE FOR PERCUTANEOUS ENDOSCOPIC LUMBAR DISCECTOMY (PELD): FORTY-SIX CONSECUTIVE CASES**

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Open discectomy for lumbar disc herniation has been a standard surgical treatment. With the development of newer endoscopic instruments and techniques, targeted fragmentectomy by percutaneous endoscopic procedure has evolved, and the favourable outcome of percutaneous endoscopic lumbar discectomy (PELD) compared with conventional open discectomy has published. A learning curve is associated with the development of any new surgical technique. The learning curve for PELD has not been described. **PURPOSE:** To define the learning curve of PELD via the posterolateral foraminal port. **MATERIALS AND METHODS:** 46 consecutive cases of PELD via posterolateral foraminal port by one surgeon for the treatment of lumbar disc herniation were reviewed. The patients were, on average, 34 ± 10 years old. There were 44 cases of disc herniation within the canal, and 2 cases of extracanalicular herniation. The time required to perform the procedure and the complications related to PELD were analyzed. **RESULTS:** The average operative time for the PELD was 69 ± 27 minutes (range, 30-150 minutes). The first 23 cases took 78 ± 29 minutes (range, 45-150 minutes), and the next 23 cases took 59 ± 21 minutes (range, 30-100 minutes). Complications occurred in six cases, including conversion to open procedure ($n=2$), dysesthesia of exiting root ($n=1$), retroperitoneal hematoma ($n=1$), and recurrent herniation ($n=2$). Four complications occurred during the first 23 cases and two complications during the next 23 cases. **CONCLUSION:** The learning curve for PELD via the posterolateral foraminal port is substantial, but not prohibitive. The PELD provides a safe and effective alternative to open discectomy in the treatment of lumbar disc herniation.

SIC05-P13

INDICATIONS FOR FULL PROSTHETIC DISC ARTHROPLASTY

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In this prospective study, a total of 134 prosthetic discs were replaced in 108 patients undergoing total disc replacement surgeries for lumbar degenerative disc disease. It was the aim of this study to correlate the clinical findings and the outcome of our patients treated with prosthetic disc for various indications and to formulate an indication criteria for disc replacement surgeries. The discs were implanted at L5/S1 in 61 patients, L5/L6 in 3 patients, L4/L5 in 31 patients, and L2/L3 in 3 patients. There were 12 patients with 2 level implantations: from L4 to S1 in 11 patients and 1 patient from L2 to L5. Two patients also had 3 level implantations. Follow-up evaluation included plain radiographs, physical evaluations using Oswestry scale, Visual Analog pain scale and the SF-32 well being questionnaire. The evaluation exercise showed 90.8% of the patients had excellent results, 7.4% had good results and 1.8% had fair results. Post operatively the average vertebral motion was increased in all patients at the operated level. Progression of disc degeneration at the adjacent level was noted in 10 patients. The average time to assume activities of daily living non aided was 2.3 weeks. No implant failure or complications due to surgery were encountered in this series. Total Disc Replacement for degenerative disc disease was found to be a good treatment modality, provided proper patient selection and criteria are adhered to. We were able to formulate an indication criteria based on this.

SIC05-P14

INTRADURAL DISC EXTRUSION WITH DIASTEMATOMYELIA

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This is a report on a 33-year-old patient with tethered cord syndrome and diastematomyelia who recently suffered severe neurological deterioration due to an L2-3 disc prolapse. Release of the tethered cord was done in the sacral area. A bilateral L2-3 TLIF failed to free the cord. By gentle finger palpation, an indurated mass was felt inside the dura in the area of the split cord. A decision was made to open the dura, which immediately revealed a very large disc sequestrum incarcerated between the 2 hemicords, which was successfully excised. The cord became free immediately afterwards. Postoperatively, the patient suffered some weakness in both lower limbs, which gradually improved in the following weeks. Diastematomyelia is a rare condition that usually presents during the childhood period with neurological manifestations. There are scattered reports of intradural disc prolapse. The author is not aware of any similar reported case combining these two rare occasions.

SIC05-P15

THE CROSS-SECTIONAL AREA OF PSOAS MAJOR MUSCLE IS ASSOCIATED WITH THE PREVALENCE OF LOW BACK PAIN

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OBJECTIVE: The aim of this study is to investigate whether the prevalence of low back pain (LBP) is associated with the cross-sectional surface area (CSA) of psoas major muscle (PM), lumbar paravertebral muscles (LPVM), visceral fat (VF) or subcutaneous fat (SF). **METHOD:** Subjects were 5,039 employees (4,267 men and 732 women aged 25-75, mean 53.1 years) who had an annual health check up in 2004. The CSA of those muscles on the umbilical level (L4 - L4/5 level) was measured by computed tomography. A self-administered questionnaire was conducted at the time of examination. **RESULTS:** The prevalence of LBP in men and women in the past one month were 39% and 41.7%. The subjects of smaller CSA of PM (under the mean value at each decade) showed significantly higher prevalence of LBP than larger ones (41.4%, 35.8%, respectively, $P < 0.0001$) but not the CSA of others. Interestingly, in the subjects over 100 cm² of the VF area categorized into metabolic syndrome, the subjects of smaller PM area showed significantly higher prevalence of LBP than larger ones (43.4%, 36.6% respectively, $P < 0.001$), but not in the subjects under 100 cm² of the VF area. Furthermore, Logistic regression analysis demonstrated that age, sex, height, body weight and PM (OR: 1.41, 95%CI: 1.24 to 1.60) were significant related to the prevalence of LBP but not the CSA of others. **CONCLUSIONS:** The CSA of psoas major muscle is significantly associated with the prevalence of low back pain, especially for the obese subjects.

SIC05-P16

THREE-DIMENSIONAL LUMBAR SPINAL KINEMATICS IN NON-SPECIFIC LOW BACK PAIN

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PURPOSE: To investigate the three dimensional movements of the lumbar spine in subject groups with different degrees of functional impairment. **MATERIALS AND METHODS:** Lumbar spinal kinematics of 60 participants with non-specific low back pain (NSLBP) and 40 healthy subjects were assessed by an ultrasonic movement analysis

device (Zebris CMS-HS). Patients with NSLBP were grouped in three cohorts according to their functional impairment previously assessed by the Oswestry Disability Index (ODI). Minimal disability (ODI: 0-20%) was found in 22 cases, moderate disability (ODI: 20-40%) in 22 cases and severe disability (ODI: 40-60%) in 16 cases. Each individual was examined in upright position for static parameters and performed flexion-extension, right and left lateral bending and right and left axial rotation movements. The parameters considered included lumbar lordosis, sacral angle, range of motion (ROM) and angular velocity. For statistical analysis Student's t tests was applied. RESULTS: No significant differences could be observed between the healthy individuals and low back pain groups in terms of static parameters ($p>0.05$). On the contrary, dynamic parameters in all directions has proved to be significantly lesser in the groups of NSLBP patients compared to healthy individuals ($p<0.05$). No significant differences of the measured static and dynamic parameters could be observed between the low back pain groups with different degrees of functional impairment ($p>0.05$). CONCLUSION: It would appear that there is no evidence for a relationship between low back ROM and functional impairment in the homogenous group of low back pain patients. (This study was supported by OTKA-T046800).

SIC05-P17

MOTION CHARACTERISTICS OF THE LUMBAR SPINE IN PATIENTS WITH CHRONIC LOW BACK PAIN

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PURPOSE: To investigate the effect of different spinal pathologies on the three-dimensional kinematics of the lumbar spine in subject groups of low back pain. MATERIALS AND METHODS: Lumbar spinal kinematics of 80 participants with chronic low back pain (CLBP) was investigated and the data compared with a database of 40 healthy subjects by an ultrasonic movement analysis device (Zebris CMS-HS). Patients suffering from LBP caused by different spinal pathology were selected and grouped in four cohorts. Non-specific back pain were present in 20, degenerative disc disease in 24, spondylolisthesis in 15 and spinal stenosis in 21 cases. Each individual performed flexion-extension, right and left lateral bending and right and left axial rotation movements. The parameters considered included lumbar range of motion (ROM) and angular velocity. For statistical analysis Student's t tests, analysis of variance (ANOVA) and multiple regression analysis were used. RESULTS: On the basis of statistical analysis significant differences could be observed between the healthy individuals and low back pain groups in terms of ROM and angular velocity in all directions. Patients with spondylolisthesis demonstrated significantly greater value of flexion and patients with spinal stenosis showed significantly lesser values in each plane of motion ($p<0.05$). No statistical difference could be observed between the diagnostic groups in their velocity characteristics. CONCLUSION: Dynamic motion characteristics differ between healthy individuals and those with chronic low back impairment. ROM appears to be a more sensitive parameter than velocity in detecting differences between groups. (This study was supported by OTKA-T046800).

SIC05-P18

UNILATERAL VERSUS BILATERAL TLIF

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The clinical and radiological outcome of 10 patients who were operated upon by unilateral TLIF was compared to a similar cohort operated upon by the same surgeon using a bilateral TLIF and tricortical iliac grafts. Difficulty in fusion bed preparation and the amount of graft that could be used was observed. The operative time was not significantly shorter. The VAS score for back and leg pain in the unilateral group was significantly lower in the unilateral TLIF group as well as the fusion rate.

SIC05-P19

EFFICACY OF LUMBAR MRI INCLUDING CERVICAL AND THORACIC SAGITTAL IMAGES

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PURPOSE: We performed lumbar MRI including cervical & thoracic parts to the patients who seem to have supralumbar lesion by symptoms and physical examination that was to be performed lumbar MRI for diagnosis of lumbar lesion to examine extralumbar lesion incidence rate, diagnostic usefulness and economical efficiency. **MATERIAL AND METHOD:** From 2001 October until 2005 December, our institution analyzed 147 cases which lumbar MRI including cervical & thoracic parts was performed to identify supralumbar lesion. Less than 60 years old were 49 cases (group 1) and over 60 years old 98 cases (group 2). Lumbar MRI for the detection of lumbar lesion was photographed sagittally and axially by T1, T2 enhanced image, and patients who seemed to have supralumbar lesion we added T2 sagittal image from brain stem to 10th thoracic vertebra. By this method we analyzed the type and incidence of supralumbar lesion and the usefulness of extended lumbar MRI. **RESULTS:** Among 147 cases performed cervicothoracic sagittal MRI to identify lesion of superior lumbar spine, 6 cases (12.2%) in group 1 and 14 cases (14.3%) in group 2 had herniation of intervertebral disk, 11 (22.4%) in group 1 and 39 (39.8%) in group 2 had spinal canal stenosis. Spinal canal stenosis significantly increased in group 2 ($P < 0.05$). **CONCLUSION:** In patients who suspicious to accompany with lesion of superior lumbar spine in symptom and physical examination, especially in above 6th decade, including cervical and thoracic spine imaging when request lumbar spinal MRI is valuable.

SIC06-P01

ANGIOGRAPHIC EVALUATION OF SPINAL BLOOD CIRCULATION BEFORE AND AFTER RECONSTRUCTIVE MICROSURGICAL OPERATIONS ON SPINAL CORD IN ITS TRAUMATIC DISEASE

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PURPOSE OF STUDY: Examination and control of spinal blood circulation before and after reconstructive operations on the spinal cord in its traumatic disease. **MATERIALS AND METHODS:** Spinal angiography was performed in 124 patients with traumatic spinal cord disease. In 26 out of all patients examination was performed before and after reconstructive surgery. Angiographic catheters Cobra of various flexure and diameter 4 – 5F (Mallinckrodt, COOK, Terumo) were used. 100 ml of contrast matter Visipac 320 were injected to every patient. Examinations were performed using angiographic complex TOSHIBA CAS-8000V. **RESULTS:** Angiographic picture of afferent arteries and vascular bed in the zone of injured spinal cord (SC) was achieved in all patients. System of anterior spinal artery (ASA) was unchanged at the level of SC injury in 7 patients (26%). ASA was deformed at the level of SC injury in 7 patients (26%). In 5 patients (17%) ASA

occlusion at the SC injury level was observed. In 9 patients (13%) ASA in the zone of injury was not detected. Results of postoperative spinal angiography showed positive angiographic dynamics manifested by the increase of ASA system diameter and length in the zone of injury as well as qualitative improvement of its structure presented by blood flow centralization and decrease in collaterals' number. No complications resulted from angiographic examination were observed. CONCLUSIONS: Spinal angiography is a reliable and precise method for the control of spinal cord blood circulation. It demonstrates physiologic grounding of reconstructive microsurgical operations in patients with traumatic spinal cord disease.

SIC06-P02

COMBINED POSTERIOR AND ANTERIOR SURGERY FOR FRACTURES OF THE THORACOLUMBAR SPINE WITH INCOMPLETE NEUROLOGICAL DEFICIT

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The selection of surgical approach for thoracolumbar fractures (TLF) with incomplete neurological deficit (IND) is presently imbued with great controversy. No ideal anterior spine fixation system exists. There are several stable posterior fixation systems, but anterior spine surgery has role in the neurological recovery. The purpose of this study is to present our experience with the combined surgical approach for TLF with IND. MATERIAL AND METHODS: Between 1990 and 2005, 94 TLF with IND and anterior canal compromise were surgically treated with combined approach. Posterior fixation was done first, followed by anterior surgery (decompression and application of bone graft). In several patients (neglected spine fractures) the anterior surgery was done before posterior fixation. Neurological status before surgery and at follow-up was evaluated by modified Frankel Grading System (MFGS) and ASIA motor score. MFGS on admission was: grade B-26, C-34, D1-19, D2-15. ASIA score ranged from 52 to 96. Age, sex, type of fracture and mechanism of injury was analyzed. The average follow-up was 20 months (range 9-65 months). RESULTS: Neurological improvement at the last follow-up was: average MFGS improvement 2 grades (range 1,5-2,8); average ASIA motor improvement 16 (range 7,4-24,4). All fractures healed with solid fusion, except 2 with failure of the implant and additional surgery. CONCLUSION: The benefits of this procedure are the ability to decompress the anterior neural elements which improves the neurological recovery, provides anterior column support and restoration or maintenance of sagittal balance with posterior instrumentation techniques.

SIC06-P03

CLINICAL AND RADIOGRAPHIC OUTCOMES OF SURGICAL TREATMENT FOR POSTERIOR FUSION OF CERVICAL SPINE USING WAVY ROD

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PURPOSE: The purpose of this study is to clarify clinical and radiographic outcomes of surgical treatment for posterior fusion of cervical spine using Wavy rod. MATERIAL AND METHODS: 22 patients (Male 4, female 18) were treated surgically using Wavy rod. Wavy rod is posterior spinal instrumentation that tightens titanium wire and rod at spinous process. Their mean age at time of surgery was 48 years old, and means follow-up period was 37 months. Anterior and posterior spinal fusion was 14 cases and only posterior spinal fusion was 8 cases. We evaluated clinical outcomes with Japanese Orthopaedic

Score (JOA) and radiographic outcomes by loss of correction of spinal lordosis. RESULT: Japanese Orthopaedic Score showed improvements in clinical symptoms. Radiological examination of anterior and posterior spinal fusion was satisfactory, but only posterior fusion of cervical spine using Wavy rod showed tendency of loss of correction of spinal lordosis. Major complications did not occur. DISCUSSION AND CONCLUSION: The goal of surgical treatment of spinal fusion is decompression of spinal cord, and stability of spine, improvement of neurological function. It was not rigid enough in only posterior spinal fusion of cervical spine using Wavy rod but in anterior and posterior spinal fusion of cervical spine using Wavy rod there were good clinical and radiographic outcomes. Surgical treatment of spinal fusion of cervical spine using Wavy rod provided satisfactory results.

SIC06-P04

OUR THERAPEUTIC ATTITUDE IN THORACOLUMBAR AMYELIC FRACTURES

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INTRODUCTION: instability may occur in the thoracolumbar spine following major disruption of the osseous or ligamentous structures either in isolation or as combined injuries. Acute instability of the thoracolumbar spine following injury is more commonly a problem requiring external or internal stabilization than in the upper thoracic region. MATERIAL AND METHODS: our experience refers to a group of 41 patients with fractures of thoracolumbar column. Mean age was 37 years, 29 men and 12 women. In 16 cases dislocation fractures were present. In all cases the therapeutic attitude consisted in the anterior left approach with reduction of the displacement and dislocation of the vertebrae, resection of the disc, of the damaged vertebral body, repair of the vertebral canal and intersomatic somatodesis with an autograft of the iliac crest. The anterior approach was associated with the posterior osteosynthesis with transpedicular segmentary instrumentation XIA. We used this method in 16 cases. In other 25 cases we used only transpedicular segmentary instrumentation XIA. RESULTS: the results obtained were: Good: in 16 cases were used anterior and posterior approach; in 20 cases were used posterior approach with transpedicular segmentary instrumentation XIA. Satisfactory: in 5 cases was used transpedicular segmentary instrumentation XIA. CONCLUSION: in amyelic lesions of the thoracolumbar column the anterior approach makes possible the decompression and restoration of the anatomy of the spine. The posterior fixation associated with the intersomatic somatodesis allows the mobilization of the patients at 3–7 days after surgery. Transpedicular segmentary instrumentation XIA makes the fixation much more stable, the recuperation faster and better.

SIC06-P05

INJURIES TO SPINAL ACCESSORY NERVE AND TREATMENT BY TENDON TRANSFER

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PURPOSE: To demonstrate that a very serious injury can be improved by performing the appropriate operation. METHODS: Ten cases with paralysis of the trapezius muscle have been treated in the past 25 years. Most cases were the result of accidental injuries. Half were of iatrogenic origin, namely paralysis followed the removal of small lipomas from the neck area. Of the six men and four women, the right side was involved six times, the left

four times. All patients were handicapped in using their extremities, causing marked weakness in abduction, with difficulty performing activities such as fishing, tennis, golf and other sports as well as simple tasks like combing their hair, putting hand behind neck and elevating the arm. The operation consisted of transferring the insertion of the levator scapulae with fascial sling through the acromion. The fascial sling was also used to anchor the spinal border of the scapula to the spinous processes of the upper dorsal vertebrae. The lateral transfer of the rhomboid muscle in a double-breasted fashion was added to this procedure. SUMMARY: The results were as follows: Excellent and Good 75%; Fair 25%. In this later group, all patients demonstrated much improvement compared with the preoperative status. CONCLUSION: This method has been found to be satisfactory for correcting paralysis of the trapezius.

SIC07-P01

HAMMERTOE REPAIR USING AN ABSORBABLE PIN AS A HAMMERTOE IMPLANT – OPERATIVE TECHNIQUE AND PRELIMINARY REPORT

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Twenty-three patients (23 feet, 29 toes) affected by hammertoe deformity of the lesser toes and treated surgically by arthrodesis of the proximal interphalangeal joint, stabilized with an intramedullary, absorbable pin (2 mm Biomet Re-unite absorbable pin), as a hammertoe implant, were reviewed. The period of follow-up ranged from 6 months to 15 months, with an average follow-up of 9 months. At follow-up, the arthrodesis was fused in 26 toes; one toe showed an asymptomatic radiographic nonunion and two toes showed asymptomatic mal-alignment. In one toe, the absorbable pin was removed because of persistent pain at the tip of the toe where the pin migrated. There were no cases of early or late infection. The average AOFAS score at follow-up was 89.3 points. The average AOFAS score before operation was 52.6 points. All patients but one were satisfied with their operation results, and would do the operation again if needed. The analysis of results indicated that the procedure is suitable for Hammertoe repair and that an absorbable pin can be used with good results as a hammertoe implant.

SIC07-P02

MITCHELLS OSTEOTOMY FOR HALLUX VALGUS – PATIENT SATISFACTION

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BACKGROUND: Twenty Mitchell distal metatarsal osteotomies for hallux valgus performed over a period of one year have been retrospectively reviewed. The 20 patients were followed for an average of 12 months (range 8 to 16 months). RESULTS: The preoperative hallux valgus angle averaged 30.9 SD (range 18- to 60) and the postoperative angle averaged 12.2 (range 5- to 20). CONCLUSION: Ninety-two percent of the patients were satisfied with the result of the procedure. They stated that, given the identical situation, they would undergo the operation again. KEYWORDS: Mitchell, metatarsal, osteotomy, Hallux, valgus

SIC07-P03

MODIFIED ARNESEN METHOD FOR INTRA-ARTICULAR CALCANEUS FRACTURE

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BACKGROUND: Several reports had alerted surgical complications such as wound edge necrosis, surgical site infection, etc., sometimes occur after open reduction and internal fixation for calcaneus fractures. We had developed Arnesen method for intra-articular calcaneus fracture. **PATIENTS:** Fifteen patients were surgically treated. According to the Essex-Lopresti classification, tongue type was 9 cases and depression was 6 cases. **SURGICAL TECHNIQUES:** Surgical techniques were briefly as follows; operations were performed under spinal anesthesia. Firstly, first fracture line and varus deformity was corrected by skeletal traction towards toes and heel according to the Arnesen method using fracture table. Secondly, bone fragment of tongue or depression was corrected by the Westhues method. Thirdly, lateral bulging was corrected using Böhler clump. Finally, fractures were fixed by several percutaneous pins. **POSTOPERATIVE CARE:** Any casts never use and early range of motion exercise was done. Partial-weight-bearing was started from 6 weeks, full-weight-bearing was permitted mostly within 12 weeks after surgery. Clinical and radiographic evaluation was done postoperatively. **RESULTS:** Clinical result was almost satisfactory; fourteen of fifteen cases were pain free, range of motion of ankle joint was up to 90% in comparison with unimpaired side. Subtalar joint was reduced well postoperatively. Although few cases were collapsed radiologically, articular surface of the subtalar joints were never displaced. **CONCLUSIONS:** Our modified Arnesen method was planned to avoid severe surgical complications and to obtain better anatomical reposition. Clinical result was almost satisfactory; however, some of these were collapsed radiologically. More recently, we use artificial bone graft.

SIC07-P04

ILOPROST FOR THE TREATMENT OF BONE MARROW EDEMA IN THE HINDFOOT

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Bone marrow edema (BME) is a rare cause of pain in the foot. We reviewed 19 patients with unilateral BME in the hindfoot treated with the vasoactive prostacyclin analogue iloprost. BME was located 9x in the talus, 3x in the calcaneus, 3x in the navicular bone and 2x in the cuboid. 11 cases were estimated to have a primary ischemic origin, the other 8 ones to be secondary to an activated osteoarthritis or to mechanic stress. Our therapy consisted of a series of five infusions with 20 µg to 50 µg of iloprost given over 6 hours on 5 consecutive days each. The Mazur's foot score improved from a mean of 54,9 (range 23-73) before to 87,8 points (47-100) 3 months after therapy, with best results in ischemic lesions with an improvement from 56,2 to 93,9 points and inferior results in patients with osteoarthritic BME as well as BME due to stress with a change in the score from 53 to 79,3 points. Magnetic resonance imaging showed complete recovery of the BME within 3 months in 12 patients (9x ischemic, 3 osteoarthritic or stress), 3x partial regression (1x ischemic, 2x osteoarthritic or stress) and no change in 4 cases with BME edema due to activated osteoarthritis. We conclude that the parenteral application of the vasoactive drug iloprost might be a viable method in the treatment of BME of different origins but especially in ischemic ones.

SIC07-P05

GASTROCNEMIUS PROXIMAL RELEASE – AN ANATOMICAL STUDY OF THE APPROACH TO THE MEDIAL AND LATERAL HEADS OF GASTROCNEMIUS

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METHOD: Fifteen cadaveric knees were dissected. The intercondylar axis was used to identify the midline and incision was made 1 cm below the skin crease. All structures were identified in layers and measured with respect to the midline. **RESULTS:** The short saphenous vein had a variable position close to the midline. The medial sural cutaneous nerve and lateral sural cutaneous nerve were both present in all but one of the knees. The variable positions of these nerves make the approach to the lateral head of gastrocnemius more prone to complications. Approach to the medial head is safe. The medial head was found to be much larger in both the muscular and tendinous portions than the lateral head. A distinct tendon was found in all cases and was far from the midline for both the lateral and medial heads. The neurovascular bundles to the medial and lateral heads originate from the tibial nerve and popliteal vessels, respectively. **DISCUSSION:** Release of gastrocnemius is an established treatment for equinus deformity of the ankle where there is no contracture of soleus. This study demonstrates a safe approach to the medial head. The variable course of the medial and lateral sural cutaneous nerves means that, during the approach to the lateral head, identification and protection must be performed in order to prevent damage to the nerves and the subsequent morbidity that this may cause.

SIC07-P06

TOTAL OPEN DISLOCATION OF TALUS - A CASE REPORT

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A 37-year-old professional fireman sustained total open dislocation of the talus by falling from ladder of approximate height of 3m. Forcible inversion of the foot caused separation of the talus, not only from the other tarsal bones but also from tibio-fibular mortise. The dislocated talus has remained in rotated position and lied with the body in front of the lateral malleolus, the head on the medial side, the calcanean surface directed backwards and the tibial articular surface under the skin. After operative reduction with a Steinmann pin inserted into the heel and used as a lever, the treatment was continued with below-knee plaster during 12 weeks. Crutches and non weight bearing continued for a further 6 months. Follow-up of 13 years has revealed a pain free ankle with good mobility and gait without limp. The radiographs have revealed moderate sclerosis without signs of avascular necrosis of the body of talus with incipient degenerative arthritis of the ankle. The patient is still able to work as a fireman.

SIC07-P07

THE INCIDENCE OF ACCESSORY BONES OF THE FOOT AND THEIR CLINICAL SIGNIFICANCE

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OBJECTIVES: Accessory bones of the foot are often confused with avulsion fractures. This study was designed to investigate the incidence of accessory bones of the foot. **METHODS:** Anteroposterior and lateral foot radiographs of 579 male patients with an age range of 20 to 48 years were examined with regard to the presence, incidence, and distribution of accessory bones. Identification of the accessory bones were made

according to the Kohler classification. RESULTS: Of 579 radiographs, accessory bones were identified in 108 feet (18.5%), all of which were symptomless. The most common accessory bones in descending order were os peroneum (31.8%), os naviculare (28.5%), os trigonum (23.9%), os vesalianum (5.4%), os supranaviculare (3.5%), os infranaviculare (3.5%), os supratolare (2.5%), and os intermetatarsium (1.2%). CONCLUSION: Accessory bones of the foot should be well recognized and their clinical significance should be appreciated in order to decrease the rate of incorrect diagnoses and unnecessary orthopaedic consultations on initial presentations of patients with foot complaints.

SIC07-P08

SURGICAL TREATMENT OF THE FIFTH TOE VARUS ANGULATION

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Different structural and functional causes produce the development of a Taylor's bunion deformity. We applied different types of the osteotomy of the fifth metatarsal head depending on the degree of the deformity, on the radiographic evaluation, the results of plantography and taking into account the presence of one or other pathology of the forefoot. We operated 20 patients with such pathology, 16 of them had Taylor's bunion deformity of the both feet (total 36 operations). In 12 cases the SCARF osteotomy was applied, in 10 cases – the Weil osteotomy, in 1 case – the Austin osteotomy, in 3 cases – the proximal osteotomy with the resection of a small bone wedge in the superior part of the cut and in 10 cases – a lateral exostectomy of the fifth metatarsal head. In 32 cases the fragments of the fifth metatarsal were fixed with Gerbert screws. In postoperative period the patients limited the load on the forefoot during 1.5 months, the supplemental immobilization wasn't applied. The results were evaluated on basis of the radiographic degree of correction, plantography and the degree of cosmetic reconstruction. In 25 cases the excellent results were got, in 11 - good results. According to our not large experience we can say that the choice of surgical treatment and the optimal type of surgical procedure allow to achieve the reconstruction of the transversal arch, the reconstitution of the normal biomechanics of the forefoot and to increase the level of our patients' life.

SIC07-P09

SURGICAL RESULTS IN TALUS FRACTURES – OUR EXPERIENCE

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INTRODUCTION: Talus fractures are rare, but because of its peculiar anatomy the complications rate is high. MATERIAL AND METHODS: Between 2001 and 2005, 30 patients with talus fractures were surgically treated in the Department of Orthopaedics and Traumatology of Bucharest University Hospital. 27 fractures were closed. Fractures were classified according to Hawkins classification: type I – 9 cases, type II – 13 cases and type III – 8 cases. All patients underwent clinical and radiological examinations at 3, 6 and 12 months and every year after this interval. RESULTS: Hawkins type I fractures were treated by cast immobilization without weight bearing for 6 to 8 weeks. Orthopaedic reduction was performed in emergency in order to avoid vascular and cutaneous complications. Hawkins type II and III fractures were surgically treated. Anterior or transmaleolar internal surgical approaches were used. After reduction, osteosynthesis

with 2 or 3 compression screws was performed. Avascular necrosis of talus was observed in 6 cases (5 type III fractures, 1 type II case). Cutaneous complications were observed more frequently in type II and III fractures and in the neglected ones. Sepsis occurred in one case. 85% of cases with avascular necrosis developed osteoarthritic changes. **CONCLUSIONS:** The prognosis of fracture-dislocation of talus is reserved, because of the high rate of avascular necrosis and osteoarthritis. The most important factors associated with good results are short time interval between trauma and surgical treatment and a perfect reduction. The surgical approach must avoid extensive devascularization of talus neck.

SIC07-P10

ARTHROSCOPIC TREATMENT OF OSTEOCHONDRAL INJURIES OF THE TALUS: ABOUT 10 CASES

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The osteochondral injuries of talus are common. It must be researched if patient continues to have pain after ankle trauma. MRI helps to make the diagnosis but arthroscopy confirms the lesion. We report a series of 10 cases of talar osteochondral injuries coming in younger patients with an average age of 28 years. It consists of athletic patients with notion of traumatism in all cases. Standard RX shows the lesion in 3 cases. MRI gives the diagnosis for all the patients which was confirmed by ankle's arthroscopy. Treatment consists of curetting the osteochondral injury. All our patients have an MRI control after 4 years. The results were considered as good in 9 cases and the sport's activity was regained at the same level in all cases.

SIC07-P11

THE FIRST RESULTS OF HALLUX VALGUS SURGICAL TREATMENT BY SCARF OSTEOTOMY

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We operated on 67 patients (115 feet) by SCARF osteotomy for correction of Hallux valgus for the period 2005-2007 years. Most of our patients (above 95%) were women. There was third stage of deformation in 90% of patients according to X-ray examination. We also performed plantography for all patients in pre- and postoperative periods. Herbert's screws were used for first metatarsus osteosynthesis. All our patients wore Baruk's shoes for 5-6 weeks after surgery. After that we recommended our patients to wear orthopaedic insole. Maximum follow-up period was approximately 24 months. We use Groulier's criteria for evaluation of results: first radius condition, forefoot condition, functional activity. Excellent and good results were in 86% cases (60-85 points). We had several complications: foot soft tissues swelling during 6 weeks post-operatively (3 patients), edge skin necrosis, and secondary wound healing (1 patient). We had no first metatarsus fractures.

SIC07-P12

UNUSUAL FRACTURE OF THE BODY OF THE TALUS: A CASE REPORT WITH REVIEW OF LITERATURE

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The fracture of the body of the talus is rare; it reaches articular congruence and brings into play the functional forecast of ankle. We report a rare case of fracture of the body of the talus to sagittal feature associated to a medial malleolus fracture at an 18-year-old patient and whose mechanism was plantar hyperflexion internal rotation and axial compression. The treatment called upon an open hearth reduction and stabilization by two small screws for the talus and two others for the medial malleolus. The evolution in six months was good. A study of the mechanism of which has occurred is presented with a review of the literature as well as the therapeutic elements and forecasts.

SIC07-P13

METHOD OF FOREFOOT RECONSTRUCTION FOR HALLUX VALGUS

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BACKGROUND: Hallux valgus is one of the most common foot deformities in women. Various types of surgical correction have been described, including distal soft-tissue procedures and metatarsal osteotomies. We report the method of forefoot soft-tissue reconstruction using a transfer of the long extensor tendon of the fifth toe. **METHODS:** The technique is used for correction of flexible pes planus transversus and hallux valgus. This procedure includes 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. After that, this tendinous graft is fixed in a drill-hole made in the first metatarsal. Simultaneously, the adductor hallucis tendon is transferred on the dorsum of the first metatarsal head. From 1998 till 2006 we performed 78 operations in 60 patients with flexible flatfoot and hallux valgus aged 17-54 years. Additionally, an Akin medial closing wedge osteotomy of the proximal phalanx was done in 3 cases. **RESULTS:** Fifty-four patients (70 feet) were evaluated at a mean of 4.5 years (range, 1-8 years) after surgery. Excellent results were achieved in 16 (22.9%) cases, good – in 42 (60.0%), satisfactory – in 9 (12.9%), poor – in 3 (4.2%) cases. **CONCLUSION:** Based on radiographic correction and clinical outcomes, this procedure is indicated for the treatment of moderate hallux valgus with flexible forefoot deformity.

SIC07-P14

TREATMENT OF THE TARSOMETATARSAL JOINT INJURIES

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Fractures and fracture dislocations of the tarsometatarsal joint are uncommon injuries but they lead to grave breaches of the anatomy and function of the foot. We present our experience of 34 cases of Lisfranc joint injuries. 22 men and 12 women with median age of 34 years (range 16–55 years) were examined. Term before surgery was ranged from 1 day to 3 years. Methods of treatment were: open (n=17) or closed (n=12) reduction with transcutaneous K-wires stabilization. Five patients were treated by immediate arthrodesis. This procedure was performed from 2 months to 3 years after the initial trauma due to a painful fibrotic ankylosis in bad position or arthrosis. The arthrodesis was partial medial in all cases. The results of tarsometatarsal injuries in 28 patients have been reviewed. The average follow-up was 4.8 years (range 1 year to 12 years). Our results clearly correlate with the quality of reduction. Good results were established in 10 cases, satisfactory results in 18 cases. Unsatisfactory results were not established. Postoperative complications were exposed in 2 cases. Fractures and fracture dislocations

of the Lisfranc joint apply to heavy injuries of the foot and lead to considerable reduction of its function. Open anatomic reduction and internal fixation is necessary in severe cases when closed reduction was unsuccessful. Partial arthrodesis is useful in cases of neglected injuries to correct deformation of the foot.

SIC07-P15

OPEN FRACTURE-DISLOCATION OF THE TARSMETATARSAL JOINT: A REVIEW OF 2 CASES

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Between 2000 and 2005 two patients (21-27-year-old males) with open fracture-dislocation of the tarsometatarsal joint were managed in our Department. The patients had type II injuries. There was severe soft tissue damage and, therefore, a high risk of infection and necrosis. The diagnosis was easy in every case. They were all managed surgically 1-3 hours after their appearance at hospital and in any case, during the first 8 hours following the injury. They had debridement and reduction. Fixation was achieved with K-wires. Postoperatively a short leg cast was applied and antibiotics were given. The cast was maintained for six weeks. Then the K-wires were removed and progressive weight-bearing was allowed. After a follow-up period of 28-43-40 months, only the second patient has complained of mild.

SIC07-P16

THE APPLICATION OF AUSTIN OSTHEOTOMY IN HALLUX VALGUS TREATMENT

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Hallux valgus deformity is one of the most common foot problems seen today by foot and ankle specialists. In period of time from 2003 to 2007, 352 patients (679 feet) were operated on for Hallux Valgus in our clinic. Austin osteotomy was performed in cases when first metatarsal corner 13-15°. Austin osteotomy was performed in 45% of cases of general number of operations carried on. As necessary PASA was corrected when it exceeded 8°. Austin osteotomy we performed McBride operation in 98% of cases, in 2% the transversal arch formation wasn't performed due to weakness of M.adductor hallucis tendon. For the fixation we applied Herbert screws in 665 cases (98%). In postoperative period we recommended confinement to bed with elevated lower extremities for feet swelling prophylactics, wearing Barouk shoes 5-6 weeks after the operation. After reduction of edema we recommended wearing of individual inner soles. Long-term results were evaluated with Groulier criteria. In early postoperative period at 15 patients we noted lingering edema of feet and ankle-joint up to 3 weeks due to nonobservance of the regimen by patients. In 2 cases relapse of Hallux valgus occurred. All the complications were corrected in 4 months after the operation. In 92% we obtained excellent and good results (60-85 points), in 6% - satisfactory results (29-59 points) and poor results (0-28 points) in 1% of cases.

SIC07-P17

HISTORIC FORM OF FOOT DESMOPLASTIC

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Fibromatosis Desmoplastic is a very rare primary tumour of bone. Although considered as a benign lesion, it can be very aggressive locally and has a high rate of local recurrence after incomplete surgical excision. Radiologically, the lesion shows no distinctive features, often simulating fibrous dysplasia, or fibrosarcoma. The localisation at foot and leg is uncommon. We report one case of historic form at the foot and leg. Histological examination after surgical resection revealed that the tumour consisted of spindle cells with small, elongated nuclei in a background of numerous collagen fibres and infiltrating lamellar bone. There was no evidence of nuclear atypia, mitotic activity, or necrosis. We also discuss histological differential diagnosis as well as clinical features and the radiological and pathologic findings of this rare disease. Recognition of this entity is important to ensure proper surgical treatment.

SIC07-P18

RESORBABLE JOINT ARTHROPLASTY OF THE FIRST METATARSOPHALNGEAL JOINT FOR HALLUX RIGIDUS

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INTRODUCTION: Hallux rigidus is a common affliction particularly of old males. The alternatives for treatment include rigid insoles, arthrodesis or resection arthroplasty. In some cases total joint arthroplasty is employed. The current study involves the implantation of a resorbable collagen-based device that allows creation of a fibrous symphysis-like joint. This device prevents the disability stemming from MTP arthrodesis or the short and floppy toe that results from resection arthroplasty. It is significantly cheaper than total joint arthroplasty.**METHODS:** The current study involves 26 patients followed for a minimum period of two years. The patients were all operated using a standardized technique involving: 1. resection of the subchondral bone on both sides of the joint, 2. osteophyctomy, 3. insertion of the collagen-sponge with soft tissue balancing to ensure proper toe alignment. Patients were followed clinically and radiographically. **RESULTS:** There were no infections and in no patient was there a need to remove the implant. Range of motion of the joint was increased from an average of 22 degrees to 50 degrees. Toe flexion strength assessed using a dynamometer increased from 7 Kg to 22 Kg on average. Radiographically the joint space increased from 1mm preoperatively to an average of 4 mm post-operatively. This space remained constant at the latest follow-up period. AOFAS (American Orthopaedic Foot and Ankle Society) scores carried out preoperatively averaged 48 and increased to an average of 75 post operatively. **CONCLUSION:** The collagen-sponge arthroplasty appears to be a feasible and low-cost alternative to total joint arthroplasty in hallux rigidus surgery.

SIC07-P19

THE FREIBERG'S DISEASE: EIGHT-CASE REPORT

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The Freiberg's disease is an osteonecrotic disease of the second metatarsal head. Described by Freiberg on 1914, this painful disorder is frequent in adolescent age with female predominance. It presents diagnosis, therapeutic and evolutive difficulties. Eight cases of Freiberg's disease have been treated from 1998 to 2006. All patients underwent excision of the concerned metatarsal head. There were seven female and one male

patient with an average age of 19 years. The symptoms were resumed essentially in a pain at the concerned metatarsophalangeal joint. X-rays showed advanced stage of the disease. The results in our series are encouraging, and we recommend the metatarsal shortening as a useful treatment option after conservative measures have failed in patients with symptomatic Freiberg's disease. The epidemiological, therapeutic and evolutive peculiarities of this series fit with the literature.

SIC07-P20

ANKLE ARTHRODESIS USING ANTERIOR PLATING

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This is a report on a prospective study evaluating ankle arthrodesis using an anteriorly placed narrow DCP in 30 patients, 21 males and 9 females, 19 were right and 11 left, 22 were post traumatic, 7 were paralytic and 1 was charcot with minimum follow-up period of 6 months. 29 ankles were totally fused at the end of follow-up and the charcot ankle was the only one which was complicated by nonunion. The operative technique used, the perioperative complications, the clinical as well as the radiological outcome will be presented.

SIC07-P21

TREATMENT OF INTERPHALANGEAL DISLOCATION OF HALLUX WITH INCARCERATED SESAMOID BONE BY OPEN REDUCTION (REPORT OF 2 CASES)

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Irreducible dislocation of hallux interphalangeal joint with incarcerated sesamoid is a rare condition, with only a few cases reported in literature. We describe two cases of dislocation of hallux interphalangeal joint which were diagnosed by plain radiographs and three dimensional computed tomographies (3D CT) and successfully treated with open reduction without excision through dorsal approach, and review literature pertinent to this condition.

SIC07-P22

FUNCTIONAL ADAPTATION OF METATARSAL BONES IN STATICALLY DEFORMED FEET

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The aim of this study was to evaluate the functional adaptation of the metatarsal bones, which occur as a result of static deformations of the feet. Sixty female statically deformed feet, patients of age of 20-40 years, with symptoms of metatarsalgia were compared to a control group of 39 asymptomatic feet of female patients of the same age. Pedobarographic and radiographic analysis were performed to evaluate the loading and skeletal functional adaptation of the feet, respectively. Out of 3 267 measured parameters, 32 parameters as potential indicators of the increasing loading of the metatarsal bones were statistically evaluated. Only 5 parameters, out of 32 evaluated, showed changes in statically deformed feet: plantar cortical index of the first metatarsal

bone; cortical index of the first metatarsal bone in lateral projection; medial cortical index of the second metatarsal bone; dorsal cortical index of the second metatarsal bone and cortical index of the second metatarsal bone in lateral projection. Statistical analysis showed significant difference between asymptomatic and symptomatic group of female patients only in 2 parameters: dorsal cortical index of the second metatarsal bone and cortical index of the second metatarsal bone in lateral projection. The results of our study show that the increase in dorsal cortical index of the second metatarsal bone above 25 is the sign of mechanical overloading of the bone which would result in metatarsalgia. These data show that prevention in these patients, namely anterior foot load relieve, could prevent the symptoms of metatarsalgia.

SIC07-P23

TARSAL TUNNEL SYNDROME AFTER TOTAL ANKLE ARTHROPLASTY: A CASE REPORT

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Tarsal tunnel syndrome (TTS) is a compressive neuropathy caused by either intrinsic or extrinsic pressure on the posterior tibial nerve or one of its branches. Clinically TTS presents with pain, dysesthesia or paresthesia, mainly along the medial aspect of the ankle and the plantar foot. The possible etiologies include trauma, space occupying lesions, metabolic disorders, ankle deformities and idiopathic causes. We report a case of tarsal tunnel syndrome caused after ankle replacement secondary to a large displaced osteophyte; an unusual complication from an increasingly common surgical procedure. Our literature search has not revealed any other article reporting osteophytes as a cause of postoperative tarsal tunnel syndrome. Our case is unusual in being a post surgical entrapment, but rather than being due to scarring is due to a displaced osteophyte. Extensive tibiotalar osteophytes are commonly seen and excised from patients undergoing ankle replacements. It is impossible to ensure all bony debris is removed from the surrounding soft tissue at the time of surgery. Pictures showing exploration of the Tarsal Tunnel and the osteophyte causing hourglass compression of the Posterior Tibial nerve are presented. **CONCLUSION:** We report a rare case of tarsal tunnel syndrome caused by osteophyte impingement after undergoing ankle replacement. Patients complaining of symptoms of TTS postoperatively after ankle replacement, especially if a cause of extrinsic compression is identified, should be explored early. As the number of ankle replacements increase, this could become an increasingly recognised complication and an important cause of tarsal tunnel syndrome.

SIC08-P01

AMPUTATION IN LEBANON: CHANGING LANDSCAPE

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INTRODUCTION: After the end of the armed conflicts in Lebanon, the distribution of the causes of amputations seems to have shifted away from traumatic events. The purpose of this study was to see how this distribution has changed. **METHODS:** All the records of disabled persons were reviewed from the Ministry of Social Affairs (MOSA), extending from the beginning of the program in 1995 till February 2006, and those that had amputations were selected for analysis. We then reviewed the cases whose amputations took place during the period extending from the beginning of 2001 till the end of 2005, a period that was relatively free of acts of aggression. **RESULTS:** Out of 56391 disabled

persons registered with (MOSA), there were 4648 (8.24%) amputees having 5214 amputations. Fifty-eight percent were from traumatic injury, 47% of them resulting from armed conflict. Twenty-one percent were due to complications of diabetes, and 8% due to other vascular problems. Over the period 2001-2005, 825 amputees were registered, having 914 amputations. The causes were 61% diabetes, 14% other vascular problems, and 14% trauma. The age group 41-64 accounted for 36.43% of the amputations, while 45.84% were above 64. CONCLUSION: After the end of the armed conflicts, the causes of amputations shifted from trauma to diabetes and other vascular problems, occurring at a relatively young age. Other studies should be done including all levels of amputation, and analyzing whether people at risk (mainly diabetics) are receiving proper preventative care.

SIC08-P02

EXTRACTION OF INTRAMEDULLARY NAILS; A REVIEW OF PUBLISHED TECHNIQUES

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Intramedullary nailing is a routine procedure in long bone fracture treatment. Nail breakage is not uncommon in the presence of delayed or non union. Fractured nails can be extremely challenging to remove, particularly the distal fragments. Many techniques for removal of broken nails are described but usually as isolated case reports. After extensive global literature review, an attempt has been made to classify these techniques with new and detailed illustrations to create an instructional guide. Descriptions include the removal of both solid and cannulated nails and are classified as antegrade, retrograde and direct. The majority of these techniques can apply to any long bone nail removal.

SIC08-P03

A STUDY TO IDENTIFY THE PERCENTAGE OF CLINICAL AUDIT WITH POSITIVE OUTCOME

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INTRODUCTION: Clinical audit plays an important part in the drive to improve quality of patient care and thus form a corner stone of clinical governance. The aim was to identify the percentage of audit with positive outcome. METHOD: We evaluated the standard of clinical audits conducted by Trauma and Orthopaedic department between June 2000 and Dec 2004 in our hospital. RESULTS: In 56 months, 60 audits were started and registered. Only 52% (31) of the registered audits were completed. Audit loop was not closed in 74% of the completed audits. 3% of the audit had a negative outcome and 13% had positive outcome. CONCLUSION: Re-education on the basic principles of clinical audit and regularly "auditing the audits" will help derive maximum benefit from good quality audits. Failure to close the loop undermines their effectiveness and wastes resources.

SIC08-P04

"GETTING BETTER TOGETHER" - PATIENT-CENTRED APPROACH TO HEALTHCARE PROVISION

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GADELRAH

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Good communication is the cornerstone of the physician-patient relationship. The American Academy of Orthopaedic Surgeons (AAOS) has established a patient-centred care initiative, themed getting better together. Getting better together calls for a partnership between the orthopaedic surgeon and patient to ensure patients and their families are informed, respected and involved in all decisions pertaining to care and treatment. We performed prospective observational study to involve the patients in their care and get the most out of their physicians' visits. Standard questionnaires inviting the patients to write down the question they want to ask their doctor, were handed over to the patients before they were seen by the doctor. The doctor will see the questions before seeing the patients and answered all the questions asked by the patient during consultation. Total number of returned questionnaires was 64 with on average 2.4 questions written per patient. Thirty four percent (22 patients) of patients did not write any questions. Of this group 55% (12) had no questions to ask, 18% (4) did not understand the study, 18% (4) could not write English and 9% (2) gave other reasons. Twenty percent (13 patients) of patients answered the standard question - with all but one patient stating that this was a useful study. Our study helped the patients and the public understand the significance of collaborating with a physician to jointly make the best health care decisions.

SIC08-P05

DO ORTHOPAEDIC SURGEONS NEED A POLICY ON THE REMOVAL OF METALWORK? A DESCRIPTIVE NATIONAL SURVEY OF PRACTICING SURGEONS IN THE UNITED KINGDOM

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INTRODUCTION: Routine metalwork removal, in asymptomatic patients, remains a controversial issue. Current literature emphasizes the potential hazards of implant removal and the financial implications encountered from these procedures. However, there is little literature guidance and no published research on current practice. **AIM:** To estimate the current state of practice of orthopaedic surgeons in the United Kingdom regarding implant removal in asymptomatic patients. **METHODS:** An analysis, by two independent observers, was performed on the postal questionnaire replies of 36% (500 out of 1390), randomly selected UK orthopaedic consultants. **RESULTS:** 407 (81%) replies were received. A total of 345 (69%) were found to be suitable for analysis. The most significant results of our study I: 92% of orthopaedic surgeons stated that they do not routinely remove metalwork in asymptomatic skeletally mature patients. II: 60% of trauma surgeons stated that they do routinely remove metalwork in patients aged 16 years and under. III: 87% of the practicing surgeons indicated that they believe it is reasonable to leave metalwork in for 10 years or more. IV: Only 7% of practicing trauma surgeons who replied to this questionnaire have departmental or unit policy. **CONCLUSION:** Our results demonstrate that most practicing trauma surgeons do comply with the evidence presented in the little literature available. However, we do believe that a general policy for metalwork removal is essential. Such a policy should include guidelines specific to age groups and level of surgeon who should be performing the removal procedure. Such a document would require further validated studies but would eventually serve to steer surgeons in achieving best practice.

SIC08-P06**NEW HINGE SYSTEM IN THE TREATMENT OF LIMB LENGTHENING AND AXIAL DEVIATIONS**Ghassan SALAMEH², Michael SCHMIDT¹¹*Orthopaedic Surgeon, Frankfurt (GERMANY)*, ²*Orthopaedic Surgeon, Abaseen Hospital, Damascus (SYRIA)*

For the treatment of limb lengthening and correction of axial deviations a special external hinge distraction system has been developed, which allows the combined treatment of congenital and acquired complex deformities of the leg. From 1995 to 2006 this new system was used in 310 patients with deferent indications in the lower limbs they presented with leg length discrepancies and axial deviation. The External Fixation Hinge System/Salamehfix is an arch hinged system and consists of arches with various diameters and perimeters, to assemble the deferent sizes of the leg in the upper and distal part with connecting special hinges, deferent sizes of the arcs to choose a special size for each patient with keeping an excellent technical functions; multiplanar multidirectional corrections; makes the fixator more suitable to each patient in size and allows the patient to move his joints freely, the insertion of the wires and screws in nearly right angels which make a rigid fixation, the insertion of wires and half pens in minor painful regions makes the tolerance to the fixator more acceptable. X-ray control is easy. Complications were mostly superficial pin infections. No nerve or vascular injuries. The new developed hinges are easy to use and allow the treatment of complex deformities with lengthening.

SIC08-P07**MALPRACTICE IN OSTEOSYNTHESIS**

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The most important principle of osteosynthesis is functional stability after the primary treatment, and to preserve this stability until bone union is achieved. Failure to understand or incorrect application of the basic principles of osteosynthesis may result in complication of the fracture healing with failure of osteosynthesis and metal fatigue. During the period 1990 till present we have come across a series of cases of malpractice in internal fixation done in the peripheral district hospital and then referred to the orthopaedic department at Al-Jall Hospital in Benghazi, some examples of this malpractice are illustrated and discussed.

SIC08-P08**PROGRESSIVE LIMB LENGTHENING BY WAGNER EXTERNAL FIXATOR FOR LOWER LIMB DISCREPANCY - CASE PRESENTATION**Radu RADULESCU, Catalin CIRSTOIU, Adrian BADILA, Octavian NUTIU, Cristian NITA
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Patient E.C., 24 years old, had a limb discrepancy due to a developmental growth insufficiency of the proximal femoral epiphysis. After preoperative planning (long leg AP X-rays of both limbs) we measured a 5cm shortening of the right femur. We performed a femoral distal metaphyseal corticotomy and fixated it with a Wagner single plane external fixator placed on the lateral aspect of the thigh. Progressive lengthening was started the 7th day after surgery by 1 mm daily (0.5 mm twice a day). The patient was allowed to walk using crutches with partial weight bearing and CPM (continuous passive motion) of

the knee was started the next day after surgery. Knee flexion rehabilitation was very much embarrassed by the 8 pins introduced, probably, too anterior through the iliotibial tract. Even forced knee flexion under anaesthesia was not successful. In this situation we preferred to complete the lengthening and immediately remove the external fixator and replace it with a locked intramedullary nail. Thus, the patient was allowed to walk with complete weight bearing and knee motion was completely recovered by CPM and active exercise (120° of active flexion). Bone union was achieved at 6 months and the hardware was removed at about 12 months after the first surgery.

SIC08-P09

ATTITUDES OF SURGICAL TREATMENT IN HEMOPHILIC ARTHROPATHIES

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The most disabling complication of haemophilia is represented by specific arthroplasty after hemarthrosis with synovitis and condral damage. We performed 19 arthroscopic synovectomies of the knee in known patients with haemophilic disease. The rising of the scores was made on the improvement in the range of movement of the knee. A second look in 3 joints after one year, shown non evolutive condral lesions after synovectomy. Patients were under treatment perioperative with coagulation factors. One patient was submitted to total joint arthroplasty. Four joint replacements were performed, all for the same patient, both hips and both knees. He needed a multidisciplinary team to ensure the success of his evolution. All hemophilic patients surgically treated need special attention, careful planning of the operation. The results are satisfactory after synovectomy with improvement of motion and very good in arthroplasty.

SIC08-P10

OCHRONOSIS: REPORTING TWO CASES

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INTRODUCTION: ochronosis is a rare enzymopathy caused by a mutation in the homogentisic-acid-dioxygenase gene. Due to the enzyme defect homogentisic-acid is accumulated in the blood and excreted in the urine. In addition, homogentisic-acid is deposited in connective tissues and cartilages, causing metabolic arthropathy and destructing osteoarthritis. In ochronosis the urine has a dark brown colour, while bluish-black pigment depositions appear on the nose, ears, sclera and above extensor tendons. **Diagnosis** is based on detecting homogentisic-acid in the urine. **CASE REPORTS:** two typical cases with multi-organ involvement are presented from our practice. A 54-year-old female developed the characteristic skin lesions 15 years ago, which were later accompanied by cardiac valve insufficiency and gonarthrosis. In a 57-year-old male severe gonarthrosis and coxarthrosis developed besides the typical pigment depositions. Due to severe symptoms he underwent bilateral knee and right hip replacement surgery. **CONCLUSIONS:** ochronosis is a rare disease, but it can be diagnosed in time based on the characteristic cutaneous symptoms, radiological changes and the typical joint involvement. A multidisciplinary follow-up is recommended to detect the various organic manifestations. In the past only symptomatic treatment was available. However, recently, reassuring experiments are carried out using the drug nitisone. From an orthopedic point of view it needs to be highlighted that in most cases destructive joint lesions develop

which require surgical interventions.

SIC08-P11

SARCOIDOSIS PRESENTING AS A TUMOR LIKE MUSCULAR LESION - CASE REPORT

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Sarcoidosis is a disease of unknown cause characterized histologically by noncaseating granulomas that can affect virtually any organ. Sarcoidosis usually presents with pulmonary and dermatologic symptoms and musculoskeletal involvement is infrequent. We present a case of a large (35 cm) histologically confirmed, sarcoid cyst of the left popliteal and calf region, with an unusual MRI appearance. A 49-year-old, heavy smoker, male, with history of C.P.D. complained of gradually enlarged edema of the left leg, knee pain and claudication, for the last 9 months. Laboratory and imaging analysis revealed a large popliteal and calf nodular mass of the left leg, compressing the popliteal and tibial vein. Surgical excision and histological analysis revealed a large sarcoid tumor. Two months after the surgery, the patient had a good healing of the wound, increased passive and energetic motion of the knee joint, and the venous decompression was evident. There were no complications like thrombosis or wound infection. It is interesting to notice that in the patient that we present sarcoidosis was diagnosed by the muscular involvement and there were no pulmonary, dermatologic or osseous infiltration. Large sarcoid popliteal and calf cysts presenting as a tumour like lesion is an exceedingly rare presentation of sarcoidosis, with no extramuscular involvement, and orthopaedic physicians should be alert for such uncommon cases.

SIC08-P12

DESIGNER ORTHOPAEDIC SURGERY IN A PATIENT WITH ANTI-VEL ANTIBODIES

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INTRODUCTION: The authors present a patient with anti Vel antibodies who had a shoulder replacement with a custom designed procedure which involved combination of Autologous blood predeposit, preoperative haemodilution and resurfacing arthroplasty. **DISCUSSION:** Shoulder arthroplasty is a highly successful procedure for degenerative and inflammatory Glenohumeral arthrosis. Perioperative blood loss is however common, and at times blood replacement is required postoperatively. It is a safe and effective solution, without potential serious undesired side effects. We report the management of a patient with anti Vel antibodies who successfully underwent a shoulder arthroplasty without the need to involve several large transfusion services. **METHODS:** The pre-operative assessment in a 65-year-old revealed anti Vel antibodies. The serological characteristics made the transfusion of Vel positive blood impossible. The patient was admitted 72 hours before surgery. Oral iron therapy was started. Patient was bled 2 units in the anaesthetic room. Hartman's infusion was started and a total of 2 litres were given pre operatively so as to cause acute haemodilution. The surgical procedure was performed (Fig 2). In the post-operative period each unit of autologous blood was transfused over a 2-hour period. The patient made an uneventful recovery and at six weeks was found to have a haemoglobin of 13.2 gm/dl. **CONCLUSION:** Using this technique we suggest that major orthopaedic surgery can safely be performed in patients with haematological problems that would otherwise require extensive list of haematological services from more than one transfusion centre.

SIC08-P13

SHOULD THE DIFFERENTIAL PRESSURE THRESHOLD FOR FASCIOTOMY BE REVISED?

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INTRODUCTION: A raise in intracompartment pressure may be caused by a variety of factors including fractures, soft tissue injuries, arterial injury etc. Delay in the diagnosis can lead to serious consequences like permanent motor weakness or sensory loss or even limb loss. **MATERIALS AND METHODS:** We studied the development of compartment syndrome in 106 patients with 109 closed tibial fractures who underwent reamed interlocking nailing. Each patient was assessed in detail with regard to the history of injury, symptoms and clinical findings. Compartment pressure was measured for all the patients of the involved compartment by simple needle technique. **RESULTS:** On pressure measurement, 10 out of 109 patients had differential pressure less than 30mmHg. But only eight of these 10 patients had classical symptoms and signs of compartment syndrome and all of them underwent emergency fasciotomy. The two other patients, who had differential pressure between 25 and 30 mmHg did not have the features of compartment syndrome and so were treated conservatively. **DISCUSSION:** Eight out of 109 patients who had the signs of compartment syndrome developed this between 24 and 36 hours after interlocking nailing. All of these patients developed features of compartment syndrome when the differential pressure was less than 25mmHg. Two other patients who had differential pressure between 25 and 30mmHg did not have the signs of compartment syndrome. **CONCLUSION:** (1) The highest incidence of compartment syndrome was seen between 24 and 48 hours after Nailing.(2) Should the differential pressure threshold for fasciotomy be revised to 25mmHg rather than 30mmHg.

SIC09-P01

PAEDIATRIC FRACTURES; MECHANISMS AND TRENDS

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INTRODUCTION: Children commonly present to hospital with musculoskeletal injuries, often with associated fractures. The authors present a retrospective observational cohort study, examining children aged up to 16 years presenting to the Accident and Emergency Department of a District General Hospital in South-East England. **RESULTS:** Children with a diagnosis of a fracture were identified by a computer search and their medical notes and X-Rays were reviewed. 1021 children with the diagnosis of fracture attended the Accident and Emergency Department from the 22nd August 2005 until 21st August 2006, and this represented 10.8% of all paediatric attendances. 63% of fractures were in males, with their commonest age at injury being 14 (Female= 11 years). More fractures occurred in the summer months, with Falls and Sports being the most common mechanisms of injury. Forearm fractures were the commonest fractures amongst children, followed by hand and finger fractures. 20% of fractures resulted in admission with the remainder being followed up in fracture clinic. Admissions were higher in the summer months. **DISCUSSION:** Fractures account for a substantial proportion of children attending Accident & Emergency. There are significant differences ($p < 0.0001$) in mechanism of injury and age distribution between the sexes. Girls sustained fractures at younger mean ages from falls, playground and trampoline injuries; whereas boys

sustained fractures at older ages from falls and contact sports. Higher fracture rates in the summer months may be due to an increase in outdoor activities in finer weather, with a higher admission rate due to more serious injuries.

SIC09-P02

EPIDEMIOLOGY OF TRAMPOLINE RELATED INJURIES IN NORTH WALES

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BACKGROUND: Despite concerns about their safety, trampolines are still a very popular activity among children. This has led to an increase in trampoline related Orthopaedic injuries. We assess the epidemiology of trampoline related injuries encountered in a district hospital of North Wales. **MATERIALS & METHODS:** This was a retrospective study conducted over a 4-year period. All trampoline related injuries were identified from the database and data collated on age, sex, mechanism of injury, season when injury was sustained, type of injury, treatment needed and final outcome. **RESULTS:** 76 patients were seen by the Orthopaedic team for trampoline related injuries between 2003 and 2006. 84% patients were below the age of 15. There was a female predominance. The incidence steadily rose from 2 patients in 2003 to 37 patients in 2006. Most injuries were outdoors and sustained during the summer. Injuries to the upper limb predominated with fractures encountered in 72.3%. Fractures accounted for 67% of the total injuries. 72% of injuries needed intervention like plasters, manipulations and surgeries. The tibia was the commonest bone fractured among the lower limb while the distal radius accounted for the most fractures in the upper limb. **CONCLUSION:** Although a popular activity, trampolines are a hazard to children. There is an increasing trend in the incidence of injuries related to trampolines. Children should be explained the dangers of a trampoline and need to be supervised while playing. With the popularity of the sport it may be impossible to ban the trampoline.

SIC09-P03

COMPARATIVE ANALYSIS OF X-RAY AND ULTRASOUND IN INVESTIGATION OF HIP JOINTS IN INFANTS

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During the last 2 years we observed 1396 patients in the age from seven days till 11 months. All children had a diagnosis of congenital hip joint dysplasia established in an out-patient department by X-ray examination. In addition all of them had a treatment prescription in abduction devices. The hip joint of all the patients we investigated with US. We used "Biomedica" and "Aloca" ultrasonic apparatus with linear transducer 5,0 and 7,5 MHz. For assessment of hip joint we used an R. Graf technique. We find disturbance of hip joint formation only at 412 children's from 1396. 180 patients had a hip joint dysplasia type IIa, 192 – type IIb, 22 – type IIc, 18 – type IIIa. At the same time at 372 of 412 patients had a minor disturbance of hip joint formation (type IIa and IIb) that doesn't need a prescription of abduction casts. Complex treatment with abduction casts have been applied only for 40 patients (types IIc and IIIa). Thus, application of US for assessment of hip joints formation has allowed to estimate more authentically a condition of hip joints at infancy children compares with X-ray, that has helped to find more differential approach to a choice of a treatment method. Exception of orthopaedic devices from treatment algorithm for the majority of children, has allowed to avoid a delay of physical development and other complications.

SIC09-P05

SURGICAL TREATMENT IN SPRENGEL'S DEFORMITY

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Sprengel's deformity consists in anomalous scapular descent. This malformation is characterized by a high scapular position, usually found between the second and eighth rib. Functional limitation is usually associated to this condition, mainly global abduction of the limb. Various other malformations can further complicate this disease: medullary, vertebral (cervico-dorsal), costal, and renal. Surgical abstention is the rule in discrete malformations. Authors present a case of Sprengel's deformity in a 9-year-old patient. This patient presented a limitation of global abduction of 40-50°, with a tendency to high dorsal scoliosis without any further malformation. The elevation of scapula was classified as grade III according to the classification of Gavendish (moderate deformation, shoulder elevated between 2 and 5 cm, with visible deformation). According to Gavendish, grade III deformation is a surgical indication. Our patient was operated combining the Robinson procedure, consisting in osteotomy and morcellization of the clavicle, and the Woodward procedure, consisting in resection of omovertebral attachments of muscles inserting in the scapula. Immobilisation according to Velpeau was applied during 15 days. Postoperative recovery did not present any complication. The patient had a favourable recovery. The shoulder leveled with the contralateral side, the deformation was no longer visible, and global abduction of 130° was achieved. We believe that surgical treatment in grade III deformation of Sprengel's deformity should be practiced between ages 6-8, and should associate the Woodward and Robinson procedures.

SIC09-P06

MEDIAL CONDYLE FRACTURE AND NONUNION OF THE HUMERUS IN CHILDREN

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INTRODUCTION: Medial condyle fracture of the humerus is an extremely rare condition compared with other paediatric elbow fractures. Five cases of this fracture including a case of nonunion were treated in our hospital and are reported here. **MATERIALS AND METHODS:** Five patients with medial condyle fracture of the humerus (3 male, 2 female) were treated including a male patient with nonunion. Mean age at the time of injury was 6.9 years (range, 3.0-12.6 years). Three patients were affected in the right elbow and two in the left. Fractures occurred in a fall in 4 cases and in a traffic accident in the remaining case. Conservative therapy with casting was performed in two cases, and open reduction and internal fixation was performed in three cases including the case of nonunion, in which conventional bone grafting from iliac crest was performed. The average follow-up period was 26 months (range, 8-72 months). **RESULTS:** Union of the fracture was achieved in all five cases. However, fishtail deformity in the plain radiographs was seen in two cases including the case of nonunion. Slight limitation of ROM remained in the nonunion case; nevertheless ROM was sufficient for active daily life. None of the patients exhibited cubitus varus or valgus physically or radiographically. **DISCUSSION:** Medial condyle fracture of the humerus makes up 1-3% of all paediatric elbow fractures. It is classified as Salter-Harris type 4 and requires accurate reduction at the initial treatment. Satisfactory outcome was obtained in all cases. However, long-term follow-up is required.

SIC09-P07**HAND INJURIES BY MINCER MACHINE**

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Domestic appliances with power machines to help housewives are on the increase. These appliances are of potential danger unless steps are taken to make them childproof. A review of thirty-three children with a mean age of 1.9 ± 0.3 years who sustained injuries to their fingers and hands by domestic mincer machines were described. In these severe injuries most of the fingers were totally minced and unsalvageable. The right hand was involved in thirty cases and the left hand in three cases. The predominance of involvement of the right hand is probably due to right-handed children exploring with their right hand. The children were brought to the hospital with the machine still attached to their hands. Only 8 thumbs were involved, with only two amputated. In introducing the hand into the meat funnel, the fingers go in first and thumb usually becomes abducted. This not only saves the thumb but prevents the rest of the hand from going further into the machine. THE AIM OF THE STUDY: In these severe injuries most of the fingers were totally minced and unsalvageable. The best course is to prevent these injuries from happening. Public health measures should be taken to educate the mothers and the severity of these injuries should be made known. Simple measures to avoid them include keeping the machines out of the reach of children, and improvement in the design of these machines, introduction of some form of cover or long neck to make them childproof.

SIC09-P08**FLEXIBLE INTRA MEDULLARY NAIL FIXATION OF PEDIATRIC DIAPHYSEAL FEMUR FRACTURES**

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The management of paediatric femoral diaphysis fracture has evolved gradually towards a more operative approach in the past decade. This is because of a desire for more rapid recovery and reintegration of the patients, and recognition that prolonged hospitalization can have negative effects even on children. Twenty-four diaphyseal femur fractures in 62 children were stabilized with flexible intramedullary nails. The patients ranged in age from 4 years 2 months to 14 years. Average length of follow-up was 10 months (ranged 3-24 months). All fractures in this series healed. Average time to union was 8 weeks. There was no complication of delayed union, nonunion, neuro vascular injury or deep infection. 3 cases had superficial wound infection treated by antibiotic and 2 cases of refracture after hardware removal was reported and treated by revision open reduction and internal fixation using plates and screws. All patients regained full range of movement. Comparing with conservative treatment flexible intramedullary nails obviates the need for prolonged bed rest and this is particularly advantageous for treating children.

SIC09-P09**TRIPLE PELVIC OSTEOTOMY IN ADOLESCENTS WITH RESIDUAL DYSPLASIA**

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Residual dysplasia of the hip joint in adolescents is complemented with a complex of biomechanical problems, the pelvic component of dysplasia being often the leading one. Triple pelvic osteotomy occupies the leading position in our clinic. The aims of surgical intervention are stability of the hip joint, elimination or prevention of hip lateralization,

restoration of articular surface congruity, centration of the femoral head, normalization of biomechanical conditions of the attached gluteus muscles function. We have been using our own operative technique: only one approach, pelvic bones osteotomies without detachment of the periosteum, use of incomplete ischium osteotomy, pubic paraacetabular osteotomy with preservation of the pubo-capsular ligament; angle-shaped ilium cut line, minimal pelvic muscles damage, avoidance of direct contact with large nerve trunks and vessels. In cases of considerable abnormality of the proximal end of the femur that can not be removed by transfer of the acetabulum additionally we perform correction osteotomy of the femur. Triple osteotomy of the pelvis reorients the acetabulum in three dimensions and allows getting the angle of vertical correspondence between pelvic and femoral components of the joint up to 90°. Displacement of the acetabulum fomis into a nearly horizontal or horizontal position is the most important biomechanical result, as it considerably increases the joint tolerance to load.

SIC09-P10

STRAYER TENOTOMY IN TREATMENT OF FEET DEFORMATION IN CHILDREN WITH CEREBRAL PALSY (CP)

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Between 2003 and 2006, we executed 45 operations with the use of Strayer technique in patients suffering from Children's cerebral palsy with unilateral or bilateral lesion, who had limits of movements in the ankle joint. There were in total 20 males and 17 females. The age of patients was from 4 to 17 years (average 8.8 years). 15 patients also had contractures in knee and hip joints. 92% of children had walking skills (independently or with assistance), three patients did not move before operation. 100% of patients passed courses of conservative therapy before surgical treatment. The comparative analysis was made with the second group of children who underwent Z-shaped lengthening of m.gastrocnemius tendon. It consisted of 20 children (12 boys and 8 girls) 5-16 years of age (average was 8.4 years). After the painful syndrome had been reduced to 2-3 units, on 5±2 day after operation we've changed the cast by strengthening plant's part. On the 6-7th postoperative day the patient started performance of passive exercises under the instructor's supervision. On 10-11th day, restoration of gait started, leaning on spica casts. Terms of fixation after Strayer tenotomy were 28±2 days. After finishing fixation, patients used orthopaedic footwear. Active tactics was not used after Z-tenotomy. Fixation in spica cast was 31±3 days. Regenerative treatment was similar to that used at Strayer tenotomy. A good result after use of Strayer technique (32 cases) is caused by less term of plant fixation and early function of legs.

SIC09-P11

PATHOLOGICAL FRACTURE IN FIRST MANIFESTATION OF CONGENITAL SHORT FEMUR

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In our population the congenital short femur is a very rare and complex defect. Numerous extrinsic factors such as trauma, drugs, viral infection, irradiation, focal ischemia have been postulated. The congenital short femur is classified into 5 types proposed by Amstutz ranging from simple hypoplasia to total absence of the femur. The measurements are the length of femur, the angulation of the femoral shaft, the neck-shaft angle and the ossified-edge angle. In our study of this subject we have a case of a child

who's affected with a metabolic disease and during his hospitalisation with a respiratory infection we detect a fracture of his both hips. In this case we found a fracture over a congenital short femur range III. **CONCLUSIONS:-** We must discard the congenital short femur when we find a bilateral hip fracture in the child.- The differential diagnosis is important between the coxa vara and the congenital short femur.

SIC10-P01

TOTAL KNEE ARTHROPLASTY IN A PATIENT WITH HARDCASTLE SYNDROME

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Hardcastle Syndrome is a skeletal dysplasia associated with potential malignant transformation. We are reporting the first case of its kind of a 32-year-old male with osteoarthritis of the knee joint as a consequence of this syndrome for which he underwent a total knee arthroplasty with a satisfactory outcome. In addition, our case demonstrates pathological and radiological signs of skull involvement; previously having not been reported in the literature as a manifestation of this condition.

SIC10-P02

TUMOR IMMUNOTHERAPY USING WT1 (WILMS' TUMOR GENE) PEPTIDE VACCINE FOR BONE AND SOFT-TISSUE SARCOMAS: A PRELIMINARY REPORT

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BACKGROUND: WT1 (Wilms' tumor gene) is originally isolated as a tumour-suppressor gene in Wilms' tumours, however, recent studies have identified its oncogenic activity in various types of cancers, and demonstrated that WT1-specific cytotoxic T lymphocytes specifically kill WT1-expressing cancer cells, thus WT1 protein can be a molecular target for cancer immunotherapy as a tumour rejection antigen. However, WT1 expression in human bone and soft-tissue sarcomas has been poorly investigated. **MATERIALS AND METHODS:** 1) The expression levels of WT1 gene were examined in 36 cases of various human bone and soft-tissue sarcomas using quantitative RT-PCR. They included 12 MFH, 9 osteosarcomas, 6 synovial sarcomas, 4 liposarcomas, 3 MPNST and 2 others. 2) Then, we conducted a phase I/II clinical trial of tumor immunotherapy using WT1 peptide vaccine for various cancers including 12 patients with locally advanced and/or metastatic sarcoma (bone 2, soft-tissue 10) which showed WT1 expression and HLA-A*2402. Patients were intracutaneously injected weekly with 3.0 mg of HLA-A*2402-restricted 9-mer WT1 peptide. After 12-weeks injections, clinical response was radiographically evaluated. **RESULTS:** 1) 28 (78%) of 36 cases overexpressed WT1 gene, and its protein expression was confirmed by immunohistochemistry, suggesting a possibility of immunotherapy using WT1 peptide for sarcomas. 2) The clinical responses included 4 stable disease (SD) and 7 progressive disease (PD) with a case of long-standing SD over 1.5 years. One patient discontinued treatment with patient's decision. **CONCLUSION:** This preliminary study suggested that tumour immunotherapy using WT1 peptide vaccine can be a new treatment strategy for bone and soft-tissue sarcomas.

SIC10-P03

EVALUATION OF CLINICAL FUNCTION AFTER DISTAL ULNA RESECTION FOR GIANT CELL TUMOUR

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GCT is uncommon encountered in ulna; early cases can be curetted, but many cases present when the tumour has expanded to large size. At this stage, en bloc resection is the treatment of choice, but potential problems could occur with regard to the instability at the distal Radio-Ulnar joint. We studied the functional outcome of 4 patients with large GCTs of distal ulna, managed by distal ulnar resection. Follow up (2-7 years). 6-10 cm bone was removed, and no reconstruction was done for residual bony defect in 3 cases; in 1 a partial distal slide of ulnar stump was done to minimize DRUJ related instability. No recurrence was seen; function was excellent in 3 and good in 1, who had distal ulnar prominence, without functional impairment. Slight grip strength was noted, without affecting hand function. Large size distal Ulnar GCTs were due to the delayed presentation or aggressive tumours; distal ulna may not be conducive for intra-osseous growth, and cortical expansion occurs early. This leaves limited surgical options, and en bloc excision is necessary for complete tumour excision. DRUJ instability was a possibility, but we noted good functional outcomes, especially in the non dominant hand. All 4 patients were women, and functional outcome was better as none were involved in manual labour. In one case we did a longitudinal ulnar osteotomy of the residual stump with a distal slide of the lower 2 cm, in an attempt to increase DRUJ stability.

SIC10-P04

AN UNUSUAL PRESENTATION OF A GIANT TUMOUR LIKE LESION OF THE THIGH

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Soft tissue swellings of the thigh, which become painful and are gradually increasing in size, should always alert the suspicion of a soft tissue tumour. We report a case of a clinically silent chronic granuloma, which presented as a giant tumour like lesion. A 59-year-old female presented with a 6-month history of painful swelling of the left thigh, gradually increasing in size. Debridement and wound closure of a laceration of left thigh was undertaken 45 years ago following a fall. She has been completely asymptomatic since then. On examination the swelling was approximately 20x10x10 cm in size. The patient was systemically well. A radiograph of the left thigh demonstrated a large soft tissue swelling with a radio-opaque shadow. An MRI scan revealed a massive degree of susceptibility artefact and suggested that this was a cystic or fluid lesion. The swelling was excised. A ferro-metallic foreign body, 3x2 cm in size, was found in the fluid filled cavity. Histology report showed a cystic lesion lined by chronically inflamed capillary granulation tissue consistent with a chronic granulomatous reaction to metal. There was no evidence of malignancy. The wound healed well in three weeks without any infection or recurrence. Massive lesions of the limbs are not necessary soft tissue tumours. This is a rare presentation of a giant encystic reaction to a metallic foreign body, which developed after 45 years of symptom free period. To our knowledge it is the longest delay to presentation of a granulomatous reaction in the English literature.

SIC10-P05

SURGICAL MANAGEMENT OF CHONDROSARCOMA: THE TATA MEMORIAL HOSPITAL EXPERIENCE

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GOALS: To identify the risk factors associated with local recurrence and systemic

metastasis in chondrosarcoma after surgical resection. **METHODS:** Between January 2000 and July 2004, 58 patients with chondrosarcoma surgically treated at our institution. Histopathological grading, surgical margins, local recurrence, distal metastases and functional outcome analyzed. **RESULTS:** 10 patients unavailable for follow-up excluded from analysis. Of 48 patients studied, 39 underwent limb sparing surgery and 9 amputated. Margins were wide in 32 and involved in 16 patients (microscopically involved in 10, contaminated wide in 6). Follow-up ranged from 24–80 months with mean of 53.1 months. Nineteen patients had disease relapse; 2 patients developed local recurrence (LR), 3 patients developed distant metastases (DM) and 14 patients developed LR + DM. Six (18.7%) of 32 patients with wide margin; seven (70%) of 10 patients with microscopically positive margins and 3 (50%) of 6 patients with contaminated wide margins had LR. Seven (78%) of 9 patients with pathologic fracture had LR in spite of obtaining wide margins in 6. Currently 27 patients were disease free (DFS=56.25%), 13 were alive with disease and 8 died of disease. Overall survival of the entire series of 48 patients was 83.3%. Functional scores (according to MSTs Scoring system) ranged from 19 to 30 with average of 23.5. **CONCLUSION:** Wide margins results in better survival. High grade tumours are associated with increased risk of systemic metastasis and poorer prognosis. Pathological fractures in chondrosarcomas may be unsuitable for limb salvage.

SIC10-P06

A RETROPERITONEAL TERATOMA PRESENTING AS PARAPARESIS

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A rare case of retroperitoneal teratoma causing cord compression thereby resulting in paraparesis thus necessitating the patient to seek medical treatment is presented. A man of 35 yrs had a mass in the left side of the abdomen for a long time. As it was asymptomatic, no treatment was done. In the last year, the mass had started to grow and caused gross weakness in lower extremities. Clinical examination and investigations showed a retroperitoneal, well defined, heterogenous mass infiltrating the L2 vertebral body and causing cord compression. At operation, decompression of cord was done by wide laminectomy and spine was stabilized by Hartshill rectangle. At the same setting, through lumbotomy, the mass was dissected out after preliminary decompression. Patient made uneventful recovery. Histology showed retroperitoneal teratoma with double malignancy: 1) Round cell Carcinoma. 2) Mucin secreting adenocarcinoma. Patient was referred to Cancer Institute for chemo and radiotherapy. Case is presented for its rarity in presentation with neurological manifestations following malignant transformation of a retroperitoneal teratoma. Surgical excision is advocated for long standing, asymptomatic, retroperitoneal large tumour to avoid malignant transformation and subsequent complications.

SIC10-P07

PROGNOSTIC IMPLICATION OF SYT-SSX FUSION TYPE IN SYNOVIAL SARCOMA

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PURPOSE: To clarify the prognostic implication of SYT-SSX fusion gene type, in association with other clinical prognostic factors, in patients with synovial sarcoma in

Japan. PATIENTS AND METHODS: Data on 108 SYT-SSX fusion transcript-positive patients with synovial sarcoma, treated in 11 tertiary referral cancer centres in Japan, were retrospectively analyzed. The following parameters were examined for their potential prognostic impact; SYT-SSX fusion type, patient age at presentation, sex, primary tumour location, tumour size, histological subtype, histological grade, treatment modalities, and the presence or absence of metastases at presentation. RESULTS: Among those patients without metastasis at presentation, 5-year overall survival (OS) rates for SYT-SSX1 and SYT-SSX2 subgroups were 84.4% and 74.9%, respectively ($P=0.244$). Five-year metastasis free survival (MFS) rates were 67.8% for SYT-SSX1 and 68.5% for SYT-SSX2 ($P=0.949$). Univariate survival analyses for 91 patients with localized disease at diagnosis showed that tumour size was the only significant prognostic factor for OS ($P=0.0033$) and MFS ($P=0.0029$), and histological grade was marginally significant for MFS ($P=0.0785$), whereas SYT-SSX fusion type and other variables were not. Multivariate survival analyses further indicated that tumour size was the most significant independent prognostic factor for OS and MFS, and histological grade was also significant for MFS. CONCLUSION: The SYT-SSX fusion type is not a significant prognostic factor and the most significant clinical prognostic factor is tumour size, followed by histological grade, for patients with synovial sarcoma in Japan.

SIC10-P08

PALMAR SQUAMOUS CELL CARCINOMA OF THE HAND (ABOUT 3 CASES)

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The palmar localization of squamous cell carcinoma of the hand is reported very little in the literature. It is characterized by its fast evolutionarity, being able sometimes leaving like alternative only the radical gesture. The authors report 3 observations of palmar squamous cell carcinoma of the hand. They are two women and a man, all old of more than 60 years. A patient reported the local application of tar during several months like artisanal receipt against the coetaneous dryness. The time of consultation was 14 months on average. Indeed, all our patients are of rural origin and followers of traditional medicine. The tumour was ulcéro-budding in all the cases. It interested the column of a long finger among two patients east occupied all the palm of the hand in a patient. The resection of the interested column was practised twice, and the amputation of the hand with ganglionic clearing out axillaire was carried out in a patient. After an average retreat of 2 years, no local repetition nor remotely was observed. Discrete lymphorrhée of the site of the clearing out occurred in the operational continuations and which yielded to the simple local care. The correct assumption of responsibility of these lesions passes by the biopsy of any ulcerous lesion of the palm of the hand.

SIC10-P09

FIBROUS DYSPLASIA WITH AGRESIVE RADIOLOGY IN A PATIENT WITH A PRIMARY

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Fibrous Dysplasia represents about 7% of all benign bone tumours. The ageing of the world population is increasing the coincidence of benign bone tumours and other malignant neoplasm, thus making the differential diagnosis of benign bone litic lesions and metastasis crucial. We report a case of a 68 years old man, with a known vesical neoplasm treated with transurethral resection in 2004, and complete remission. One year

later a lytic lesion is detected in his proximal right femur, which is diagnosed of Fibrous Dysplasia by Tru-cut biopsy. Thradiological aggressive appearance of the lesion aroused suspicions, thus a new incisional biopsy is performed with the same diagnosis. The pain is increased. We decide to resect the lesion and a prosthesis HMRS is implanted. The pathologic study of the whole mass brings the new diagnosis of osteogenic sarcoma transformation of the Fibrous Dysplasia. Malignant transformation of fibrous Dysplasia is very rare, with less than a hundred cases reported in the literature. The management of benign bone lesions in oncologic patients is rarely treated in the literature, we review the relevant bibliography about the matter and support that an aggressive approach to Fibrous Dysplasias in patients with a primary neoplasm, may be recommended in cases of atypical radiological images.

SIC10-P10

TELANGIECTATIC OSTEOSARCOMA SIMULATING THE APPEARANCE OF AN ANEURYSMAL BONE CYST

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Telangiectatic osteosarcoma (TOS) is a rare and aggressive variant of osteosarcoma. It accounts for 5% of osteosarcoma. It presents more commonly as a pathologic fracture than conventional osteosarcoma. The difficulty in differentiating this tumour from aneurysmal bone cyst is emphasized both from the radiological and pathological aspect. Between 1996-2006, we treated 3 patients with TOS. 2 patients in the distal metadiaphysis of the femur and 1 patient in the proximal metadiaphysis of the femur. The female-male ratio is 2:1. The age of the patients was from 10-26 years (mean 18.3). TOS appears as a painful, radiographically lytic mass lesion in the long bones. It is characterized by blood-filled vascular spaces lined by malignant osteoblasts separated by fibrous septa, which contain the multinucleated cells, and scanty osteoid. Because of difficulty in differentiating this tumour from benign entity the surgical management was limb salvage. Local recurrence of disease after surgery was in 100% cases. In 2 cases we made disarticulation of the hip joint and in 1 case wide excision. In 2 cases after surgery, chemotherapy was used similar to the treatment of high-grade osteosarcoma. 1 case died 3 years after radical surgery and chemotherapy. 1 case had lung metastases after radical surgery and chemotherapy and 1 case was disease-free 1 year after excision of tumour. **CONCLUSION:** A high degree of suspicion is necessary with a purely destructive lesion of the long bones because of difficulty in differentiating this tumour from aneurysmal bone cyst.

SIC10-P11

SKELETAL METASTASES OF UNKNOWN ORIGIN: AN EXPERIENCE WITH 17 PATIENTS AT YUKOUKAI GENERAL HOSPITAL

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BACKGROUND: Metastatic bone tumour is most common malignancy of bone, and is often diagnosed as the initial clinical manifestation of malignant disease. **PURPOSE:** In this study, we retrospectively analyzed clinical evaluation of patients with skeletal metastases of unknown origin to devise an efficient diagnostic strategy. **METHODS:** Between September 2002 and August 2006, 17 patients who were suspected to have

skeletal metastases of unknown origin visited to our hospital. We retrospectively analyzed these patients' records. RESULT: There were 15 men and 2 women. The median age was 64 years (range, 24 to 76 years). The primary tumour was identified in 15 patients, but in 2 patients a diagnosis of primary tumour was not obtained. Of the identifiable primary tumours, 3 were multiple myelomas, 2 were carcinomas of the prostate, 2 were carcinomas of the lung, 2 were carcinomas of the liver, 2 were carcinomas of the stomach, and 4 were others. Determinable diagnostic tests were histopathological examination in 5 patients, computed tomography in 4 patients, laboratory examination in 4 patients (multiple myeloma, and carcinoma of the prostate), and endoscopic examination of the digestive tract in 2 patients (carcinoma of the stomach). DISCUSSION AND CONCLUSIONS: In our series of 17 patients with skeletal metastasis of unknown origin, primary tumour was diagnosed in 15 patients (88.2%). Although histopathological examination was most successful for diagnosis, less invasive tests should be done prior to it and even it could not lead to final diagnosis in 2 patients (11.8%).

SIC10-P12

TREATMENT OF JUVENILE BONE CYSTS FROM OBSERVATION TO ENDOSCOPIC SPOGIOPLASTICS

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INTRODUCTION: Relying on other methods we developed a new method with success. AIM: To develop method of treatment to be minimally invasive, to completely remove the tumorous endothel. To accelerate remodelling of bone mass without post-operative immobilization; shorten time of treatment to full weight-bearing. METHOD: We compared 23 therapies (14 boys, 9 girls, aged 9.9) juvenile bone cysts, from 1990-2006. Between 60-90% of the bearing surface of the bone tissue was destroyed. We treated 11 patients with puncture and kortizon, bone Kiel graft (3), with homotransplantate (6), with autotransplantate (4). Spontaneous fractures =9 times (2 re-fractures), immobilization used 7 times, performed osteosynthesis (2 cases). RESULTS: Duration treatment to full weight-bearing with kortizon puncture lasted 2-5 years, combined with spongioplastics up to 2 years. The shortest duration was with spongioplastics (6 months), but if there was remaining tumorous endothel after the operation, relapses occurred. The arthroscope was introduced through small hole (not destroying the corticalis), we removed the pathological endothel; filled up the cyst through same hole with grounded spongiosa taken from the bone bank. The hole closed with a cortical stopper and we got the internal immobilization. Without the external immobilization, limb could be actively moved and have weight-bearing for stimulation of the bone tissue for quick remodelling. CONCLUSION: Extremely big cysts in calcaneus, humerus and tibia treated with this method and the children had full-weight bearing after a month. They wore no immobilization the entire time. The X-ray scans showed fast remodelling of bone mass. We had neither post-operative relapses nor complications.

SIC10-P13

SMALL CELL OSTEOSARCOMA: REPORT OF A RARE NEOPLASM

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Small cell osteosarcoma is a very rare tumour, with less than 200 reported cases, and only 5 described in the upper part of the tibia, that have worse prognosis than

conventional osteosarcoma. We report a new case of tibial small cell osteosarcoma, its radiological atypical appearance and the importance of making a differential diagnosis with the Ewing Sarcoma for applying the right therapeutic protocol, with emphasis in the surgical approach using tumoural prosthesis. The patient evolved in an atypical way with only bone metastasis, one in the distal third of the same tibia, sternum and ribs.

SIC10-P14

CHRONIC EXPANSIVE HAEMATOMA IN THE MUSCULOSKELETAL SYSTEM: REPORT OF TWO CASES AND REVIEW OF THE LITERATURE

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The Chronic expansive haematoma is a rare complication that can happen spontaneously, after a traumatism or rarely secondary to surgery. There are few cases reported, and its epidemiology is unclear. We show our experience in two cases, one in an 82-year-old man with a history of hip prosthesis the previous year, who reported no known coagulopathy, and another case in a 52-year-old man without relevant previous history. We review the clinical management, the differential diagnosis with malignant tumours, and the utility of the different complementary techniques (CAT, MR, Biopsies...), altogether with the published literature. We also show the importance of the arteriography as the gold standard for the diagnosis and treatment.

SIC10-P15

BONE GRAFTING AND OSTEOSYNTHESIS AT BENIGN BONE TUMORS AND TUMOR- LIKE LESIONS OF LONG BONES

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We have studied the results of treatment of 652 children, who were operated in our department from 1982 until 2005. The segmental resection was performed in 14 cases, sectoral - in 106, boundary - in 383 and excochleation - in 149. The bone defect, depending on its localization and size, was filled with massive or crushed bone grafts: cortical - 181 and spongy - 89. Different forms of stable osteosynthesis were used in 68 cases and adaptive - in 92. For guaranteeing the optimum conditions of the healing of bone wound and retention of the function of the extremity after the segmental resection of the bone, we consider it necessary to use massive cortical bone grafts and stable osteosynthesis. After the sectoral resection or extended excochleation, if less than 2/3 of the circle of the bone preserved, we consider it necessary to use the stable "preventive" osteosynthesis. Adaptive osteosynthesis is permitted in some cases, when the residual strength of the bone is sufficient. The grafts must fully replace bone defect and have the capability to pick up the part of the load (massive cortical - in the diaphysis, cortical-spongy or spongy - in the metaepiphysis). The crushed grafts may be used for the filling of residual cavities around the massive grafts or sealing of relatively small metaepiphyseal defects. All the methods of bone grafting and osteosynthesis must maximally restore the strength of bone and reduce the necessity of the immobilization to the minimum.

SIC10-P16

INTRAOSSEOUS LIPOMA PROXIMAL TIBIA IN A RHEUMATOID PATIENT

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A 55-year-old patient referred from the rheumatology clinic with a painful left knee and an abnormal X-ray. CT scan was requested in the orthopaedic clinic, and this showed bone tumour. The patient then had excisional biopsy and an impaction bone graft. The histopathology confirmed a rare intraosseous lipoma.

SIC10-P17

EPIPHYSEAL FEMORAL OSTEOLASTOMA: REPORT OF A RARE LOCALIZATION

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Osteoblastoma is an uncommon benign bone tumour diagnosed in about 1% of primary bone tumours. Predominantly observed in the axial skeleton, it can be observed in long bones (20%), generally in the diaphysis (80% of the long bone localizations). In typical cases, standard imaging is highly suggestive of the diagnosis. The typical image is a lytic zone surrounded by bony condensation, and a minimal osteosclerotic reaction peripherally, rarely invading the soft tissues. The tumour we report presented an unusual localization and an atypical aspect on the imaging studies. Located in the femoral epiphysis, this osteoblastoma respects the soft tissues, as seen on the CT and MRI studies which visualized an encapsulated tumour with a calcified shell.

SIC10-P18

GIANT CELL TUMOR OF THE DISTAL RADIUS: RESECTION AND RECONSTRUCTION WITH A PERONEAL FREE GRAFT - 2-CASE STUDY

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The giant cell tumor (GCT) of the distal end of the radius is relatively frequent. Benign forms usually heal using curetting and filling. Nonetheless, GCTs are characterized by local relapse, especially in the distal end of the radius. Some authors repeat the curetting and fill in the defect using an autograft or polymethylmetacrylate. The authors present two cases of local relapse treated with block resection and reconstruction using the proximal end of the fibula. The patients were followed up after 9 and 5 years. The functional and radiological results were satisfying. This resection technique of the affected epiphysis and its replacement with an osseus graft seems to be more in accordance with tumour treatment. It is characterized, however, by a series of technical difficulties inherent to the graft extraction and fixation. Concerning the graft, the proximal end of the fibula seems to be the ideal graft for the reconstruction of the distal epiphysis of the radius. The free graft is certainly of great technical simplicity and should be easily carried out by any orthopaedic surgeon. This technique, however, is accompanied by the uncertainties of the graft healing. These inconveniences can be overcome with microsurgery. A pedicled osseus flap is, however, much more complex and requires a much higher level of training. The favourable evolution of our two patients both anatomically and functionally makes us wonder whether a more complex technique is justified.

SIC10-P19

COMPRESSION OF THE EXTERNAL PLOPLITEAL SCIATIC NERVE BY A SYNOVIAL CYST OF THE SUPERIOR TIBIAL-PERONEAL ARTICULATION

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Compression of the peroneal nerve by synovial cyst is rare. Since 1921, less than 70 cases have been described. Authors present a case report of extrinsic compression of the peroneal nerve by a synovial cyst. The 42-year-old man consulted for left leg pain appearing abruptly 25 days earlier. Pain was followed by paralysis of the peroneal nerve with deficit in the anterior tibialis muscle, both extensor hallucis muscles, and lateral peroneal muscles. Palpation made evident a soft, deep mass in the proximal third of the antero-external compartment. The other signs were a discrete footdrop gait and hypoesthesia of the external face of the ankle. Electromyography found diminished sensitive and motor conduction speed. X-rays did not show any abnormality. Doppler ultrasound described a well defined liquid structure. MRI confirmed the presence of a cyst. Surgical exeresis of the tumour was carried out. An antero-external approach was used, the tumour was found along the long peroneal muscle. Its puncture evidenced yellow mucoid liquid. The tumour was outside the neural sheath and the peroneal nerve endings were separated out. Detection of the two terminal branches of the peroneal nerve and its branches was carried out. Pathology confirmed a true synovial cyst. Pain had disappeared when he awoke. After 2 months both mobility and sensitivity were recovered, and progressively strength. Functional recovery of the antero-external compartment was progressive. After a five year follow-up the patient does not present any relapse.

SIC10-P20

THE CHONDROMYXOID FIBROMA OF THE LEG : ABOUT ONE CASE

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The chondromyxoid fibroma is a rare benign tumour. It represents less than 1% of the osseous tumours. The objective of this study is to discuss the radiological and therapeutic aspects through a clinical observation and a review of the literature. We report the observation of a young 24-year-old patient, without particular antecedents, presenting since 4 years, a progressive tumefaction and of spontaneous appearance of the higher end of the tibia with mechanical pains and a light boitery, without other associated signs. The clinical examination noted a tumefaction on the proximal end of the tibia with pains. The radiography of the knee supplemented of a TDM had shown an osteolytic image of the proximal end of the tibia, without périostée reaction, nor invasion of the articulation or the soft parts. The biopsy had revealed an aspect in favour of a chondromyxoid fibroma. The treatment consisted of a complete excision of the tumour. The evolution was simple.

SIC10-P21

BIPOLAR ANEURISMAL CYSTS OF THE TIBIA: A CASE REPORT

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The aneurismal cysts is a rare pseudotumoral bone dystrophy, benign all the time and always solitary. We report a rare case of bipolar aneurismal cysts of the tibia, in an 18-year-old girl's tibia, revealed by painful knee and diagnosed by X-rays. The surgical treatment consisted of tumoural resection and corticospongial graft. Multifocal aneurismal cysts are rarely described in the literature. It's always secondary to a pre-existent lesion that has had homodynamic modifications.

SIC10-P22
NAVIGATION SYSTEM IN BONE TUMOR SURGERY

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The registration using skin markers in surgery has not yet been reported in the orthopaedic surgery. We herein investigated the usefulness and issues of registration using skin markers. Surgery was performed for six patients with bone tumours, comprising the following: osteoid osteoma (n=1), oncogenic osteomalacia (n=2), parosteal osteosarcoma (n=1), chordoma (n=1), and recurrence of chondrosarcoma (n=1). Registration was performed using a navigation system and skin markers that were placed on the skin surrounding the affected area on the day before surgery, and CT was performed in consideration of surgical position. Postoperative follow-up ranged from 6 to 12 months (mean, 9.3 months). Registration error for the six patients ranged from 0.6 to 1.1 mm (mean, 0.87 mm). The margin of resection was adequate, based on postoperative images and histological assessment. Although postoperative follow-up was short, all cases were disease free. In this study, which involved skin in the hip and limb areas, no problems were observed in any patient, and surgery was performed with adequate margin.

SIC10-P23
MINIMAL INVASIVE SURGERY FOR BENIGN TUMOUR OF PROXIMAL HUMERUS

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INTRODUCTION: To present a case of osteochondroma of proximal humerus successfully treated with shoulder resurfacing following excision of the tumour. **METHODS:** A 30-year-old male presented with a gradually worsening pain and stiffness over a period of four months in his left non dominant shoulder. He had an excision of chondroblastoma after open biopsy of the lesion, fifteen years ago from the left proximal humerus. He remained symptom free since then until recently when his symptoms recurred. X-ray of his left shoulder has shown exostoses just below the humeral head and arthritic changes in the glenohumeral joint. Bone biopsy confirmed the diagnoses of osteochondroma. It was interesting to note two different pathologies in the same shoulder. Considering his young age, uncontrolled pain and limited shoulder movements, shoulder arthroplasty was performed. **RESULTS:** Clinical and radiographic findings are discussed. **CONCLUSIONS:** Various surgical procedures are reported in literature for treating benign and malignant lesions of proximal humerus. We have achieved a satisfactory outcome with simple excision and resurfacing in a benign tumour of proximal humerus.

SIC10-P24
RELATIONSHIP AMONG CLDN7, ELF3, AND SNAIL IN THE FORMATION OF THE EPITHELIAL STRUCTURES IN SYNOVIAL SARCOMAS

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We investigated claudins (CLDNs), critical molecules in the tight junction indispensable for the formation of epithelial structures, in biphasic synovial sarcoma(SS), and reported that CLDN7 was the most closely associated with the epithelial component of SS among 21 CLDNs and positively regulated by ELF3, an epithelia-specific member of the Ets family of transcription factors. But immunohistochemistry showed that there were some non-epithelial cells expressing ELF3 but not CLDN7, which indicated the presence of negative regulators. We focused Snail transcriptional factor previously reported as negative regulator of CLDN7 and investigated the relation of Snail with ELF3 and CLDN7. The expression of Snail was inversely correlated with that of ELF3 by RT-PCR in 16 SS tumour samples including 8 biphasic SSs, and induction of CLDN7 by exogenous ELF3 was increased with the inhibition of Snail. And we confirmed by Chromatin immunoprecipitation assay that Snail was bound to -142 E-box, that was the binding site of Snail, which was closely located at -150 Ets site that was the binding site of ELF3. These findings indicated the possibility that Snail inhibited the transcription of CLDN7 by interfering with the binding of ELF3 to CLDN7 promoter. Next we will investigate the relationship of Snail, ELF3, and CLDN7 by immunohistochemistry and focus the association of SYT-SSX fusion protein with these molecules.

SIC10-P25

OSTEOID OSTEOMA, A BONE LESION CONTAINING NERVE FIBERS: IMMUNOHISTOCHEMICAL POSITIVITY FOR NEUROFILAMENTS AND S-100 PROTEIN

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The study is retrospective on 10 osteoid osteomas operated with resection in our hospital. All the lesions were clinically and histologically reevaluated. Clinically the pain had disappeared and no recurrence was registered over one-year follow-up. Novocastra primary ready to use mouse monoclonal antibodies for paraffin S-100 protein and neurofilaments were used in a sequential application with biotinylated link antibody and streptavidin labeled with peroxidase. Liquid DAB was the chromogen. We could demonstrate in all lesions immunohistochemical positivity with both antibodies. In general the positivity for neurofilaments was diffuse and stronger than for S-100 protein in the nidus. In the reactive zone S-100 protein was more often focally expressed in histologically identifiable nerve fibres. In conclusion, this panel of antibodies could be recommended in the diagnosis of osteoid osteomas especially in some difficult cases in which an osteosarcoma should be ruled out.

SIC10-P26

HALLUX ANGIOSARCOMA / RARE LOCALISATION

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Angiosarcome is a malignant rare tumour which develops starting from the endothelial cells (1% of all the sarcomas), characterized by its local aggressiveness; its fast evolution and its forecast sinks with a rate of survival at 5 years rare. The interest of our observation is to bring back the rare case of tumour from its type and especially its localization in the hallux which was described only very seldom in the literature. It concerns a 65-year-old patient whose beginning of symptomatology goes up to 5 months

by the appearance of a subcutaneous painful nodule with a simple ecchymose in glance, the evolution two months ago was marked by the exacerbation of the pain and the complicated appearance of an extensive bruise then of an important coetaneous ulcerations putting by so the bone naked. The radiological assessment and the T.D.M. objectified an aspect misty of the two phalanges with aggressive images of osteolysis and osteocondensation with an obliteration of cortical and an invasion of the soft parts perished osseous; the assessment of extension did not show secondary localizations. A first biopsy objectified an aspect of angiosarcome differentiated very well. The therapeutic attitude was radical by an amputation in the level of the operational articulation of Lisfranc with an aggressive polychemotherapy in post operation. The evolution was marked by the absence of local repetitions.

SIC10-P27

DESMOIDE TUMOUR AND SYNDROME OF TURNER

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The desmoides tumours are a rare and benign fibrous neoplasm. These tumours sit especially at the belts and the roots of the members, the osseous localizations are very rare; they account for 0.1% of the osseous tumours. They touch especially the metaphysic long bones. The etymology remains unknown, several factors were accused, among them the genetic predisposition; the only well documented association is that with the adenomateuse polypose familial but only one recent observation in the literature treated the association of a syndrome of Turner and of a tumour desmoide of the colon. We brought back a case of an exceptional association of a syndrome of Turner and of an aggressive tumour desmoide of before arm in a 36-year-old patient. The radiological assessment and the I.R.M objectified a bulky tissue mass of the external, internal and posterior cabin of before arm with an invasion of the inter-bones membrane and very important osteolysis of the ulna with obliteration. The patient profited from two biopsies which confirmed the diagnosis of a tumour desmoide without signs of malignity. The therapeutic attitude was a broad soft parts invaded resection with complement into postoperative by a hormone-therapy containing tamoxifene. The interest of this observation is to bear this association of a tumour desmoide extra abdominal and syndrome of Turner not described in the literature, of the rare localization and to insist on the aggressive character of these tumours.

SIC11-P01

BONE NONUNION. DOES IT DEPEND ON US?

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The fracture impairs the bone fragments blood supply and the osteosynthesis performs a "second strike" on microcirculation. The patients with nonunions were subdivided into 3 groups: after plating (15), IN (5) and ExFix (10). Applying plates in diaphyseal monoosseal segments is a mistake. In unstable A3, B3, C3-type fractures the compression plate application leads to the stress-shielding effect and plate fracture or the screw migration. We treated the patients by implant removal and intramedullary fixation with canal reaming. In tibia fractures the Ilizarov method is quite useful. IN is the most biomechanically suitable in diaphyseal fractures. The soft tissues injury is minimal. Some surgeons claim that this method destroys the endosteal circulation, indeed the fracture

destroys all kinds of circulation. The reason for nonunion is a severe bone damage, inappropriate surgical technique (short and thin unreamed nails, neglected dynamization and incorrect ante- or retrograde implant choice). Using ExFix as a primary osteosynthesis specially in multiple trauma, it is necessary to change it into multi-plane external system or internal fixation after the vital signs stabilization. Some surgeons forget that the fibula reparation is quicker, so it's necessary to perform an osteotomy. We treated the patients by plating or IN. In all cases except one (humerus pseudoarthrosis after plating) we gained the fracture healing. We didn't apply bone substitutes and bone healing stimulating substances. In our opinion all kinds of osteosynthesis, performed in the proper way, are the best conditions for osteoinductive processes.

SIC11-P02

NEW TREATMENT WITH INTERCONNECTED POROUS CALCIUM HYDROXYAPATITE CERAMIC FOR JUXTA-ARTICULAR INTRAOSSEOUS CYSTIC LESIONS IN RHEUMATOID ARTHRITIS PATIENTS

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BACKGROUND: Juxta-articular intraosseous cystic lesions (JAICL) are common lesion in patients with rheumatoid arthritis (RA) and could cause spontaneous pathological fractures and extensive joint destruction. JAICL have been rarely treated surgically. We evaluated the feasibility and effectiveness of curettage and packing with newly developed interconnected porous calcium hydroxyapatite ceramic (IP-CHA) for the treatment of JAICL in RA patients. **METHODS:** Twelve JAICL in 10 RA patients were treated by curettage and packing with IP-CHA. Ten lesions were impending pathological fractures. Three were male and seven were female, the average age of operation was 59 years (range, forty-nine to seventy-two years). Follow-up assessment was based on final radiography at an average of 16.2 months after surgery (range, five to thirty months). The expansion of the cystic lesions around the implanted IP-CHA, the reabsorption of the IP-CHA itself and post-operative fractures were assessed on the basis of the radiographies taken at just after operation and final follow-up. **RESULTS:** The locations were as follows: distal radius, 8 lesions; distal ulna, 1; proximal tibia, 1; distal tibia, 1; distal fibula, 1. No lesions showed the reabsorption of implanted IP-CHA itself. One of 12 lesions showed out-expansion of radiolucent area around the implanted IP-CHA at the final follow-up. There was no post-operative fracture as complication. **CONCLUSIONS:** These results suggested that surgical intervention with the IP-CHA could be useful for prevention of pathological fractures due to JAICL. The efficacies of this technique might be augmented by amelioration of disease activity with concomitant drug therapy including biologics.

SIC11-P03

COMPRESSION PLATING IN HUMERAL SHAFT NON-UNION

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AIM: Various treatment options are recommended in the treatment of humeral shaft non-union. The purpose of our retrospective study was to determine the results of compression plating in humeral shaft non-union. **PATIENTS AND METHODS:** Between 1995 and 2005, 17 patients with non-union of the humeral diaphysis were treated by ORIF with plate fixation. Initial treatment of the fractures was non-operative in 9 cases

and operative in 8 cases (4 x plate fixation, 3 x intramedullary nail, 1 x intramedullary rod). There were 14 women and 3 men with a mean age at the time of injury of 56 years (range, 19 - 83 years). Based on pre-operative X-rays 16 cases were classified as atrophic non-union and one case as a hypertrophic one. All non-unions were stabilized with plate fixation (15 DCP and 1 LC – DCP). Additional cancellous bone grafting was performed 12 times. The posttraumatic time interval averaged 17 months. Postoperatively all patients were examined clinically and radiologically until the non-union had healed. RESULTS: Follow-up examinations took place at a mean time of 6 (3-10) months after surgery. In 15 cases (88.2%) the patients were pain free in daily activities and the non-union had healed radiologically. In 2 (11.8%) cases no bony healing was seen. Complications were seen in 3 cases; twice transient radial nerve palsy and one local haematoma. CONCLUSION: Stable plate fixation combined with autologous cancellous bone grafting appears to be the successful treatment option in the treatment of humeral shaft non-union.

SIC11-P04

RESULTS OF INTERLOCKING NAILING AND ALLOGRAFTS IN MANAGEMENT OF NON-UNITED FRACTURES SHAFT OF FEMUR AND TIBIA

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OBJECTIVES: Evaluate use of interlocking nail and allograft in redo fixation of nonunited fractures femur and tibia in cases of implant failure, neglected cases with and after external fixator and assess union rate and return to functional activity. MATERIAL AND METHODS: 75 patients underwent this study, 30 cases with nonunited fracture femur 2 cases after external fixator, 22 cases implant failure with plating and 6 cases implant failure with nailing. 35 cases nonunited tibial fracture 4 cases after external fixator, 8 cases neglected conservative treatment 21 cases implant failure with plating and 2 cases after nailing. The age of patients ranged from 19 to 62 years, male to female 54:21. The study was carried out in the period between July 2003 and December 2006, follow-up ranged from 6 months to two years. For all patients, intramedullary nailing with allograft as a tool of fixation. RESULTS: Patients assessed according to union rate, return to functional activity and ROM. The function assessed according to criteria of Schatzker and Lambert. The results were excellent in 63 cases with full range of motion, union of fracture between 16 to 20 weeks and return to sedentary functional activity within 5 weeks postoperative. 5 cases of infection, 5 cases necessitated regrafting but with no implant failure, one case of DVT, and one case limited ROM. CONCLUSION: Use of interlocking nail with allograft in fixation of nonunited femoral and tibial fractures is excellent choice with early weight bearing and functional activities.

SIC11-P05

THE SURGICAL TREATMENT OF LIMB LENGTH INEQUALITY, BONE LOSS AND NONUNIONS OF LONG BONES WITH EXTERNAL FIXATOR

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The study comprises 46 patient, 29 males, 17 females, aged between 15 and 60 years. There were eleven patients with nonunions, 2 at humerus, 3 at femur, 6 at tibia. The restore of bone loss and the treatment of nonunions were done by Ilizarov method, followed by rehabilitation, with the goals: early mobilization with loading in almost every case of nonunions and partial loading in case of bone loss, improving muscle strength

and articular mobility. Good results were obtained in 31 patients with limb equalizing bone stock restore, union of nonunions and a good joint mobility. In 12 cases, the results were satisfactory with moderate joint stiffness, muscular hypotrophy and slight nerve palsy. In 3 cases, due to major complications, we had to perform amputation of the limb that lead to unsatisfactory results.

SIC11-P06

FREE VASCULARIZED FIBULA TRANSFER FOR PSEUDARTHROSIS OF THE HUMERUS

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The goal of this study was to describe technical points to simplify this procedure as humerus approach, fibula harvesting, vessels recipient and type of fixation. Three patients with a mean age of 60 years with an aseptic non union of the humerus were treated with a vascularized fibula graft. The mean length of the graft was 10 cm. We harvested fibula on the ipsilateral side with an incision centred at the mid-shaft (nutrient vessel). The mean length of the peroneal pedicle was 6 cm. Humeral shaft defect was exposed through a long lateral approach. Radial nerve was always identified first and a "gutter" was custom-made in the proximal and distal humeral segment to receive the fibula. A long plate with 3 screws distal and proximal spanning the entire bone defect. A medial shaft approach allowed identifying brachial artery and vein to perform a microsurgical lateral anastomosis. Radiological bony union was achieved in 3 patients at a mean time of 5 months. All united fibulae hypertrophied during the follow-up periods (minimum 12 months) and no stress fracture of the grafted fibula was detected. A complementary cancellous bone graft had been applied systematically. No nerve complication on the donor and recipient site. Any foot and ankle dysfunction was observed. The free vascularized fibular graft has been successfully applied as a reconstruction option in patients with non union of the humerus after failure of traditional procedure.

SIC11-P07

REGENERATION AND OVERGROWTH AFTER MASSIVE DIAPHYSIAL BONE LOSS

Geries R HAKIM

The importance of the function of the periosteum in the fracture healing process has been documented and recognized in scientific literature for many years. We present a case involving the full regeneration and resultant overgrowth of the radius after massive diaphysial bone loss. The extruded piece of bone was not used, due to contamination. After treating a ten-year-old boy with an external fixator and correct alignment of the radius, we recorded the regeneration of 9 cm of bone loss and also overgrowth. This was then treated with a shortening osteotomy and epiphysiodesis of the distal epiphysial growth plate. After nine years follow-up, full function and range of movement was observed.

SIC11-P08

THE USE OF A MADE-IN-MALAYSIA HYDROXYAPATITE (HA) GRANULES (GRANUMAS™): EARLY CLINICAL RESULT A ONE-YEAR REVIEW

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This paper is to report on the work that has been performed, in conjunction with a multi-institution research project, towards achieving the production of a locally made bone graft substitute. Hydroxyapatite (HA) granules made from local raw materials have been fabricated using a novel method (Patent (Pending) No. PI 2004 0748). The granules were characterised both chemically and physically and found to abide by the ASTM F1185 - 88 (1993) specification that covers the material requirements for HA intended for use as surgical implants. Biocompatibility studies, involving various cytotoxicity and genotoxicity studies; in vivo animal studies, comprising of acute systemic toxicity, dermal sensitisation and primary skin irritation assays and also implantation studies; and a phase 1 clinical trial involving the use of the granules for root socket obliteration in young healthy adults following tooth extraction was performed. Based on the results of these studies, the material was approved for a phase 2 clinical trial. Young adult patients with a fracture of the distal end of the radius requiring bone graft usage is voluntarily recruited into this study after fulfilling a set of inclusion and exclusion criteria. An informed consent is acquired prior to surgery. Clinical and radiological observations were made and recorded. Measurements are made and the results were analysed. This presentation represents the preliminary results of patients that have been operated on in 2005.

SIC12-P01

HIP FRACTURE IN TRANSIENT OSTEOPOROSIS OF PREGNANCY

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Transient osteoporosis of hip (TOH) is an uncommon disorder during pregnancy but possibly under diagnosed condition. We report the case of a 37-year-old Lebanese woman who developed pain in both hips in the seventh month of pregnancy and fractured both hips 10 days after giving birth. The purpose of this report is to elucidate the diagnostic and therapeutic aspects of transient osteoporosis of pregnancy and to stimulate physician awareness of this condition. Early diagnosis of which may prevent unnecessary invasive procedures and better understanding of this condition will ultimately help in the prevention of bone loss in pregnant women.

SIC12-P02

RECYCLED PALM OIL IS BETTER THAN SOY OIL IN MAINTAINING BONE PROPERTIES IN MENOPAUSAL OSTEOPOROTIC MODEL OF OVARIETOMIZED RATS

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Palm oil is shown to have antioxidant, anticancer and cholesterol lowering effects. It is resistant to oxidation when heated compared to other frying oils such as soy oil. When frying oil is heated repeatedly, it forms toxic degradation products, such as aldehydes which when consumed, may be absorbed into the systemic circulation. We have studied the effects of taking soy or palm oil that were mixed with rat chow on the bone histomorphometric parameters of ovariectomised rats. Female Sprague-Dawley rats were divided into eight groups: (1) normal control group; (2) ovariectomised-control group; (3) ovariectomised and fresh soy oil; (4) ovariectomised and soy oil heated once; (5) ovariectomised and soy oil heated five times; (6) ovariectomised and fresh palm oil; (7)

ovariectomised and palm oil heated once; (8) ovariectomised and palm oil heated five times. These oils were mixed with rat chow at weight ratio of 15:100 and were given to the rats daily for six months. Ovariectomy had caused negative effects on the bone histomorphometric parameters. Ingestion of both fresh and once-heated oils, were able to offer protections against the negative effects of ovariectomy, but these protections were lost when the oils were heated five times. Soy oil that was heated five times actually worsens the histomorphometric parameters of ovariectomised rats. Therefore, it may be better for postmenopausal who are at risk of osteoporosis to use palm oil as frying oil especially if they practice recycling of frying oils.

SIC12-P03

INCIDENTAL VERTEBRAL FRACTURES ON CHEST CT: 'A LOST OPPORTUNITY'

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AIM: To investigate the prevalence, site and rate of incidental spinal fracture on Chest CT scans performed for pulmonary disease. As well as assess the frequency with which these fractures are noted in the Radiologists report. METHOD: 200 consecutive Chest Multi-detector CT scans, performed over a 3-month period, were included. The thoracic spine was reviewed in the sagittal plane (Reconstructed) on bony windows, by three radiologists. Vertebral fractures were graded using a validated semi-quantitative technique (Genant et al). RESULTS: The mean age was 61 years. 48% of patients were female. The prevalence of fractures was 35% (70). Of these, 73% (51) were mild (Grade 1) fractures, 19% (13) moderate (Grade 2) fractures and 9% (6) severe (Grade 3) fractures. Fractures commonly affected patients above the age of 50 (70%). The most common sites of fracture were from T9 to T12 (53%). The overall detection rate as assessed by examination of the radiologists' reports, issued at the time of scanning, was 3% (6 patients). CONCLUSIONS: 35% of patients who underwent chest CT had vertebral fractures. There is significant underreporting of these fractures on chest CT. It is important that Radiologists report incidental fractures on non-musculoskeletal imaging, as this represents a missed opportunity to institute secondary prevention.

SIC12-P04

CLINICAL OUTCOME OF CONSERVATIVE TREATMENT FOR OSTEOPOROTIC COMPRESSION FRACTURES IN THORACOLUMBAR JUNCTION

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OBJECTIVES: To validate a treatment plan by analyzing the clinical outcome of conservative treatment for patients with osteoporotic vertebral compression fractures at thoracolumbar junctions. MATERIALS AND METHODS: We evaluated 83 cases. After conservative treatment, based on 10-point pain rating scale at last follow-up, the group was sub-divided into two groups. Group A (N=28): had a score above five points on the pain scale. Group B (N=55): less than five points. Evaluation of the correlation between the clinical outcome and factors affecting outcome were recorded at initial and follow-up assessment. RESULTS: The mean VAS score was 320±16.2, and the mean compression ratio was 24.74±12.03% at injury and 21.68±11.43% at the last follow-up. The mean compression ratio at injury was 27.67±10.50% in group A and 23.25±10.57% in group B. The mean compression ratio at the last follow-up was 53.43±13.31% for group A and 42.86±13.74% for group B. The change in compression ratio was 25.76±12.68% in group

A and $19.60 \pm 10.25\%$ in group B. The mean BMD was -3.63 ± 1.16 for group A and -2.80 ± 1.10 for group B. The compression ratio at last follow-up, change of compression ratio and BMD were significantly different in comparisons between group A and B ($p=0.001, 0.031, 0.003$, respectively). **CONCLUSION:** The clinical outcome of osteoporotic compression fracture was related to the compression ratio, and compression ratio was related with BMD. Patients with osteoporotic compression fracture with a compression ratio of more than 30% and a T-score from the BMD of less than -3.5 require active treatment.

SIC12-P05

RARE ETIOLOGY OF OSTEOMALATIA

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Authors present the case of Mrs. K.H., 45 years old, without any known medical history, consulting for diffuse osseous pain evolving for the past three years. Accompanying symptoms included mechanical arthralgia, myalgia, and intense myasthenia. Clinical exam revealed a prostrated patient presenting painful cyphoscoliosis with dorsal hunch, and tenderness to palpation of spinous processes and articular mobility. X-rays demonstrated diffuse demineralization of the long bones and vertebral column, with vertebrae and rib fractures. The phosphocalcemic work-up was notable for hypophosphatemia between 6-10 mg/L, normal phosphaturia, and a decrease of vitamin D derivatives. Calcemia, calciuria, and alkaline phosphatases, as well as parathyroid hormone were normal. Absence of evident etiology explaining hypophosphatemia called for a re-evaluation of the diagnosis. A new clinical exam revealed a solid, hard, non-tender mass in the external side of the right thigh that had evolved over the past 10 years. The diagnosis of oncologic hypophosphatemic osteomalatia was then evoked. Evolution was marked by normalization of the phosphatemia in the 72 hours following tumour exeresis, and by progressive recovery from clinical symptoms. Pathology study pointed to hemangioma diagnosis. Less than a hundred cases of oncogenic hypophosphatemic osteomalatia have been reported in the literature. The physiopathologic mechanism of this entity is not understood, although it seems to be in relation with tumour secretion of an agent that inhibits sodium-phosphate transport. Recent immunohistochemical studies have highlighted the expression by certain cells of a phosphate regulation gene, found on the X chromosome (PHEX).

SIC12-P06

ECONOMIC IMPLICATIONS OF OSTEOPOROSIS RELATED FEMORAL FRACTURES IN SAUDI ARABIANS

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BACKGROUND: The incidence of Osteoporosis related femoral fractures is assessed to be 6 per 1000 Saudi women. The cost of managing such fractures has not been assessed till now. The aim of this study is to assess the cost to manage femoral fractures from the admission to discharge of the patients. **PATIENTS AND METHODS:** This is a retrospective study of all patients admitted to the orthopaedic department at King Fahd Hospital of the University between January 2001 and December 2005. There were 63 patients admitted to the hospital with osteoporosis related fractures which was defined as a fracture occurred due to fall at ground level in men and women over the age of 50 years. Forty-three patients sustained femoral fractures which were analyzed. The cost of

treatment from admission to discharge was calculated. RESULTS: The average age of these patients was 72.11 years (range 52-103 years). There were 23 males and 20 female patients. These patients stayed a total of 760 days (mean 17.67 days). The total cost of managing these patients was SR 1.76 million @ of SR 40937 per patient. In the eastern province the cost of managing these fractures is estimated to be SR 69.59 million (1700 fractures) and for the whole country 8440 fractures, the estimated staggering cost is SR 3.45 billion. CONCLUSION: In conclusion this study raises serious economic concerns. We believe that if osteoporosis is diagnosed early and adequately treated the incidence of these fractures will decrease by 80% thereby reducing the hospital cost, morbidity and mortality.

SIC12-P07

ADVANTAGE OF OSTEOSYNTHESIS WITH BONE CEMENT IN TREATMENT OF LONG BONE FRACTURES; EXPERIMENTAL INVESTIGATIONS

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In osteoporosis, cortical thinning reduces the length of engagement, the maximum screw torque that can be applied, and the frictional force between plate and bone, thus increasing the potential for fatigue failure. For this purpose, it is necessary to find out how to increase the contact surface between metal implants and the bone in order to obtain more uniform distribution of local tensions, and more stable osteosynthesis, and to prove through experimental investigations that the use of bone cement for treatment of long bone fractures in osteoporotic injured persons represents a method of choice and a treating standards. In our research, using a special device, experimental investigation of mechanical resistance of standard and modified osteosynthesis of the broken cadaveric, macerated tibia and a fresh cow femur to the static and dynamic load was conducted. We have undoubtedly proved the advantage of modified osteosynthesis with bone cement in treatment of long bone fractures which is of utmost importance for treatment of bone fractures in osteoporotic injured persons.

SIC13-P01

EARLY RESULTS OF SHOULDER INSTABILITY AND DISLOCATION TREATED WITH ARTHROSCOPIC ANTERIOR STABILIZATION - ONE SURGEON EXPERIENCE

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AIM: to evaluate the value of arthroscopic labral repairs in treatment of shoulder dislocation and instability. METHODS: The study was conducted at the Clinic for Orthopaedics and Traumatology, Military Medical Academy throughout period from January 1st, 2004 until September 30th, 2006 operated by single surgeon. Thirty-seven patients with diagnosis of shoulder instability and dislocation, radiographically and MRI confirmed have been followed prospectively. Evaluation of results was conducted according to Rowe Score. The research included 37 patients with traumatic anteroinferior shoulder dislocation. Mean age in the group of patients was 26 years. The research included 30 male patients and 7 female patients. In four patients arthroscopic labral repair was performed as result of failed open shoulder surgery with bone graft. Complication was prolonged recovery (2 patients). RESULTS: The average Rowe Scores in the group

were 42.2 preoperatively and 89.3 postoperatively. Results were compared with Student t-test and showed a statistically significant difference ($p < 0.05$). CONCLUSIONS: arthroscopic labral repair presents invaluable procedure for treatment of patients treated for anteroposterior shoulder dislocation. KEYWORDS: arthroscopic anterior stabilization, shoulder dislocation

SIC13-P02

PRIMARY RECONSTRUCTION IN MUTILATING INJURIES OF HAND TREATED AT THE DEPARTMENT OF ORTHOPAEDIC SURGERY IN THE LAST THIRTY YEARS

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The people with mutilating injuries of a hand are usually brought to the nearest hospital, because there is no other way of helping them that is why even in smaller hospitals, the interest in surgical problems of damaged hands has interested. Healing a mutilated hand requires a great experience of a surgeon, but such skilful and experienced surgeons are not always available in every hospital. Even those surgeons, who are familiar with all theoretical and technical details, sometimes are not able to perform immediately a definite reconstruction of a severely injured hand. There were 133 patients who had been taken into consideration during the last thirty years. All of them had severely mutilated hand injuries and were hospitalized in our hospital. There were cases where the whole hand or most of the fingers were mutilated. In those cases the most frequent causes of mutilation arose from corn pickers (45), motor saws (23), presses (11), factory machines (13), explosions (23), traffic accidents (2) and other. The most important stage in the treatment of a wound consists of wound exploration and surgical excision. So, for example, everything must be done in order to save and preserve the thumb. After the surgical excision, the surgeon begins with reconstruction of osseous parts and that is usually performed by using Kurschner wires or external fixator. After that, tendon, nerve and skin reconstruction is done. In most cases the primary reconstruction is definitive as most of the patients do not want to undergo any further treatment.

SIC13-P03

CHRONIC UN-REDUCED ELBOW DISLOCATION: A COMPLICATION FOLLOWING TENNIS ELBOW RELEASE

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INTRODUCTION: Lateral epicondylitis is a common affliction that can be treated non-surgically. However, surgical treatment is rarely indicated, and results are usually effective in more than 90% of patients. Although complications have been described, chronic elbow dislocation following open tennis elbow release is not a reported complication. MATERIALS AND METHODS: A fifty-seven year old, right hand dominant lady had lateral epicondylitis of the non-dominant left elbow that did not improve with conservative treatment. The patient had undergone a lateral epicondylar release on the dominant right elbow previously and was willing to have the same procedure on the left; however, she was advised surgical treatment in the form of a lateral epicondylectomy. Two and a half months later she continued to have pain and elbow stiffness, which was present immediately following surgery, and had been unable to use the arm. Examination of the limb revealed malalignment of the joint and a decreased range of motion with a 45-degree flexion contracture. Radiographs confirmed a posterolateral dislocation of the elbow as well as an area of bone loss over the lateral epicondyle. Computed tomography further confirmed the extent of the defect over the lateral epicondyle and capitellum. The

patient subsequently underwent an open reduction of the dislocation. DISCUSSION: The incidence of tennis elbow in the general population has been reported to be 2% and, considering the relatively small number of patients for whom an operation has been found to be indicated, the need for operative treatment of this condition is limited.

SIC13-P04

A RARE CAUSE OF ACUTE MEDIAN NEUROPATHY

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Acute median neurological deficit can be caused by extraneural and intraneural factors. Displaced distal radius fractures, ganglia and haematomata secondary to a haematological abnormality are common extraneural factors leading to acute median nerve compression. Soft tissue tumours are the commonest causes of intraneural cause of acute median neuropathy. A 71-year-old patient presented with a 2 days history of a sudden onset of severe, painful lump on the volar aspect of the left wrist associated with tingling and numbness in the fingers. There was no history of injury, injections at the wrist, previous carpal tunnel syndrome, haematological disease or anticoagulation therapy. On examination, there was an approximately 1x1cm in size painful swelling, on the volar aspect. His left thumb and the two and half radial fingers were swollen, tender and there was a mixed picture of paraesthesia and hyperaesthesia. There was also loss of thenar muscles function. Coagulation screening was normal. An ultrasound scan illustrated a well circumscribed focal lesion measuring 14x10x10mm, which appeared to lie intrinsic to the median nerve, proximal to the carpal tunnel. Consequently, the surgical excision revealed an intraneural haematoma. This is a rare case of spontaneous haematoma causing acute median neuropathy. The understanding of the "miniature" compartment syndrome within the nerve itself makes the operative decompression a surgical emergency. Awareness of the symptoms and the ability to notice subtle signs are of vital importance in order to establish the diagnosis. The period between onset of symptoms and surgical intervention defines the prognosis.

SIC13-P05

CLINICAL RESULT OF PALMAR LOCKING PLATE FIXATION FOR DISTAL RADIUS FRACTURES. NECESSITY OF INTERNAL FIXATION FOR ULNAR STYLOID PROCESS FRACTURES?

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We performed palmar locking plate (PLP) fixation on 87 patients (23 men, 64 women, mean age 64.8 years) with distal radius fracture (DRF). The mean follow-up period was 6.2 months. At the end of the follow-up period, range of motion, grip power and Disability of Arm Shoulder Hand score were measured. Further, the radiographic end-point was measured at the time of injury, directly after surgery and at the end of each follow-up period. In addition, we classified ulnar styloid process fracture (USF) merger in 44 patients (tip 18, base 26) with displacement degree and examined presence of pain and bone healing rate. Ulnar side pain remained in 9 of 87 patients (10.3%) and bone-healing rate of USF merger patients was 14 of 44 (31.8%). However, the poor results concerning the presence of ulnar side pain could be attributed to ulnar variance at our final

assessment. Even if bone-healing rate was not obtained for treated USF with PLP in merged DRF, we concluded that in the final assessment, ulnar side pain will not occur.

SIC13-P06

ANTEGRADE RUSH PINNING FOR FRACTURES OF HUMERAL SHAFT

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INTRODUCTION: The treatment modalities for humeral fractures are varied. We treated 200 cases of shaft humerus fracture of various fracture patterns with closed multiple Rush nails with promising results. We evaluated the simple, cost effective, closed intramedullary technique of Rush nails. **MATERIALS AND METHODS:** From January 2000 to January 2006 we treated 200 patients with stable & unstable humeral fractures with multiple Rush nails. The mean age was 37 years (30-78 years). One hundred and seventy-four males and twenty-six females were enrolled for this study. Three-quarters 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, under radiological guidance. **RESULTS:** 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. **DISCUSSION:** The Rush Nail achieves the inherent stability based on the principle of "three point fixation". The stability is achieved by the flexibility of the nails and the crowding of the medullary canal & gaining anchorage in the distal metaphyseal region. **CONCLUSION:** Rush Nailing combines the advantages of the minimally invasive surgery, minimal instrumentation, cost efficient implants, minimum morbidity.

SIC13-P07

ISOLATED RADIAL HEAD DISLOCATION - A RARE AND EASILY MISSED INJURY IN THE PRESENCE OF MAJOR DISTRACTING INJURIES

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BACKGROUND: High velocity accidents can lead to major injuries – long bone fractures, abdominal trauma, pelvic fractures and chest injuries. These injuries can act as distracting factors during the initial assessment of a polytrauma patient and innocuous but significant smaller injuries can be missed. **REPORT:** A 44-year-old man presented to us with a high velocity motorbike accident after a head-on collision with a truck. Examination revealed extensive bruising of the pelvic region, scrotal swelling and bilateral knee effusions. Initial radiographs showed an open book type pelvic fracture but no other bony injuries were identified. 12 hours later, the patient complained of pain in the right elbow. On examination, there was minimal swelling over the elbow and tenderness over the radial head. Although he had good flexion and extension of the elbow, forearm pronation and supination were restricted and painful. Radiographs showed an anterolateral dislocation of the radial head with no associated fractures of the radius, ulna or disruption of the distal radioulnar joint. **CONCLUSION:** Isolated dislocation of the radial head without concomitant ulnar fracture or humeroulnar subluxation is a rare injury with few reports in literature. In the presence of major distracting injuries like long bone fractures, pelvic fractures, chest and abdominal injuries, an isolated radial head dislocation can be easily missed. This report has been prepared to stress the importance of a thorough secondary survey in patients with polytrauma after high impact motor vehicle accidents. A

proper secondary survey in patients with major distracting injuries can prevent important injuries being missed.

SIC13-P08

LONG TERM OUTCOME OF TENNIS ELBOW. DO PATIENTS REALLY DO BETTER?

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BACKGROUND: The general consensus is that patients with tennis elbow do well whatever the treatment received after a few years. Is this really the truth? **MATERIALS & METHODS:** This was a retrospective study conducted on all patients presenting with a tennis elbow under a single surgeon over a 5 year period. Data was collected from patients' case records regarding demographics, diagnosis, side, treatment modalities and condition at final follow-up. A questionnaire with the Patient Rated Elbow Evaluation (PREE) scoring sheet was sent to the patients and results analysed from the data obtained. **RESULTS:** 61 patients, 31 females and 30 males were included in the study. The mean age of the study group was 46.9 years. 51 patients responded to the questionnaire. All patients had NSAIDs as part of the treatment, 38 had splints, 35 had physiotherapy, 38 had steroid and local anaesthetic injections and 14 had surgery. At their last visit to the hospital, 4 were awaiting surgery, 45 had complete relief of symptoms and 12 had no relief. The mean PREE score was 46.6/100 which was rated as fair, mean pain score was 30.1/60 which showed that >50% patients still had moderate pain and the mean function score was 16.4/50 which showed that despite the pain most patients were functionally not affected. **CONCLUSION:** Contrary to the general belief, many patients with tennis elbow are symptomatic even after a few years after treatment. We recommend annual follow-up of patients with tennis elbow without hastily discharging them from the clinic.

SIC13-P09

A DEFINITE PROBLEM IN DISTAL RADIUS FRACTURES

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Most distal radius fractures are treated conservatively regardless their morphology and biomechanics. Earlier the injury affected mostly perimenopausal females; now it affects younger patients who suffered a high energy trauma. The new injury features change the approach to the problem. The fundamental treatment characteristics are stability and joint involvement. The instability criteria are: comminution, radial shortening, the dorsal angulation more than 15-20°; broken ulnar styloid. The unstable fracture has a tendency to redisplace. The joint involvement worsens the prognosis and requires precise anatomy restoration. We subdivided our patients due to our modified Fernandez classification: 1. bending extraarticular stable fractures (150) which needed closed reduction, cast immobilization. Patients were allowed to train small hand joints. 2. Shearing intraarticular fractures (12) where 11 patients underwent volar plating without external immobilization, except 81-year-old patient treated conservatively due to high surgery risk. The results in both groups were good and excellent because of early anatomy and functional rehabilitation. 3. Comminuted fractures (55) were treated by ExFix. This provides rigid fracture immobilization without opening the fracture site. The results were satisfactory or

good. Not such brilliant outcome in these patients is regular: the ligamentotaxis cannot perform a better reposition than open reduction. 4. Malunions and nonunions were observed in 7 patients with the pain syndrome, severe movement restriction and the visible deformity. The aim of surgery was the radial length and volar angle restoration. When necessary the ulnar head was resected. The results were good.

SIC13-P10

MORPHOLOGICAL CHANGES OF THE SHOULDER IN PATIENTS WITH FULL THICKNESS TEAR OF THE ROTATOR CUFF

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INTRODUCTION: Repeated microtrauma, overuse injuries, trauma, and occupational disorders and age related degeneration are considered as main factors in development of full thickness cuff tear. We reviewed the relationship of patient's age, etiology and local pathology found at surgery. **MATERIALS & METHODS:** 86 Pts (20-77 years old, mean 54) with a full thickness tear of the rotator cuff were included. Patients were divided into three age groups. Surgery consisted of anterior and inferior acromioplasty with meticulous decompression and cuff repair, followed by intensive physiotherapy. **RESULTS:** 26 Pts (30%) had small tears, (<2cm), 43 Pts (50%) had medium tears (2-4 cm) and 17 Pts (20%) had large or massive tears (>4cm). Incidence of large or massive tear increased significantly with age ($p<0.005$). Degenerative changes and acromion hypertrophy were present in 54 Pts (63%), their prevalence was significantly higher in the old age group - 74% as compared to 57% in the middle age group and 33% in the young age group ($P<0.005$). 39/86 Pts (45%) had fibrotic scars with marked thickening of the subacromial bursa. Following surgery, based on the UCLH scoring system, 72 Pts (84%) had excellent and good results. Better results were present in the young and the middle age groups. Poor results were observed in older patients with large or massive tears. **DISCUSSION:** Based on this study, it is concluded that surgical treatment in these patients should consist of meticulous decompression by anterior and inferior acromioplasty as well as scar excision, followed by cuff repair.

SIC13-P11

CLAVICULAR PLATING - ANTERIOR OR SUPERIOR?

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From 2000-2005, 46 fresh midshaft clavicular fractures in adults with initial shortening of >20mm on the radiographs were treated with primary internal fixation. The aim of this study was to analyse the results of placing the plate on the anterior surface of the clavicle compared to superior placement. There were 31 men and 15 women. The average age was 34.5 years. The follow up varied from four months to 24 months. The functional outcome was analysed by the physiotherapist with Biodex machine using Constant score. None had non-unions/delayed unions/neurovascular complications/pulmonary injury/shoulder droop in either group. Two patients in the superior group who had a broken implant were replated anteriorly. Seven patients had implant removal due to prominent metal work, out of which six were superiorly placed plates. Plating the clavicle anteriorly has the advantage that the plate is less prominent and the necessity for implant removal becomes less. In our study, the incidence of hardware failure and implant removal was higher in the superior compared to the anterior group. Hence we recommend anterior plating of the clavicle as a better method compared to superior plating of the clavicle.

SIC13-P12

ATYPICAL MAYFIELD TYPE IV INJURY OF THE WRIST

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INTRODUCTION: Fractures and dislocations within the carpus are high-energy injuries with extensive ligamentous disruption. They are usually unstable and require reduction and fixation with K wires and often open repair of the ruptured perilunate ligaments. They are associated with significant morbidity and loss of function. **METHODS:** A 25-year-old manual ground worker fell from a height of seven feet onto his dominant outstretched hand. Radiographs demonstrated fractures of the scaphoid, capitate and triquetrum. The carpus had displaced dorsally with volar lunate dislocation. He underwent reduction under general anaesthesia and K wire fixation of the fractures. At one year follow up he is back working full time as a manual ground worker and reports little functional deficit in his wrist. Revised Disability of the Arm, Shoulder and Hand (DASH) Score is 27% and optional work module score is 31%. Grip strength is 65% of the contralateral side. **DISCUSSION:** Mayfield classified progressive carpus injury and perilunar instability. The Mayfield Type IV injury shows complete Perilunate dislocation of the carpus with disruption of scapholunate, capitulunate, lunotriquetral and finally dorsal radiocarpal ligaments allowing the lunate to displace volarwards. These injuries are inherently unstable and often require volar and dorsal approaches to the wrist with primary ligament repair. **CONCLUSION:** The injury reported is an atypical Mayfield Type IV injury because the force line is through the fractured carpal bones rather than the perilunate ligaments. In this fracture dislocation a good functional outcome in a high demand patient was achieved after limited surgical stabilization.

SIC13-P13

DYNAMIC BIOMECHANICAL ANALYSIS OF DIFFERENT OLECRANON FRACTURE FIXATION DEVICES – TENSION BAND WIRING VERSUS INTRAMEDULLARY NAILING – AN IN-VITRO CADAVERIC STUDY

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INTRODUCTION: The aim of this study was to introduce a test-setup with dynamic angle alteration to imitate the joint motion for the evaluation of different olecranon fracture fixation devices and to introduce our new designed Olecranon-nailing system (ONS). **MATERIALS AND METHODS:** 21 fresh cadaver upper extremities underwent olecranon fracture by the means of transverse osteotomy and received 3 different fixation systems. Group 1: Tension band wiring (TBW) according to Weber. Group 2: XS-nail with 9 holes, all locked with 2mm threaded K-wires. Group 3: ONS with 90mm length, locked with 2.7mm screws, a variable angle hole for the distal fragment and a distal locking screw. The servo-pneumatically test stand worked with a rotational angle-adjusted engine and a linear force-adjusted engine. 2 steel pins were placed in the proximal, 2 in the distal olecranon fragment for video motion analysis. We measured the difference of motion between the 2 pairs of pins. After 300 cycles we compared the fragment displacement. The data were determined for statistical analysis. **RESULTS:** After 300 cycles the displacement in the fracture fixation model was significantly higher in the TBW-group than in both the ONS and the XS-nail group. **CONCLUSION:** Other studies evaluating biomechanical properties of osteosynthesis with joint-involvement did not change the force-direction dynamically. We introduced a test-setup with dynamic angle alteration to

imitate the joint motion. This is an important step for the accurate biomechanical evaluation of the treatment of different fracture fixation methods. The tested nailing systems showed advantages in loosening.

SIC13-P14

LUXATION ERRECTA: ABOUT TWO CASES

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Lower luxation (errecta) is a curiosity which accounts for only 0.5% of luxations of the shoulder. We report two cases, at dux young patients (means of age: 28 years), in accordance with accidents of the public highway. One of the two patients presented neurological disorders with types of paraesthesias at the level of the territory of the radial nerve which disappeared after reduction. The reduction was founded in urgency under sedation. The evolution was good in both cases. Luxation errecta is rare, it succeeds a shock on the upper limb in great abduction or antepulsion. The casualty presents the arm in the air. This abduction is irreducible. The obvious clinical diagnosis is confirmed by radiography. The lesions of the cap are constant, the frequent neurological lesions. The treatment includes: - the reduction in urgency, by traction in the axis of the member under general anaesthesia, with checking in radiology; - the application with a binding of Crêpe, during 3 weeks. Rehabilitation is: - statics during the immobilization, by isometric contraction of the deltoïde; - dynamics with the ablation of the immobilization. Its duration depends on the age and the associated lesions. The evolution of the noncomplicated luxations treated in urgency, correctly immobilized and rehabilitated, is favourable.

SIC13-P15

OSTEOSYNTHESIS FOR DISTAL RADIUS FRACTURE ASSOCIATED WITH TFCC INJURY

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INTRODUCTION: The purpose of our study was to evaluate the outcome of treatment for distal radius fracture with triangular fibro-cartilaginous complex (TFCC) injury using Disability of the arm, shoulder and hand score (DASH). **PATIENTS AND METHODS:** Between 2005 and 2006 we had 33 patients (4 males and 29 females, average age 62 years old) who had distal radius fracture associated with TFCC injury. According to AO classification, types of fractures included A2 (11 patients), B2 (2), B3 (4), C1 (10), and C2 (6). We observed the intra-articular condition with arthroscopy, and performed osteosynthesis using the Titanium Distal Radius Plate®. Temporary wire fixation of DRUJ was performed on two patients which showed the DRUJ instability after osteosynthesis. At 6 months after operation, we divided patients into two groups; a pain group (showing pain or tenderness at the ulno-carpal joint, or showing positive in the ulnocarpal stress test), and a no-pain group (showing no such pain). DASH scores were evaluated between the two groups. We followed up all patients for 6 months or more. **RESULTS:** Intraoperative arthroscopy showed 18 patients had a rupture at the radial attachment in the TFCC, and 15 patients had a rupture at the ulnar attachment site. Average DASH score of the pain group (11 patients) was 12.5 points, and that of the no-pain group (22 patients) was 13.8 points. There was no statistically significant difference between the two groups. **CONCLUSION:** We concluded surgical repair was not necessary for TFCC injury with distal radius fracture.

SIC13-P16**INTERSCALENE REGIONAL ANESTHESIA FOR ARTHROSCOPIC SHOULDER SURGERY**

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BACKGROUND: A retrospective review of arthroscopic shoulder surgery using interscalene regional block anaesthesia was performed. **METHODS:** We retrospectively reviewed the cases of 86 consecutive patients who had shoulder arthroscopic surgery under interscalene regional block over a 3-year time period in a small community-sized military hospital. All blocks were performed with use of standard blunt-needle technique with the patient awake and with the use of preoperative nerve stimulation to localise the brachial plexus. **RESULTS:** Of the 86 patients, 69 interscalene blocks (80%) had a successful block whereas 17 (20%) required general anaesthesia because of an inadequate block. However, 4 of these had a complete block in the recovery room and required no postoperative narcotics. There were no seizures, pneumothoraces, cardiac events, or other major complications. Minor complications included 6 patients with transient Horner's syndrome, 4 patients who experienced anxiety, which was controlled with sedation, and 3 with nausea. **CONCLUSIONS:** In summary, when administered by an anaesthesiologist committed to and skilled in the technique, interscalene regional block provided excellent intraoperative and postoperative analgesia with a relatively low complication rate. The technique is reproducible within the resources available in most community-level hospitals.

SIC13-P17**TOTAL CARPOMETACARPAL DISLOCATION - TWO CASE REPORTS**

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The carpometacarpal dislocation is rare injury, the anterior type is exceptional; we report two cases, Mr A. T., 18 years old, male, student, right-handed, without pathological medical history. He was admitted in emergency after a fall of closed left hand injury; examination revealed a total impaired mobility and an important swelling of the hand without vasculonervous disorders. X-ray revealed a pure anterior dislocation of the five carpometacarpal joints. Mr B. M., 27 years old, taxi driver, right handed, he was admitted six hours after a fall of motorbike for a closed right hand injury, examination revealed a total impaired mobility and an important swelling of the hand. X-ray revealed an anterior fracture-dislocation of carpometacarpal joints. Both patients were operated in emergency, using the posterior double approach, which allowed reducing the dislocation. It was maintained by K-wires. An antebrachiopalmar cast was applied for six weeks one year later, the result obtained was considered excellent.

SIC13-P18**RECURRENT PALMAR DISLOCATION OF THE DISTAL RADIOULNAR JOINT (DRUJ) - PATHOMECHANICS, DIAGNOSIS AND TREATMENTS**

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Recurrent palmar dislocation of the distal radioulnar joint (DRUJ) is extremely rare, where the ulnar head displaces palmarly in supination, while it is reduced in the neutral to pronation. We experienced 18 wrists (age: 20-74, average 47; 4 male, 14 female; 6 right and 12 left). Seventeen patients had dorsally mal-united radius. All patients demonstrated palmar dislocation of the ulna with click during supinating motion, then the ulnar head was reduced in the neutral to pronation position during pronating. Severe DRUJ pain was found in 3 patients, moderate pain in 3, mild pain in 4, and the other 8 patients, painless. Radiographs indicated less than 5 deg of the dorsal tilt of the radius in 8 wrists, 15 to 20 deg in 9, and more than 25 deg in 1 wrist. Arthrogram and MRI delineated avulsion of the TFCC at the fovea. We performed reconstruction of the TFCC in 6, open repair of the TFCC in 5, dorsal wedge osteotomy of the ulna in 2, corrective osteotomy of the radius in 1, fixation of the ulnar styloid in 1. Two wrists needed salvage procedure. In TFCC reconstructed wrists, recurrence was noted in 1, DRUJ instability and slight limitation of supination in 1. Recurrent palmar dislocation of the DRUJ may be due to subsequent mal-alignment of the forearm bones, reduced buttress effect of the sigmoid notch and loss of stabilizing effect of the radioulnar ligament. The TFCC must be reattached and correction of the radius may be needed.

SIC13-P19

INCIDENTALLY-DIAGNOSED KIENBOCK'S DISEASE

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The clinical features of incidentally-diagnosed Kienbock's disease have not yet been reported in detail and remain unknown. We reviewed the results of our examination of 14 patients with incidentally-diagnosed Kienbock's disease. These patients had never previously been clinically or radiographically examined in a clinic or hospital, and had never received any treatment for their condition. For 12 of these patients, Kienbock's disease was incidentally diagnosed on X-ray examinations performed for other reasons, including carpal tunnel syndrome in 4 cases, Colles' fracture in 3 cases, pseudogout attack in the wrist in 2 cases, infection of the hand in 1 case, osteoarthritis of the CM joint of the thumb in 1 case, and osteoarthritis of the MP joint in 1 case. The remaining two patients were incidentally diagnosed with Kienbock's disease based on radiographs obtained from a medical examination. Kienbock's disease was mainly discovered in the dominant hand of elderly women who had been engaged in manual labour. Although radiographical findings revealed an advanced Kienbock's disease, current symptoms were mild in all cases and no problems with wrist pain were observed in either activities of daily living or at work, and no treatments for Kienbock's disease were required. Appropriate treatment for Kienbock's disease should therefore be carefully considered with the knowledge that some patients have no problems with activities of daily living or at work without treatment for a long period of time.

SIC13-P20

CLINICAL EXPERIENCES WITH A THREAD STABLE IMPLANT FOR THE TREATMENT OF OSTEOPOROTIC FRACTURES OF THE PROXIMAL HUMERUS

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Authors introduced a new implant system for the treatment of proximal humeral fractures. This system (specially designed plate and screws) acts as a fixateur interne therefore

provides a good stability in osteoporotic bones as well. The special design of the wholes and the screw heads provide a very good stability, with locking but still allow a wide range of screw placement (about 60 degrees conically). Therefore the system can be called as a thread stable system. As far we know there is not any such system available. After successful cadaver experiments the system was introduced in the clinical practice. Between 01.02.2004 and 01.12.2006, 24 patients were treated with the new system. There was no implant failure, all but two fractures healed without complication. In the remaining cases the implant caused some restriction of movement, therefore the implants were removed after the boney healing. The functions of the shoulders were evaluated using a modified Constant-Murley score. There were 5 excellent, 14 good and 5 acceptable functional results. The indications, the implant system and the results are presented. According to the early clinical experiences, authors recommend the system for the clinical practice, especially in osteoporotic cases.

SIC13-P21

RADIOCARPAL FIBROUS TISSUE FORMATION FOLLOWING DISTAL RADIUS FRACTURE

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BACKGROUND: Intra-articular fibrous tissue formation in the radiocarpal joint causes dysfunction of the wrist joint. We performed second-look arthroscopy and evaluated intra-articular fibrous tissue formation of the radiocarpal joints following distal radius fracture. **METHODS:** From October 2005 to September 2006, 28 cases who had undergone arthroscopically assisted reduction and internal fixation of distal radius fractures were subjected to the second-look arthroscopy. Eight men and 20 women were identified. Mean age at the time of primary operation is 57 years old (range, 20 to 81 years). Sixteen right wrists and 12 left were involved. The mean period from the first arthroscopy to the second-look was 12 months (range, seven to 16 months). Intra-articular soft tissue injuries were evaluated at the first arthroscopy, and intra-articular fibrous tissue formation at the second-look surgery. **RESULTS:** Second-look arthroscopy showed intra-articular fibrous tissue formation in the 19 cases (68%). Fibrous bands extended from the midradial ridge to the scapholunate ligament diversely. In the nine cases of them, a thick fibrous septum completely divided the radiocarpal joint into two cavities. The ratio of intra-articular fracture was 84% in the fibrous band (+) group, 89% in the fibrous band (-) group. The ratio of scapholunate ligament injury to be severer than the grade two of Geissler's classification was 53% in the fibrous band (+) group, 11% in the (-) group. **CONCLUSIONS:** Radiocarpal fibrous tissue formation was observed in 68% of the patients following distal radius fracture, especially to a high rate in the cases with scapholunate ligament injury.

SIC13-P22

FUNCTIONAL OUTCOME OF OUTERBRIDGE-KASHIWAGI PROCEDURE FOR ELBOW ARTHRITIS: 1-13 YEAR FOLLOW-UP

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Between 1994 and 2006, 83 patients (84 elbows) underwent Outerbridge-Kashiwagi (OK) procedure. Of these, 76 patients (78 elbows) were available for review. There were 64 men and 12 women, mean age 59.8. 62 patients had primary osteoarthritis and the rest (14) post-traumatic arthritis. Mean duration of symptoms was 25.5 months. The overall mean follow-up was 56 (range 12–150) months; of these 30 patients had more than 5-

year follow-up with a mean of 96 months (range 60-150) months. Their mean pre-operative flexion improved from 115° to 134° post-operatively ($p < 0.001$) and mean pre-operative extension deficit improved from 28° to 13° post-operatively ($p < 0.001$). The mean MEPS improved from 52 pre-operatively to 84 post-operatively ($p < 0.038$). The mean pre-operative DASH score improved from 63 (range 37-92) to 41 (range 24-75) post-operatively ($p < 0.001$). The mean pre-operative DEORS improved from 6.3 to 4.9 post-operatively ($p < 0.001$). Majority of patients [58 patients (76.3%)] returned to their previous work. There were few complications (2 superficial wound infections, 1 myositis ossificans and numbness along ulnar nerve). Of the 17 patients who had recurrence after 5 years, 4 patients had to undergo revision surgery (3 improved). 59 patients (77.6%) were satisfied with the surgery. The OK procedure gives excellent to good results in 80.5% of patients at 4 years and 70.9% continue to show similar results at a mean of 9 years. Although 17 out of 30 patients in long-term group had recurrence on X-ray beyond 5 years, only 3 required revision OK procedures.

SIC13-P23

BIOMECHANICAL EVALUATION OF PROXIMAL HUMERAL FRACTURE PLATE FIXATION: COMPARISON OF HUMERUS ROTATION IN ELEVATION

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INTRODUCTION: The purpose of this study was to investigate the relation between rotation position of humerus when elevating the shoulder and fracture stabilization using three types of internal fixation plates. **MATERIALS AND METHODS:** Nine paired humeri were harvested from a cadaver. We used a cadaveric two-part proximal humeral osteotomy model to perform a biomechanical evaluation of the following three types of internal fixation plates: Proximal humeral internal locking system (PHILOS), locking compression plate for the proximal part of the humerus (LCP-PH), and May proximal humerus plate. We newly developed a mechanical test device in shoulder elevation. Loosening of the plate was detected by the strain gauge. Their continuous signals were recorded on a personal computer (Measurement-DAQCard 6024E, National Instruments Company). In this fracture model, stability of the three different plates was compared between the internal- and neutral-rotation positions. **RESULTS:** May proximal humerus plate and LCP-PH were more durable under cyclic loading in the internal rotation position than in the neutral rotation position. With PHILOS, there was no significant difference in stability between the neutral- and internal-rotation positions, and PHILOS was stable cyclic loading in both positions. **CONCLUSION:** With May proximal humerus plate and LCP-PH, the mechanical property was different depending on rotation positions, and both the plates were stable only in the internal rotation position. On the other hand, with PHILOS, the durability increased since more screws could be driven into multiple directions, and the rotation position of humerus did not have much influence on the stability.

SIC13-P24

V-Y ANTERIOR TRANSPOSITION OF THE ULNAR NERVE

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PURPOSE: To show a new technique that can improve function of the hand and wrist caused by compression of the ulnar nerve. **METHODS:** A new procedure was developed, performed the usual manner, a medial incision over the elbow, the ulnar nerve is exposed, freed at the ulnar groove and neurolysis is performed if indicated. The medial intermuscular septum is excised and the nerve is mobilized proximally. The nerve branches of the ulnar nerve supplying the flexor carpi ulnaris and flexor profundi of the ring and little fingers are mobilized, dissected, and retracted. The origin of the flexor muscles is dissected and V-Y plasty performed. The incision is made like a V shape and closed like a Y shape. With this method, the nerve is transposed in the new created bed, there is approximately 5 to 6cm of lengthening of the flexor muscles, and a wide space is created for the ulnar nerve. This space is much larger compared with the previous method. **SUMMARY:** Results: Excellent 75%, and Good 25%. No fair results and no failures. **CONCLUSION:** This method has less recurrences of compression than previous methods.

SIC13-P25

EPIDEMIOLOGY OF HAND INJURIES IN A TERTIARY LEVEL HAND CENTER IN UK

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Our hospital has a catchment of more than 15 hospitals. We retrospectively analysed 1500 patients from August 2005 to September 2006. The purpose of this study was to assess the volume of workload in a tertiary level hand centre in UK. Details of patient demographics, region involved, dominance, mode of injury, weapon causing injury, alcohol involvement, tetanus status, time of presentation and delay in being taken up for operation were recorded. We have made attempts to identify pattern of injuries with the weapon involved. The study also assessed the volume of patients coming in over a summer and winter. Details of the number of paediatric patients referred and operated were noted.

SIC13-P26

TRIGGER FINGER WITH PROXIMAL INTER PHALANGEL JOINT CONTRACTURES (25 CASES)

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The purpose of this study was to analyse the results obtained after ulnar resection of the FDS tendon to open the A1 pulley (technique described by D. LEVIET) in trigger finger with proximal inter phalangel joint contracture. The A1 pulley was divided after an incision just distal to the distal palmar crease; the ulnar slip of the FDS was resected after dorso ulnar incision behind P1 and P2; full extension was assessed. Post operative evaluation showed that the residual fixed deformity averaged 10° in 5 cases. No case of a swan neck deformity. Then we confirmed that this technique is indicated for patients with loss of passive extension in the PIP by a long history of triggering. We have to note the surgical technique modification.

SIC13-P27

WAVE TEST – ASSESSMENT OF STABILITY AFTER MANIPULATION OF DISPLACED WRIST FRACTURES

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(UNITED KINGDOM)

Displaced wrist fractures in children and adults constitute about 20% of Trauma admissions. These patients undergo manipulation under anaesthesia and/or K wiring of the distal radius. We describe a method (Wave test) of assessing stability of fractures after manipulation and the need for further stabilisation with either K wire fixation or other means of stabilisation. Once the fracture is reduced and anatomical alignment is restored, we test for fracture stability by holding the forearm proximally and waving the wrist. If the reduction was stable, then there will be no movement at the fracture site. This is confirmed with image intensifier. Now a plaster back slab or cast is applied. If the fracture displaces with this test, then we go ahead and stabilise the fracture with other means i.e. K wire fixation, external fixation, open reduction and internal fixation. We tested this test as a pilot study on 20 consecutive patients (12 adults and 8 children) booked for manipulation of displaced extraarticular distal radial fractures. Of the 20 patients, 11 were found to be unstable (8 adults, 3 children) and had further stabilisation procedures. We followed all patients at outpatients' clinic and all 9 patients who were found to be stable with wave test and had no further fixation went on to union of the fractures uneventfully. This is a simple test for testing fracture stability in distal radial fractures. Further prospective study is required to validate this test.

SIC13-P28

THE HERBERT ULNAR HEAD PROSTHESIS FOR POST-TRAUMATIC DISORDERS OF THE DISTAL RADIO-ULNAR JOINT

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We report a series of four cases with previously unreported use of Herbert Ulnar head prosthesis to treat DRUJ pain and instability. There is only one reported incident of Herbert Ulnar Head replacement in acute trauma. **PATIENTS AND METHODS:** There are 3 female and one male patient. The age range was 30-76 years. The mean follow-up was 22 months (10-33 months). Patients were assessed using Mayo modified wrist score and DASH score. **RESULTS:** Average age was 50 years. Average follow-up was 22 months. All patients returned to previous level of sporting and work activity. All patients achieved full range of motion. The average grip strength is comparable to normal wrist. There was no instability and patient satisfaction remains high. The mean Mayo modified wrist score is 100 (100-100). The mean Dash score was 20.8 (18-24). There was no radiological loosening and stress shielding. **CONCLUSION:** Our experience though small suggests that this implant should be considered as a valuable tool in dealing with these difficult problems. One may consider replacement rather than resection as the short to medium term survival of this implant seems excellent. The Herbert Ulnar Head Prosthesis has been well reported in treatment of inflammatory arthritis and its sequelae. However it is less well published in post traumatic conditions. Herbert Ulnar Head allows reconstruction of the posttraumatic disorders of the distal radio ulnar joint after failed excision arthroplasty or other salvage procedures. It may be used in primary treatment of chronic disorders of DRUJ.

SIC13-P29

TREATMENT OF ELBOW FRACTURE-DISLOCATION

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Treatment of fracture-dislocation of the elbow joint is often complicated. In the past 12

years we have operated for 14 cases of elbow fracture-dislocation. This time, results of operative treatment of 12 cases, which could be followed up for more than 3 months, will be presented. The maximum follow-up period was 7 years 4 months. The average age at injury was 40 years ranging from 11 to 84 years. The duration from injury to operation was 0 to 14 days, with an average of 6 days. The associated fractures were olecranon fracture in 6 cases, terrible triads in 3 cases, radial head fracture in 1, and humeral condylar fracture in 2. Olecranon fractures were fixed with tension-band wiring or plating, radial head or neck fractures and coronoid fractures with Herbert screws, and condylar fractures with K-wires. Using Wheeler's method of evaluation, result was excellent in 6 cases, good in 3, fair in 2, and poor in 1. In conclusion, rigid fixation and early rehabilitation yielded good results, whereas, poor fixation, late operation and late rehabilitation resulted poor results.

SIC13-P30

GLOMUS TUMOURS OF THE HAND

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We report a series of 31 patients with glomus tumours between 1996 and 2005. The diagnostic depended on clinical study and was confirmed by histological study. An osseous defect was seen on plain X-ray films in 2 cases (4.45%). The treatment was a surgical and complete excision of the tumours, we used for this an operative microscope for all cases. The average follow-up was 4 years; we noted 1 case of recidivist. Functional results were excellent. The pain had completely disappeared in all cases, but in 2 cases tenderness occurred. We have only 2 cosmetic problems.

SIC13-P31

THERAPEUTICAL MANAGEMENT IN CATASTROPHIC ELBOW

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A patient victim of traffic accident who presents a left elbow open fracture III degree with lost of condyle, a part of the humeral epitrochlea and radial nerve lesion without vascular affection. An immediate treatment in urgency required friedrich wound and stabilisation with external articulated fixation in the first act. After, in a second act, an arthroplasty of trochlea and epitrochlea interposition was realised using part of fascia latta autologue. As a consequence of the nerve radial lesion was made a free nerve graft polifasciculated. DISCUSSION: It is important in these kinds of fractures to realise the stabilisation of the articulation and to check the neurovascular situation. We need a polidisciplinary team for a correct therapy.

SIC13-P32

DYNAMIC SUSPENSION-SLING ARTHROPLASTY OF SHECKER

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The trapeziometacarpal joint stabilizes the base of the first metacarpal after the removal of the trapezium in patients who have trapeziometacarpal joint osteoarthritis. Other techniques involving ligament reconstruction are accompanied by complications such as

proximal migration, dorsal subluxation of the first metacarpal base, and impingement of the first and second carpometacarpal joints. From 2003 to 2006, 21 patients (23 thumbs) underwent this procedure. Follow-up was an average of 1.5 years. After surgery, key pinch increased from 2 to 8.5kg. Pain decreased according to ADL score from 16.7 (before surgery) to 27.7 (after surgery). The dynamic suspension-sling arthroplasty of Shecker is a good option for rhizarthrosis treatment in II and IV Eaton ranges when medical treatment has failed. In our series, results are satisfactory in respect to a good function and decrease the painful clinic.

SIC13-P33

EFFECT OF CHITOSAN AND BONE MARROW CELLS ON ROTATOR CUFF HEALING IN A RAT MODEL

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Rotator cuff tears are common in humans and are notoriously difficult to heal. The current study was undertaken in a rat model in order to assess whether a self-gelling chitosan mixed with bone marrow cells will lead to increased healing. The study employed a previously described acute surgically-created tear model. **METHODS:** 40 animals were operated on bilaterally and an acute tear of the supraspinatus tendon was created. One side served as control and the other as experimental group. The tear was either sutured immediately or sutured and covered with the chitosan mixture. Quantitative histological examination was carried out at 6 intervals over a three-month period. Amount of inflammation, presence of tendon healing, cellular density in the repair area were assessed. Parameters related to muscle atrophy including muscle fiber diameter, pennation angle, amount of muscle fibrosis, amount of muscle atrophy were assessed as well. **RESULTS:** Histologically improved healing was noted as demonstrated by decreased inflammatory cell concentrations and improved tendon healing in the experimental group. The improved tendon healing led to diminished supra-spinatus muscle atrophy. **CONCLUSIONS:** The mixture of chitosan with syngeneic bone marrow cells appears to promote a faster healing of the rotator cuff in a rat model. Further evaluation is needed in order to define whether the bone marrow cells are necessary or the effect is principally due to the chitosan gel.

SIC13-P34

CAUTION DURING UPPERLIMB SURGERY ANAESTHESIA

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INTRODUCTION: Blood pressure measurement is one of the important aspects in monitoring an anaesthetised patient. It is done commonly using indirect measurement with automatic cuff. In upperlimb surgeries there is only one free upperlimb for either application of BP cuff or to gain I V access. There is no literature available on similar complication during these surgeries. The aim of this report is to present an unfortunate episode that could have been prevented. **CASE REPORT:** Pre-Op: A 50-year-old lady was listed for her left hand Dupuytren's contracture release. She was fit & well with ASA grade I. Anaesthesia room: Patient was stable and a 20G I V cannula was inserted into the right hand dorsum. A blood pressure cuff was applied on the same arm. The Consultant administered standard anaesthesia. Intra-Op: During the surgery the anaesthetist noticed that patient developed hypotension and bradycardia. I V fluids were already flowing but the heart rate further dropped to 40 BPM and 0.6mg Atropine was given. The heart rate decreased further and another bolus of 0.6mg Atropine was given,

patient went into asystole. Immediate CPR measures were undertaken. At this stage the anaesthetist realised that the automatic cuff was continuously inflating. The cuff was immediately deflated and soon patient regained heartbeat and blood pressure. The whole of this episode took just a few minutes. Post-Op: Patient recovered completely and had no further complications. CONCLUSION: Do not use the same limb to gain I V access and measure blood pressure.

SIC13-P35

TREATMENT OF FRACTURES OF DISTAL PART OF HUMERUS WITH JOINT INVOLVEMENT

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Treatment of fractures of distal part of humerus with joint involvement is always connecting with a problem of extension contracture of elbow. One of the reasons is the difficulty of reduction of articular surface. Joint fragments have a tendency of displacement because of wrist flexors and extensor attachment to epicondyles of a humerus. We use an original method for open reduction of fractures of condyles. Expose to the distal humerus through a transolecranon approach. The tissues from the lower humerus by subperiosteal dissection with excision of epicondyles. The muscles an block are displaced in anterior part. Joint fragments (as a rule trochlea, capitellum and their fragments) become absolutely free, which allows making an exact reconstruction and fixation. Displacement of points of an attachment wrist flexors and extensor not come because of their fixation to medial and lateral intermuscular septa of the arm. Closure is otherwise affected in conventional fashion. Results were studied in 71 patients (49 men and 22 women). Excellent and good results were stated in 64 cases, satisfactory results in 5 cases and poor results in 2 cases.

SIC13-P36

POLYFIX WRIST FIXATION SYSTEM - A NEW DEVICE WITH COMBINED EXTERNAL AND INTERNAL FIXATION OF DISTAL RADIUS FRACTURES

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Chang et al. (Biomechanical comparison of five external wrist fixators. Bull Hosp Jt Dis. 2002-2003; 61(1-2): 40-4) had three requests for a good external fixator: initial rigid fixation of the fracture, low weight and low price. The Polyfix complies with all these requests and more. Our aim is to introduce the new device, show the operative technique and present the clinical results of our study of this device. The Polyfix has a non-bridging radiolucent low profile frame of polyethylene with predrilled channels, two distal with an angle of 45 degrees and six proximal with an angle of 50 degrees. Fixation is achieved by inserting 2.0mm pins, two through the distal holes and the styloid process and usually three pins through the proximal holes and the proximal radius. The pins are crossing each other, interlocking the fracture thus adding an internal fixation to the external. The fixation is so stable that the patients can immediately use their wrists for daily activities. We recommend a mini incision from the styloid process to fracture site to identify the radial nerve and avoid nerve injury but also to have the possibility of reduction of the fracture to an anatomical position. Repeated clinical and radiological follow-ups until 5 weeks postoperatively, when the device was extracted, showed undisturbed healing with no fracture displacement and little pain for the patients. The patients in our initial study have now been followed for 12 months and they show good recovery of their wrist and hand function.

SIC13-P37**PANNER'S DISEASE: A CASE REPORT**

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Panner's disease, the osteochondrosis of the capitellum, is characterised by disordered endochondral ossification of the epiphyseal growth center. Panner's disease is seen in children in age group 5-10 years who are involved in sporting activities putting repetitive valgus stress on the elbow. At this time the capitellum blood supply is already vulnerable. Panner's disease is similar to osteochondritis dissecans (OCD); a condition that occurs after the skeleton is done growing. We present here an unusual case report of a 6-year-old boy who presented with pain and stiffness of elbow joint without trauma. The patient regained full range of motion without pain by giving rest to the elbow. The radiographs typically show resorption of capitellum followed by capitellum regaining its original shape in a few months time. We believe that patients with Panner's disease can be managed nonoperatively. Surgery is needed only in patients having loose bodies in elbow joint or having osteochondral defect not improving with conservative management.

SIC13-P38**CASE REPORT - TREATMENT OF DESTRUCTIVE INJURY OF THE RIGHT ELBOW**

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Destructive injury of right elbow in young worker with destruction of joint and great defects of soft tissue and bones combined with radial nerve injury. TREATMENT: 1st act - Primary surgical treatment with transitor external fixation. 2nd act - Covering of the posteromediolateral defect of the soft tissue with fasciocutaneous pedical thoracoabdominal flap. 3rd act - Functional tendon transfer for high radial nerve palsy (FCR transfer - Brand, Tsuga). Presentation of good functional result (after one year of observation).

SIC13-P39**IMPROVEMENT OF FUNCTION BY LOSS OF MOTION: ARTHRODESIS OF THE WRIST**

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The arthrodesis of the wrist is seen as ultima ratio in treatment of symptomatic instability and painful arthrosis. The aim of the study was to evaluate the functional outcome and quality of life after wrist fusion. Between 1997 and 2004, 57 radiocarpal joint fusions (56 patients) were performed at the study centre. We examined 36 (63.2%) of the 57 wrist fusions after a median follow-up of 34 months (range 13–74 months). The most common cause for this procedure was posttraumatic arthrosis after fractures of the distal radius. Beside clinical and radiological examinations we evaluated outcome using a questionnaire including the DASH score. The preoperative DASH-score averaged 70.4 points, the postoperative DASH score averaged 48.9 points. The grip strength in comparison of both hands was postoperative 46% of the other side. The strength in the finger grip (first and second finger) was 51% of the other side. The average amount of pain in the Visual Analogue Scale (VAS from 0 to 100) was preoperative 84.6 points,

postoperative 36.6 points, which was significantly less. **CONCLUSION:** This study shows that by operative immobilisation of the radiocarpal joint patients achieve an obvious profit of function because of pain relief. Total fusion of the radiocarpal joint is an excellent option for the treatment of many different painful disorders of the wrist and should be considered in the therapeutic concept. Long ranging courses of suffering could be shortened and quality of life could be improved.

SIC13-P40

THE REVERSE HOMODIGITAL ISLAND FLAP

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The reverse homodigital island flap is a flap deducted from the proximal phalanx in order to cover the wastes of cutaneous pulpar substance of the long fingers. Its vascularisation is based on the presence of intermediate digitopalmar arches. This study reports 14 homodigital reverse flap practiced with success in 14 patients. In 13 cases, this flap has been used as neurovascular flap, and as an arterial flap in only one case. The results of our series were very encouraging: we did not notice any necrosis, three cases of resolvent venous congestion, satisfactory salvage of sensibility and renewal of activity in all cases. This technique permitted the recovery of long fingers cutaneous pulpar waste of substance during one stage operation; it provides soft and good vascularised tissue and permits a precocious mobilisation.

SIC13-P41

CARPAL TUNNEL DECOMPRESSION THROUGH A LIMITED PALMAR INCISION

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Eight hundred patients (800) underwent carpal tunnel release (935 hands) through a limited mid palmar incision between years 1989 and 2004, with a follow up between 6 months and 15 years, the average length of incision was 2.7cm. The average time of surgery was 18 minutes. The time to return to work was an average of three weeks. All patients reported relief of symptoms except 9 patients. There was no injury to median nerve, vessels or tendons. This technique proved to be safe, simple, economic, effective and easily reproducible.

SIC13-P42

EARLY DIAGNOSED PISIFORM FRACTURE - A CASE REPORT

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BACKGROUND: The pisiform fractures are extremely rare and could easily be misdiagnosed as a wrist strain. **PURPOSE:** We present our experience of a pisiform fracture which was diagnosed immediately after the trauma. **PATIENT:** A 40-year-old male builder fell on the ulnar side of his right wrist. He came to the emergency department claiming pain and swelling at the ulnar side of his wrist. In clinical examination he appeared to have limited range of motion at his wrist. After the classical radiographic control we detected an isolated fracture of the pisiform which was visible in the anteroposterior radiograph of the wrist. After this, we performed a 3-D CT of the right wrist in order to confirm the fracture as well as to examine the degree of dislocation of the

fractured segment. There was no dislocation and we treated the fracture with a cast for four weeks. RESULTS: The range of motion was normal and fracture callus was obvious in the classical anteroposterior radiograph after the two-month period. The patient returned to his work without problems after this period. CONCLUSION: In conclusion, we must be very suspicious after wrist trauma in order to diagnose early a pisiform fracture. Usually they are not obvious in classical radiographs and we should probably perform more advanced examinations such as reverse oblique radiographs, computed tomography, magnetic resonance or high-resolution bone scintigraphy. Primary treatment is easier and has extremely better results than the delayed one.

SIC13-P44

DELTA FLAP RECONSTRUCTION FOR MASSIVE ROTATOR CUFF TEARS - FUNCTIONAL RESULTS

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INTRODUCTION: Large defects of the rotator cuff often cannot be surgically repaired. The delta-muscle flap is a relatively simple method for the treatment of the defect with local tissue. Aim was to evaluate the outcome regarding pain, function and radiological correlate. METHODS: In a retrospective study 20 consecutive patients were evaluated. The index procedure took place between 2000 and 2003. 15 patients were male, mean age was 62 years. Inclusion criterion was a rotator cuff defect Bateman grade IV. Exclusion criteria were smaller defects, shoulder instability and fractures of the injured shoulder. An open reconstruction with acromioplasty and a pedicled delta flap was performed. Follow-up period was mean 37 months. Follow-up included clinical examination, ultrasound, MRI and the Constant and Simple shoulder tests. RESULTS: According to the Constant/Simpls shoulder test the result was good in 15/14 patients. We found a poor result in one respective two cases. Mean Constant score was 72,3 (+/-7,8). A marked improvement in shoulder function and pain was found. MRI showed a subacromial covering of the defect in all cases, nearly always the flap showed marked fatty degeneration. As a complication we saw one superficial infection. CONCLUSION: The delta flap is a simple method for the repair of large defects of the rotator cuff. The clinical results are satisfying, the clinical scores are comparable to those achieved with latissimus dorsi- or pectoralis transfer. The procedure itself is relatively simple compared to above-mentioned methods.

SIC13-P45

THE REVERSED SHOULDER PROSTHESIS. OUR EXPERIENCE. A SERIAL OF CLINIC CASES

Inmaculada Noble SANCHEZ, Miguel FLORES, Javier TALLON, Yassin BUREDDAN,

INTRODUCTION: Summary about characteristics, properties, indication, advantages and handicaps of using the reversed shoulder prosthesis. MATERIAL AND METHOD: Description of a serial of patients operated on in our hospital in the last 10 years, using these prostheses. RESULTS: Statistics values according to the clinics results using the prosthesis. A brief discussion comparing the results with another kind of clinics cases. Finally, biographical references used.

SIC13-P46**JOINT MOBILITY OF THE HAND IN THE ASPECT OF GRASPING FUNCTION - A SYMBOL DIAGNOSTIC SYSTEM**

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AIM: To create practical and enough precise diagnostic system to diagnose restriction of movements in high amplitude joints of hand within the aspects of grasp function. MATERIALS: Data from literatures; one hundred and fourteen patients with contractures of inter- and metacarpal phalangeal joints of the hand; eighteen orthopaedicians who took part in the experiments and questionnaire. METHODS: Conducting experiments, making hand model, collection and analysis of data from the literatures, patients and orthopaedicians, drive a new system. RESULTS: We offer a new, unusual diagnostic system in which the functional zero position of the hand is used. In our system, diagnosis is explained by letters and numbers, which simplify the diagnostic process. The mainstay of the system is the following: 1. In neglected old injury of the hand, to achieve good grasp function, best to transfer the mobility sector to more functional zone than to recover the amplitude of joint mobility. That is why, we recommend evaluating joint mobility by functional zero position. 2. Derivation of contractures – In any mobility restriction of phalanges during the movement at joints in any direction or in any planes. We can compare the possibility of joint mobility by digital data during preoperative and post operative follow-up. By this way, our system answers the question about the degree of grasping ability of the hand by evaluation of one joint mobility, and gives the indications and contra indications to decide the type (operative or conservative) of treatment.

SIC13-P47**SCAPHOCAPITATE SYNDROME (A CASE REPORT)**

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CHU IBN ROCHD (MOROCCO)

Scapho-capitate fracture is a rare lesion and its mechanism is controversial. Forced extention seems to be the most frequent cause as this movement of the wrist induces scaphoid fracture by compression. Hyperextension of the wrist as a result of the scaphoid lesion allows contact between the posterior margin of the radius and the neck of the capitate inducing a capitate fracture. We report a case of transcapoid, transcapitate, palmar perilunate fracture-dislocation with ejection of the proximal pole of the scaphoid and lunate into the palmar aspect of the forearm. Consolidation was noted at 8 weeks with a good mobility of the wrist.

SIC13-P48**AXILLARY ARTERY LESION IN THE FRACTURES OF THE UPPER EXTREMITY OF THE HUMERUS**

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SUMMARY: The complex fractures of the upper extremity of the humerus happen at the same time with vascular and nervous lesions in 5 at 30% of cases. The aim of our study is to expose the diagnosis problems of those lesions that can happen especially to patients with multiple injuries and their treatment modalities. We report a case of a patient

who presents: a concussion, a left acetabular fracture and a complex fracture of the upper extremity of the right humerus associated with axillary artery lesion with ischemia manifestations. The angioscanner showed an outspread thrombosis of the axillary artery. The treatment consisted of the reduction of the humerus fracture and fixation with plaque; after that, a revascularisation obtained by interne saphena venous graft. The evolution was favourable with the disappearance of ischemia signs. The complex fractures of the upper extremity of the humerus can be complicated by vascular and nervous lesions due to the proximity of the brachial plexus and the axillary artery. A rigorous diagnosis strategy can permit the adequate treatment in a brief time.

SIC15-P01

SUBJECTIVE & OBJECTIVE OUTCOME OF INTRA-ARTICULAR ACL RECONSTRUCTION WITH & WITHOUT EXTRA-ARTICULAR STABILIZATION

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AIM: to assess complication rate and patients' satisfaction following intra articular ACL reconstruction with and without extra articular stabilization. METHOD: retrospective review of clinical records and patients' postal questionnaire for all consecutive cases done in Oldchurch hospital between 1998 and 2004. Outcome assessment: objective: knee laxity, stiffness, failure, infection, dvt; subjective: pain score, final knee stability, general improvement. RESULT: 98 patients, mean age 33 (18-52), average follow up: 1 year. Higher rate of complications with patellar tendon compared with hamstrings, complication rate increased with age, infection rate decreased with peri op antibiotics.

SIC15-P02

MEDIAL PLICA SYNDROME OF THE KNEE: IS CLINICAL DIAGNOSIS RELIABLE?

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BACKGROUND: Pathological medial plicae is known to cause anteromedial knee pain. However, clinical diagnosis of pathological medial plicae is poorly defined in the literature and therefore, arthroscopic diagnosis remains gold standard. We report a system of clinical diagnosis based on the criteria set by us for these painful conditions of the knee. METHODS: We prospectively studied forty-eight symptomatic patients (sixty-six knees) with clinical suspicion of pathological medial plica based on five "essential" and four "desirable" criteria set by us. All patients were subjected to arthroscopic examination, to confirm or disprove our clinical diagnosis and, for treatment. RESULTS: Arthroscopic examination confirmed our clinical diagnosis of medial plicae in forty-four (sixty-two knees) of these patients showing a diagnostic accuracy of 91.7% (95% confidence interval: 80.0%, 97.7%), sensitivity of 100% (95% CI: 92.0%, 100.0%) with our method. Those with pathological medial plicae at arthroscopy (forty-four patients; sixty-two knees), were treated by arthroscopic resection. Thirty-nine patients (fifty-five knees) showed satisfactory outcome (95% CI: 75.4%, 96.2%) after arthroscopy. CONCLUSIONS: We believe that our method of clinical diagnosis of pathological medial plicae is simple, non-invasive, economic and reliable. Symptomatic medial plicae can be successfully treated by arthroscopy. This study has changed our clinical practice and also allowed us to decrease substantially the cost of diagnostic imaging.

SIC15-P03**UNUSUAL CASE OF BILATERAL PATELLA TENDON RUPTURES IN THE ABSENCE OF ANY RISK FACTORS**

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Bilateral simultaneous patella tendon ruptures are very rare and extremely uncommon in healthy individuals. We report an unusual case of a 46-year-old man with this injury in the absence of any risk factors and highlight the importance of being thorough in examining patients following trivial injuries. Following a fall whilst dancing, this man presented with bilateral painful knees. Diagnosis of bilateral patella tendon ruptures was made after examination and initial investigations. The patient proceeded to have an operation the following day. The ligamentous edges were refreshed and sutured with ethibond and reinforced with circlage wires. Post-operatively the knees were splinted and a tailor made physiotherapy protocol introduced. The patient recovered well and had full range of motion in both knees without any complications on follow up. Bilateral ruptures are rare in healthy individuals and not commonly reported. In high risk patients, patella tendon rupture can occur following a trivial injury. In cases like this, careful examination should be carried out so as not to miss the other side.

SIC15-P04**MUCOID DEGENERATION OF ANTERIOR CRUCIATE LIGAMENT; POST OPERATIVE FOLLOW UP RESULTS**

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Mucoid degeneration of the Anterior Cruciate Ligament is a very rare cause of knee pain in a patient with physically intact ligament and no obvious trauma history. MRI is the most useful tool for differentiating it from an intraligamentous ganglion or other rarer lesions in the knee joint. Diagnosis is confirmed by arthroscopic criteria and histopathology. Treatment options are not standardised due to rarity of the condition. We report 3 cases of mucoid degeneration of the anterior cruciate ligament (ACL). Debulking of the ACL was performed by a judicious excision of the degenerated mucoid tissue, taking care to leave behind as much of the intact ACL as possible. We present the review of literature and our follow up results analysis with IKDC scoring.

SIC15-P05**ARTHROSCOPIC MEDIAL RELEASE – A NOVEL CONCEPT OF TREATMENT FOR OSTEOARTHRITIS OF THE KNEE**

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A retrospective case series study was conducted to review the clinical outcomes of 193 knees of 122 patients who had received arthroscopic medial release for various degrees of osteoarthritis of their knees between Sep. of 2003 and March of 2004. There were 18 (15%) male and 104 (85%) female. The mean age was 61 years (range, 41 to 82). The pain domain of the knee society score (KSS) and patients' subjective satisfaction were used for the outcome evaluation. The preoperative femorotibial angle (FTA) of each knee was measured. The mean of the FTA of each outcome subgroup was calculated. The average follow-up period was 35 months (range, 32 to 38 months). RESULTS: The mean of the pain domain of the KSS increased from 31 preoperatively to 42 postoperatively. For patients with stage II OA, the satisfactory rate was: excellent, 44.4% (mean of FTA:

4.00); good, 42.9% (2.50) and fair, 12.7% (1.78). For stage III OA: excellent, 13.3% (0.64); good, 39.1% (0.39); fair, 42.9% (-2.22) and poor, 4.7% (-4.40). For stage IV OA: good, 16.7% (-4.67); fair, 55.6% (-5.21) and poor, 27.7% (-5.87). Eight of the 10 poor result knees were converted to arthroplasty after AMR with an average delay of 16 months. CONCLUSIONS: Arthroscopic medial release is a good modality for the treatment of stage II osteoarthritis of the knee joint. For patients with stage III OA, satisfactory results could be anticipated in patients without varus deformity of their knees. Some stage IV patients still get benefits from this procedure.

SIC15-P06

BILATERAL PATELLAR TENDON RUPTURE: A CASE REPORT

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Bilateral patellar tendon rupture is a relatively rare injury and occurs mainly in patients suffering from systemic disease, metabolic disease or are taking corticosteroids. The authors present the case of bilateral patellar tendon rupture in a 40-year-old man, with tendinitis of bilateral patellar tendon and in cure of local glucocorticoid injections. Patellar rupture was diagnosed by radiographic, ultrasound and MRI.

SIC15-P07

DYNAMIC TESTING AND TREATMENT OF UNSTABLE BIPARTITE PATELLAE

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INTRODUCTION: To report two cases of unstable symptomatic bipartite patella and significance of arthroscopy and Thumb pressure Test over bone scintigraphy. METHODS: We present two cases of unstable bipartite patellae presenting with anteriolateral knee pain. We describe how diagnosis and subsequent successful treatment with two different methods were achieved in these cases and review management of symptomatic bipartite patella. DISCUSSION: The commonly practiced treatment is either the excision of accessory fragment or cast immobilisation but we have successfully treated these cases using small cannulated screws. In our view lateral release should not be done in these cases as it may lead to AVN of the piece and might convert into a loose body too. Satisfactory outcome was achieved in one case with surgical fixation and the other with excision. We recommend the treatment ideally by fixation of the fragment after curettage of the surface to achieve stability and union. However, if the piece is small, fragmented and already with advanced hyaline cartilage damage then excision achieves good outcome. CONCLUSION: We believe this is a disabling problem which can be easily solved if found and defined. Arthroscopy with slight thumb pressure over the accessory fragment is a more reliable investigation as compared to bone scintigraphy to diagnose gross instability.

SIC15-P08

INDICATION AND RESULTS OF USING HERBERT SCREW IN TREATMENT OF OSTEOCHONDritis DISSECANs OF THE KNEE JOINT

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INTRODUCTION: OSD is the most common source of loose bodies in the knee Joint. As

the other sources are: synovial chondro matosis, osteophytes, fractured articular surface, and damaged menisci. The site of OCD of knee Joint are as follows: 1-medial femoral condyle near the attachment of the posterior cruciate ligament 85%: classical 69%; extended classical 6%; inferocentral 10%. 2-lateral condyle 15%: inferocentral 13%; anterior 2%.The type of treatment are as follows: at first depends on: age-location, degree of involvement observation: immobilization; arthroscopic drilling of intact lesion; existing of fragment + debriding of crater; fixation + grafting bone pegs; fixation: by (K.W. Herbert screw); allografts; musaic plasty; chondrolytes culture. During the last 3 years we had 18 cases of O.C.D of the knee Joint, in 6 cases we did internal fixation of the fragment by Herbert screw. Our results were approximately good. After about 6 months the R.O.M. was about 90% of normal knee Joint and complete weight bearing happened without any pain, and functional scores SF36 were excellent and good.

SIC15-P09

THE FIXATION STRENGTH OF BIODEGRADABLE MATERIALS IN ACL RECONSTRUCTION

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The aim of the present study is to demonstrate the effectiveness and low morbidity of ACL reconstruction using the bone- patelar tendon-bone and hamstring graft fixed at femoral side with absorbable cross pins or absorbable screw. MATERIALS AND METHOD: A number of 137 patients with chronic ACL tear were arthroscopically operated using three different techniques:-Group 1 (51 patients): BTB graft fixed with interference screw at both side.-Group 2 (57 patients): BTB graft fixed using absorbable cross pins at the femoral side and interference screw at the tibial tunnel.-Group 3 (29 patients): double loop semitendinosis and gracilis fixed with absorbable cross pins proximally. Patients were evaluated objectively (Lachman test, pivot shift, KT-1000), subjectively (IKDC) and functionally (Tegner scale) before 12 and 24 month. The IKDC score was used to evaluate the result. Differences between groups were statistically evaluated using the Student T test. RESULTS: We did not record any significant difference in terms of effectiveness and morbidity among 3 groups. CONCLUSIONS: Based on our data the new technique of fixation at the femoral tunnel with absorbable cross-pin seems to be reliable and assure comparable results to those obtained with interference screw. This technique provides a secure fixation with satisfactory early clinical results. The results of the present study confirm that this procedure could represent an useful alternative option for the ACL reconstruction.

SIC15-P10

ACL RECONSTRUCTION USING AUTOTRANSPLANTS

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We completed 502 arthroscopic plastic surgical interventions of anterior cruciate ligament in the period from 2002 to 2006 year, altogether 215 (43%) using autotransplant BTB (group I) and 287 (57%) -hamstring (group II). In different terms after surgery we investigated 124 patients: 58 from the first group and 66 from the second group. Middle index of Tenger came to 5.2 scores in the first group (from 9 to 3) and to 4.8 scores in the second group. 94% of patients in the first group and 92% of patients in the second group

gathered from 81 to 100 scores according to Lósholm scale. Results of motions volume parameter-analysis of each patient according to IKDS demonstrate, that no limit in straightening in operated knee joint was revealed. Results of analysis demonstrate, that in all cases of patients in the first group - 50/58 (86%) and patients in the second group - 64/66 (96%), the volume of straightening in operated knee joint differed from contro-lateral joint by less than 6°. 46/58 (79%) patients from the first group and 53/66 (80%) patients from the second group were classified to the group A. 12/58 (21%) patients from the first group and 13/66 (20%) patients from the second group were classified to group B.

SIC15-P11

INTRA ARTICULAR MEDIAL MENISCAL CYST: A REPORT OF FIVE CASES

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The intra articular medial meniscal cyst is a rare pathology, described very little in the medical literature. This pathology is often discovered fortuitously and is largely supported by the development of the imagery in particular by magnetic resonance. Its physiopathology is not always perfectly known. The authors report five observations of intra articular medial meniscal cyst which treatment was based on the arthroscopy allowing the meniscal resection with evacuation of the contents of the cyst. The evolution was considered good in all the cases with a complete functional recovery.

SIC15-P12

ARTHROSCOPIC WASHOUT OF THE KNEE IN MIDDLE-AGED PATIENTS

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PURPOSE: The evaluation of short/mid-terms results of arthroscopic washout of the knee in middle-aged patients. **MATERIAL & METHOD:** Forty-three (43) patients aged 45-61 years (average: 54.7 yrs) with persistent knee pain (\pm knee swelling) despite the conservative treatment underwent arthroscopic washout of their knee. Twenty-four patients (24) were females and nineteen (19) were males. In twenty-three (23) cases the painful knee was the right one and in the remaining twenty (20) the left. The main arthroscopic findings were: synovitis (57%), chondral lesions of femoral and/or tibial condyles (50%) – usually not detected in MRI-scan -, degenerative tears of menisci (43%), degenerative changes ('arthritis') in tibiofemoral (32%) and patellofemoral (25%) joints. The patients were followed-up for 12-36 months (average: 22 months). **RESULTS:** 92% of patients were pain/symptoms free during the first seven post-op months. 83% of the patients appeared to have a significant improvement of their clinical condition during the follow-up period and were very satisfied with the outcomes of the treatment. Four patients re-complained for knee pain, but the pain was mild. Three patients underwent knee replacement. **CONCLUSIONS:** The arthroscopic washout of the knee seems to have satisfactory results in treatment of persistent knee pain due to 'degenerative changes' in middle-aged patients.

SIC15-P13

INVESTIGATION RESULTS OF BIOMECHANICAL PROPERTIES OF ACL AUTOTRANSPLANT MADE FROM PATELLAR LIGAMENT

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Actually the use of autotransplant made from the middle third of patellar ligament with the purpose of ACL reconstruction is widespread methodic in arthroscopic surgery. One of the major questions is the primary adequate stability of ACL transplant. In our trial we investigated the stability of autotransplant made from the middle third of patellar ligament. To realize this aim perfectly we collected the cadaver materials: patellar, connected with a part of tibia with the aid of patellar ligament. We cut off the lateral portions of patellar ligament to receive the middle portion. We fixed rigidly the patellar to the transverse beam, and we put successively a load with a fixed mass to the part of tibia. We determined the total mass of load in the moment of middle patellar ligament part rupture. MATERIALS: 10 cadaver complexes "patellar - middle third of patellar ligament – tibia". We collected the material from adult male cadavers from 28 to 55 years old. The middle term after death was 6 days (from 1 to 30 days). RESULTS: middle patellar ligament part rupture localized generally at the top third of ligament (8 cases) or at the attachment place of middle patellar ligament part to the patellar. The loading, needed to break the middle patellar ligament part was from 620 to 1150 H, on the average 940 H.

SIC15-P14

IRREDUCIBLE CHRONIC LATERAL DISLOCATION OF THE PATELLA AND VALGUS KNEE DUE TO ESCHAR ON THE LEG

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INTRODUCTION: We are presenting the surgical treatment of a 17-year-old female who had a thermal injury in her childhood. The eschar formed resulted in a developmental patellar dislocation and valgus knee. CASE REPORT: The patient had a thermal injury by boiling water when she was 5 years old. It was healed by the formation of a wide and thick eschar. Deformity, weakness and pain developed as she grew. The knee movements were 30-120 degrees and painful. She walked with a limp and the muscle strength of the quadriceps was 2/5. On the radiographies the patella was located on the lateral of the lateral femoral condyle. SURGICAL TECHNIQUE: The knee joint was exposed with an anterior 'S' shape incision over the eschar. The quadriceps muscle was released up to the middle thigh and valgus deformity of the femur was corrected by a supracondylar osteotomy. Tibial tuberosity was translocated from lateral to anterior. Early range of motion exercises was started. At the latest follow-up, osteotomy sites were healed, knee range of motion was 0-130 degrees of flexion and mild pain at the extremes of flexion and extension was present. Muscle strength of the quadriceps is 4/5. On the X-rays the patella is located anatomically and the mechanical axis of the limb is normal. CONCLUSION: Relocation of the patella to its anatomic position provides an almost normal extremity even after many years of dislocation.

SIC15-P15

RELEASE OF VASTUS LATERALIS TENDON IN RECURRENT DISLOCATION OF PATELLA

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BACKGROUND: Recurrent patellar dislocation is not uncommon and leads to significant morbidity in young population. Most of the procedures described for its management

cause considerable surgical trauma, big surgical scars and prolonged rehabilitation. Management of recurrent patellar dislocations has evolved significantly over the past decade with advancement of biomechanical knowledge of patellofemoral restraints and injury patterns. HYPOTHESIS: Vastus lateralis plays a crucial role in recurrent lateral dislocation of patella. Obviating the lateralising effects of vastus lateralis helps in managing this condition. PATIENTS AND METHODS: Between 2002 and 2005, ten patients who had habitual or recurrent patellar dislocation underwent lateral retinacular release that included a release of the vastus lateralis tendon and were observed prospectively. One patient had a bilateral release. RESULTS: At a mean follow-up of 24 months only one patient had redislocation secondary to significant trauma, none had medial instability clinically. Though the quadriceps strength was not measured quantitatively, none of the patients had quadriceps weakness clinically. The range of motion significantly improved. The knee score improved from average of 31.09 preoperatively to 60.90 postoperatively. The retropatellar pressures showed a statistically significant decrease postoperatively. CONCLUSION: Proximal realignment through release of vastus lateralis tendon is a safe, reliable procedure in patients with recurrent dislocation resulting from imbalance of soft tissue tension around patella, but with a normally sited patella and normal trochlea. Correcting dysplastic factors, in particular tibial tubercle transfers and trochleoplasties, are best reserved if more minimal surgery has failed.

SIC15-P16
SIMULTANEOUS AND SPONTANEOUS BILATERAL PATELLAR TENDON RUPTURE IN AN SLE PATIENT

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Spontaneous bilateral patellar tendon rupture is a rare event often associated with systemic diseases. A 26-y-old woman, with systemic lupus erythematosus, treated with corticosteroids, presented to the emergency department after a fall from standing position unable to walk or extend her knees. On examination there was only great pain on palpation and passive movements of both knees with no obvious skin trauma or bruises. The patella on both knees was palpated at a high position. X-rays revealed bilaterally no fracture but patella alta. Based on the above the diagnosis of bilateral patella tendon rupture was made. Intraoperatively both patella tendons were found ruptured in their midsubstance. In addition medial and lateral collateral ligaments were found having complete or partial rupture. They were all sutured. Moreover patellar tendons were reinforced using encircling wire. On the first postoperative day functioning knee braces were administered and physiotherapy started allowing only passive motion and no weight bearing. The patient was followed up at 14 weeks. Mobilization with crutches started at six weeks and at 14 weeks she was walking using crutches and had knee flexion of about 100 degrees, on both sides. Concluding, detailed history and clinical examination are essential for the proper diagnosis of even rare cases such as spontaneous bilateral patella tendon rupture. In addition the surgical treatment followed was the same as the one that would be given to an otherwise healthy individual with good functioning results, but with slower rate of rehabilitation.

SIC15-P17
EFFICACY OF INTRA-ARTICULAR INJECTION OF SODIUM HYALURONATE (SYNOCROM) IN THE TREATMENT OF KNEE OSTEOARTHRITIS IN MALAYSIAN POPULATION

BACKGROUND: Management of osteoarthritis of the knee is aimed at controlling pain, improvement of function and avoiding toxic effects of therapy. An intra-articular injection of sodium hyaluronate is one of the pharmacologic treatments that can meet the above aim. The objective of this study was to assess the function, pain and quality of life in patients with osteoarthritis of the knee after taking intra-articular injection of sodium hyaluronate (Synocrom). **METHODS:** This is a prospective study in fifty patients who have been given intra-articular injection of sodium hyaluronate (Synocrom) 3 times in 3 consecutive weeks. They were followed up for at least a minimum of 6 months. Patients were reviewed at 2nd, 8th and 24th weeks after last injection. Patients were assessed with Lequesne algofunctional index for function, VAS (Visual Analogue Score) for pain, range of movements and side effects. **RESULTS:** The average age was 60.9 years and female to male ratio was 3:1. We found that knee pain and function improved after 6 months with intra-articular injection sodium hyaluronate (Synocrom) and the majority of patients had favorable effects which lasted at least 6 months from the last intra-articular injection ($p < 0.01$). The only side effect noted was the incidence of an acute non septic joint effusion in one of the patients post 3rd injection. **CONCLUSIONS:** We recommend the use of intra-articular injection sodium hyaluronate (Synocrom) as one of the treatment options for patients with knee osteoarthritis as a temporary measure before taking the option of a total knee replacement.

SIC15-P18

SIMULTANEOUS RUPTURE OF THE PATELLAR TENDON AND THE ANTERIOR CROSSES LIGAMENT: A MATTER OF ONE CASE

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The simultaneous rupture of the patellar tendon and the former cross ligament is a very rare organic association; given that up to now, only 11 cases were reported in the French-speaking and Anglo-Saxon literature. We report a case of simultaneous rupture on a 24-year-old patient, having presented at the continuation of a fall secondary of a deficit of the quadriceps in phase of recovery, a closed traumatism of the right knee. The exam found a former instability, with a deficit of the extension of the knee; the rupture of LCA and the patellar tendon were confirmed on the I.R.M without associated meniscus lesions. Surgical repair in only one time was carried out by rebuilding by a graft of the fascia lata for the patellar tendon and by the tendons of the duck leg for the former cross ligament, the patient profited of a passive then an active rehabilitation in an interval of safety of 0 at 45°. With an 8 months retreat, the knee was stable, with a normal extension of the knee and without asymmetry of the two kneecaps. The interest of the observation lies in the organic association itself which is rare, to give a progress report on the relation on the biomechanical level between the ligament laxity and the patellar lesion, to study the supporting factors and the various therapeutic processes.

SIC15-P19

MEASUREMENT OF STIFFNESS OF DEGRADED ARTICULAR CARTILAGE BY AN INDENTATION METHOD CLINICALLY

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The reduction of cartilage stiffness and loading property may cause osteoarthritis of the joint. Traditionally, clinical techniques applied for the in vivo diagnostics of cartilage pathologies are highly subjective and mostly unsuccessful for the sensitive analysis of cartilage degeneration. In this study, we have utilized arthroscopic indentation instrument (Artscan 200 that is both CE and FDA approved) to measure the damage of cartilage in vivo in order to understand the compressive stiffness of different degrees of damage. In addition, from the viewpoints of diagnosis of cartilage damage and evaluation of the tissue engineered cartilages, we need standard testing procedures to measure mechanical and tribological properties of cartilages. In this research, an arthroscopic indentation tool was applied to measure the cartilage stiffness in the surgery room. The testing protocol has been set up for further measurement. In the future, we are going to evaluate and quantify the degree of cartilage generation through in-vivo and in-vitro measurements. The ultimate goal of this research is to develop a quantitative standard to evaluate the functions of tissue engineered articular cartilages.

SIC16-P01

MID AND LONG-TERM RESULTS AFTER SURFACE REPLACEMENT OF THE KNEE

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Evaluation was done 12 resp. 6 years after the operation. We evaluated 48 (81%) of 59 RMC knees 12 years after surgery as well as 206 (80.3%) of 255 Wallaby knees 6 years after operation. We found 2(4.1%) loosening in the RMC and 5 (2.5%) in the Wallaby group. The mean age at surgery was 75 years (56-92) in the RMC and 69 years (45-92) in the Wallaby group. 44 patients (91%) in the RMC group and 193 patients (94%) in the Wallaby group felt distinct improvement concerning pain, walking ability and function. None of the patients in both groups felt the same problems as before surgery. 4 patients (9%) of the RMC group and 11 (5.4%) of the Wallaby group told that they have now more problems than before the operation.

SIC16-P02

KNEE SURFACE REPLACEMENT - A SOFT TISSUE PROCEDURE

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In times of computer-aided knee replacement one has to consider that the operative procedure is a problem of alignment and ligamentous balancing. Therefore it is necessary to realign the thigh and to balance the soft tissues. Bony alignment can be performed with templates or by computer-aided planning. Soft tissue balancing needs a lot of skill and experience. Our mid- (n=255) and long-term (n=69) results of bicondylar knee replacement show good or excellent results when following the typical steps of soft tissue balancing. This paper shows how to solve the problems even in gross deviations.

SIC16-P03

READMISSION RATES WITHIN A 6-WEEK PERIOD IN PATIENTS FOLLOWING AN ACCELERATED DISCHARGE PATHWAY AFTER TOTAL KNEE REPLACEMENT

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BACKGROUND: There is an increasing emphasis on efficient utilization of health services leading to earlier discharge times in many hospitals. However, it is important to see this does not lead to an inappropriately high rate of readmissions. In fact the UK Department of Health uses readmissions within 28 days as a clinical indicator for comparing outcomes following Hip Replacements. There is not much published data regarding early readmission rates following Knee Replacements. So, we decided to evaluate the readmission rates in our unit. **METHODS:** We looked at readmission rates in 209 consecutive Knee Replacements done in our unit. All patients had the AGC Knee Replacement and were discharged home under an accelerated discharge protocol with COMBAT (Community Orthopaedic Mobility for Basildon and Thurrock) nursing care when they achieved the criteria for discharge. **RESULTS:** Average in patient stay after excluding outliers was 4.9 days (range 2-9) with 41 (20%) patients going home in ≤ 3 days. Readmission within 6 weeks for any reason was 16 (7.6%) of which 4 did not have anything significant wrong with them. The readmissions did not appear to be related to length of hospital stay. **CONCLUSIONS:** 1) It is possible to discharge patients home early and safely provided a carefully selected criterion is followed and backup care is provided at home. 2) This reduces the costs of in patient care without compromising outcome. 3) Readmission rates over a 6-week period for any reason were not found to be inappropriately high.

SIC16-P04

AN EARLY EXPERIENCE WITH TOTAL KNEE REPLACEMENT FOR ELDERLY PERIARTICULAR KNEE FRACTURES

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Periarticular knee fractures in osteoporotic/osteoarthritic bone present a challenge to fixation, mobilisation or non-operative management. We present a series of 7 proximal tibial and 4 distal femoral fractures in 1 male and 10 females with mean age of 76 years, radiological and intra-operative evidence of osteoporosis/osteoarthritis at a mean follow-up of 24.4 months. All patients underwent total knee arthroplasty. Cemented semi-constrained prosthesis with long stem tibial component was used for tibial fractures. Distal femoral fractures were managed using stemmed, cemented rotating-hinge prosthesis. Wedges, augments and bone graft were used when appropriate. Patients were allowed rapid mobilisation with immediate full weight-bearing. Good clinical results were achieved with fracture healing, sound fixation and well-aligned flexible knees. Analogous to arthroplasty for hip fractures, this technique should be considered as a treatment option in elderly periarticular knee fractures with osteoporosis and/or osteoarthritis.

SIC17-P01

KNEE ARTHROPLASTY POST-OPERATIVE FOLLOW UP. A TIME FOR REVIEW.

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INTRODUCTION: Knee arthroplasty represents a large consumer of resources in orthopaedic surgery. Although the need for follow up is universally accepted, there is much debate on the duration and frequency of outpatient visits. To date there is no evidence regarding the cost effectiveness of follow up. 90% of knee arthroplasty failures do so after 5 years. Joint replacement review is conducted by a variety of personnel including orthopaedic surgeons, surgical care practitioners (SCPs) and extended scope

practitioners (ESPs). METHODS: A questionnaire was sent out to orthopaedic surgeons working in the Sandwell and West Birmingham Hospitals Trust enquiring about their practice for following up patients who have had knee replacements. Information regarding the length of follow up, frequency of visits and the use of check radiographs were recorded. RESULTS: The mean length of follow up was 28.3 months. (12-60 months). The mean number of visits in the first year was 3.7. (3-4). The mean number of total visits was 6. (4-9). On average 2 check radiographs were performed in the first year. Mean total number of check radiographs performed was 4. The mean cost for each patient is 590 pounds. (224-896 pounds).DISCUSSION: There is considerable variation in knee arthroplasty follow up with ensuing cost implications. Guidance is required for the appropriate review, which will allow early detection of complications in an efficient and cost effective manner. In our trust a protocol has been suggested for the follow up of knee arthroplasty by ESPs and SCPs.

SIC17-P02

SAW CUT ACCURACY IN KNEE ARTHROPLASTY: AN EXPERIMENTAL CASE CONTROL STUDY

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INTRODUCTION: The correlation of limb mal-alignment to early aseptic loosening in total knee arthroplasty (TKA) is well established. Navigated TKA has heightened awareness of mal-alignment in conventional TKA, as well as providing an accurate means of measuring alignment per-operatively. AIM: To assess cutting error, and examine the Hypotheses: 1."Slotted osteotomies are more accurate than Un-Slotted" 2."Second pass of the saw blade improves the accuracy in TKA".

METHOD: 3 pairs of fresh frozen human knees were prepared, exposed, and positioned as for primary TKA. Standard cutting guides were used in conjunction with a clinical navigation system, and the error (Difference between the achieved resection, and the planned resection) in each osteotomy was measured. A second, tidying, pass of the saw blade was made and the error re-measured. Cutting guides were used with a slotted and un-slotted technique in left and right knees respectively. A single experienced surgeon performed all 96 osteotomies. RESULTS: Slotted Tibial osteotomies are more accurate in the sagittal ($p=0.01$) and coronal ($p=0.04$) planes. Second pass osteotomy reduced variability in Femoral ($p=0.07$) and Tibial ($p=0.17$) osteotomies. Second pass osteotomy reduced variability in Femoral ($p=0.07$) and Tibial ($p=0.17$) osteotomies. DISCUSSION: The bone cutting process is prone to high levels of random error that can result in implant mal-alignment, and thus predispose to aseptic loosening. Navigated TKA gives the operating surgeon the opportunity to check each osteotomy, and correct any error where necessary. In conventional TKA, the authors recommend the use of dual pass slotted osteotomies, for optimum accuracy.

SIC17-P03

NAVIGATION ASSISTED MINIMALLY INVASIVE TOTAL KNEE ARTHROPLASTY IN THE OBESE PATIENT: LESSONS LEARNED

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Prospective study using navigation in minimally invasive (MI) total knee arthroplasty (TKA) in obese patients. Fifty MI TKA in obese (BMI >30) and fifty in non obese patients

(BMI <30). Second group was a control of the MI instruments and our surgical technique. Navigation was used to check the position of cutting blocks and components during surgery. For the obese group problems to position the EM guide in the centre of the tibial plateau were observed, resulting in varus alignment of 2.4° (range, 1.3° to 4° varus). If skin incision was not distal enough, the guide was riding on the soft tissues and had a tendency to valgus alignment of 1.8° valgus (range, 1.2° to 3.6°). The non everted patella and the minimal tibiofemoral dislocation have a tendency to push the tibial component in internal rotation 5.6° (range, 4.8° to 9.7°). Observing the lateral side for sizing of the tibia is difficult. Using the 4 in 1 cutting block needs an adequate distal incision since oblique positioning of the saw could damage the skin. During implantation of the components a varus position of the tibia (2.4° of varus) with excessive cement under the lateral tibia plateau (>2mm) was observed. Cement retrieval posterolateral is very difficult. Flexion of the femoral component (5.7° flexion) is observed. Early functional results should not compromise alignment and implant survival. Navigation brings out the typical pitfalls during surgery. Extension of the skin incision distally avoids skin damage and allows better positioning of cutting guides.

SIC17-P04

FUNCTIONAL OUTCOME AFTER UNICOMPARTMENTAL KNEE ARTHROPLASTY IN PATIENTS WITH OSTEOARTHRITIS OF THE MEDIAL COMPARTMENT

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INTRODUCTION: The optimal treatment of osteoarthritis of the medial compartment of the knee joint is still controversial. We present our experience with unicompartmental meniscal bearing knee arthroplasty in patients with localized osteoarthritis of the medial compartment of the knee joint. **MATERIAL & METHODS:** Between 2001 and 2005, 32 Pts (21F, 11M; 52-70 year old, mean 63Y) underwent surgery using the Medial Oxford Unicompartmental Knee. 5/32 Pts had since been operated on their other knee, 1-2 years after the first UKA. Patients were followed for 1.5-4 years (mean 2.5Y), and evaluated by the Knee Society Score and radiographs. **RESULTS:** 29/32 (90%) patients, including the five patients who had staged bilateral procedures of both knees, had excellent and good results. They were almost free of pain and had marked improvement in knee function. The remaining 3/32 patients (10%) had fair results. A second look arthroscopy of these patients revealed a progressive development of degenerative changes in their knees. **CONCLUSIONS:** Unicompartmental knee arthroplasty is a favourable procedure in patients with localized arthritis of the medial compartment. It allows replacement of only the affected joint compartment with less bone loss. Recovery and rehabilitation is quick and ambulation is early. The ideal patient for UKA is a relatively young patient with localized degenerative changes, who has a stable knee, a flexion contracture less than 15 degrees and a mechanical axis of less than 10 degrees from neutral for a varus knee, or less than 5 degrees for a valgus knee.

SIC17-P05

HOW TO ACHIEVE HIGH FLEXION AFTER TOTAL KNEE ARTHROPLASTY USING STANDARD IMPLANTS

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PURPOSE: The activities of daily living (ADL) of most Middle-Eastern and Far-Eastern population include adopting postures which require high flexion at the knees (averaging at least one hundred and thirty degrees or more). A range of high flexion implants have

been put on the market by the implant manufacturing industry with suggestions of achieving high flexion based on their design. However, the implants have a much higher cost than the standard implants. The purpose of this study was to establish that high flexion is possible to achieve using standard implants if certain surgical technique-related points are consistently addressed during the surgery. **METHOD:** One hundred consecutive patients were included in the study and each one was subjected to a well-defined sequence of surgical steps while using a standard fixed-bearing total knee prosthesis. These points are expanded in the paper. **RESULTS:** Seventy-three percent of the patients reviewed have been able to achieve cross-legged sitting positions or high flexion postures. **CONCLUSIONS:** It is the author/surgeon's understanding that the most important determinants for this were certain surgical technique related issues. These are discussed in the paper. The above subject has specific relevance to the Asian population.

SIC17-P06

COMPARISON OF ACCURACY POSTERIOR TIBIAL SLOPE IN TOTAL KNEE ARTHROPLASTY USING INTRAMEDULLARY AND EXTRAMEDULLARY CUTTING GUIDE

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BACKGROUND: Achievement of posterior tibial slope is one of the factors that will lead to a better range of knee flexion after total knee arthroplasty. The objective of this study is to compare the accuracy of achieving 7 degrees posterior tibial slope when using intramedullary and extramedullary alignment guides for tibial resection in total knee replacement. **METHODS:** This is a retrospective radiographic study in 74 postoperative weight bearing lateral views of total knee arthroplasties using Nexgen LPS between 2001 and 2005. Posterior slope angle is measured between a line perpendicular to the anatomic long axis of the tibia and a line obtained by using the inclination of the tibial component. The angle is then measured using a protractor. **RESULTS:** Forty-three cases (58.1%) were in extramedullary group and the remaining 31 (41.9%) cases were intramedullary. In 22 cases (29.7%); 7 degree posterior slope was achieved. Within this group, 18 (82%) were with intramedullary technique and 4 cases (18%) with extramedullary technique. The mean degree for intramedullary and extramedullary technique is 6.90 (range from 5 to 8) and 4.88 (range from 0 to 8) respectively with p-value of 0.004 at 0.05 significance level. **CONCLUSION:** In this study, intramedullary alignment guide is more accurate compared to extramedullary guide to achieve seven degree posterior tibial slope.

SIC17-P07

THE S-ROM NOILES ROTATING HINGE KNEE-SYSTEM USED IN REVISION ARTHROPLASTY

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INTRODUCTION: We wanted to know if function and stability could be restored with the S-Rom Noiles Rotating Hinge Knee-System in cases of major bone defects after Knee-Arthroplasty. We analyzed the early results including reinfections, early loosening, fractures and the handling of the prosthesis. **METHODS:** Since April 2004, 16 patients were followed prospectively concerning arthroplasty as a salvage-procedure due to major bone defects and ligament instability. In 10 cases the procedure was performed to resolve infection-situations after osteosynthesis or knee-arthroplasty. 6 patients had either aseptic loosening or highly unstable situations. Follow-up period was up to 20 months. **RESULTS:** There were no deep vein thromboses clinically, no major bleeding

complications, no dislocations or early loosening. Adverse events included one intraoperative fracture and 2 reinfections. Reinfections were controlled by revision surgery consisting of one change of inlay and one second step prosthesis replacement. Mean duration of operation was 189 min. The functional outcome was good even in obese patients with multiple comorbidities. The mean BMI was over 31. Range of motion increased by roughly 35°. 2 patients had a loss of ROM but a restored joint function. Radiologically all showed correct fit of the prosthesis with regular bone-cement interface. Mean ICU-time was 2.1 days. Average time of hospitalisation was 29 days. Scores concerning functional outcome, Activity of daily living and depression evaluation were determined. **CONCLUSION:** The S-rom Noiles Rotating Hinge Knee-System is a safe and feasible prosthesis especially in high risk cases. It provides good functional outcome along with high patient satisfaction.

SIC18-P01

SURGICAL TREATMENT OF SECONDARY SPINE DEFORMITIES

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In our clinic, 32 patients (aged 5-29 y.o.) with secondary spine deformities were operated. All patients earlier have undergone laminectomy, due to which in all cases developed severe deformities of spine: 6 in cervical spine, 10 in cervicothoracic, 5 in thoracic, 9 in thoracolumbar and 2 in lumbar spine. The average value of kyphotic deformity was 85 degree, scoliotic deformity - 79 degrees. In all cases performed surgical correction of spine deformity using De Puy and CDI instrumentation. Surgical treatment in 20 cases was divided into 2 parts: anterior release with following halo-traction and dorsal correction; in 12 cases correction was performed in one-step - halo-traction and dorsal correction. Average correction of kyphotic deformity after surgery was 51%, skoliotic deformity 62%. Good results in treatment of secondary spine deformities may be achieved using combined surgical approaches, halo-traction with dorsal instrumentation.

SIC18-P02

STUDY OF SURGICAL MANAGEMENT OF NON-IDIOPATHIC SCOLIOSIS

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Management of non-idiopathic scoliosis (which consists of 20% of all scoliosis cases) is not easy because underlying condition needs correct diagnosis before treatment. **AIM:** To critically analyze the outcome of surgical management of correction of deformity of non-idiopathic scoliosis following instrumentation and fusion of spine. **MATERIALS AND METHODS:** 18 cases of non-idiopathic scoliosis were operated at S I O R, Pune. Classification used was Lenke's and measurement of scoliosis by Cobb's method. For curves more than 75 degrees before skeletal maturity anterior plus posterior correction was done. Only posterior correction for curves up to 75 degrees in cases close to skeletal maturity. Only anterior correction for curve up to 75 degrees in cases under skeletal maturity. (Only anterior procedure saves between 2 to 3 fusion levels especially in lumbar curves). **RESULTS:** Average follow-up period: 2 years 4 months. There was complete fusion seen in all the cases with no recurrence of deformity. All patients had satisfactory results with no functional impairment. Average correction achieved was 64%. **CONCLUSION:** We concluded that segmental instrumentation is an excellent modality of correction for non-idiopathic scoliosis and also allows early mobilization. But it is important to diagnose underlying cord anomaly such as tethered cord and

diastatomyelia and treat them before scoliosis correction.

SIC18-P03

MANAGEMENT OF CERVICO-DORSAL KYPHOSIS: AN ENIGMA

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Managing Cervico-dorsal Kyphosis is a grey zone in treatment of spinal deformities. Bilateral costotransversectomy and extended posterolateral approach gives excellent scope to do complete anterior decompression as well as allows anterior reconstruction with Titanium cages through posterior approach in cases of Cervical Dorsal Kyphosis. Aim of our study was to study surgical management of kyphotic deformity at cervico-thoracic junction (upto D4-5) with or without neurological deficit secondary to various pathologies. To document efficacy of Pedicle subtraction osteotomy, Egg Shell procedure, Anterior column reconstruction through posterior approach. We present our experiences with 23 patients treated through standard and modified posterior approach using a variety of instrumentations. Our study concludes that Posterior management of Cervicodorsal kyphosis through the posterior approach is a safe, less morbid, easier technique as compared to anterior procedures although some issues with relation to instrumentation need to be addressed.

SIC18-P04

COMPARATIVE STUDY - ANTERIOR RELEASE AND POSTERIOR INSTRUMENTATION VERSUS ONLY ANTERIOR RELEASE AND ONLY ANTERIOR INSTRUMENTATION IN IDIOPATHIC SCOLIOSIS

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AIMS: 1) To study the percentage of correction in the Cobb's angle in Idiopathic scoliosis in patients treated with only anterior instrumentation versus those treated with anterior release and posterior instrumentation. 2) To compare the number of segments fused to achieve correction in the 2 groups. MATERIALS AND METHODS: The study was conducted at Sancheti Institute for Orthopaedics and Rehabilitation, Pune from June 2004 to 2006. Total of 58 patients. There were 33 male patients and 25 females. Age group of the patients: 6 years and 18 years. Patients were assessed with preop X-rays - AP bending views and lateral views. Cobb's angle was measured preoperatively. Patients with Cobb's angle of < 75 degrees were treated with only anterior release and anterior instrumentation. Patients with Cobb's angle > 75 degrees were treated with anterior release and Posterior instrumentation. Moss Miami Instrumentation was used in all cases. RESULTS: 41 patients were treated by anterior release and posterior instrumentation, 17 patients were treated with anterior release and anterior instrumentation. CONCLUSION: Anterior release and anterior instrumentation provides the advantages of a less morbid approach as compared to a combined approach and incorporation of lesser segments for fusion. The correction in the Cobb's angle and maintenance of the sagittal profile is better achieved with an anterior release and posterior segmental instrumentation. The posterior approach also has the advantage of allowing a simultaneous Costoplasty to be performed if required. However, we would like to stress that the study is still in its infancy and requires a longer study period and larger number of patients to demonstrate a statistically significant difference.

SIC18-P05**CAN "SNIFF NASAL INSPIRATORY PRESSURE" (SNIP) DETERMINE SEVERITY OF PAEDIATRIC SCOLIOSIS?**

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INTRODUCTION: Sniff nasal inspiratory pressure has become a valuable tool in assessing respiratory muscle weakness. Its role in the scoliosis population is still being defined. **AIM:** To assess significance of Sniff nasal inspiratory pressure in paediatric patients with scoliosis. **METHODS:** Eighty-nine paediatric patients were investigated with SNIP at the time of preoperative assessment for scoliosis surgery from Jan. 2000 to Dec. 2006. Patients were divided into neuromuscular (24) and idiopathic (55). Other causes and revision were excluded (10). SNIP was evaluated with respect to curve pattern and curve degree. This included radiograph and case note review. **RESULTS:** The mean SNIP value for the idiopathic and neuromuscular groups was 70 cm H₂O and 44 cm H₂O respectively. This was significantly different (0.006). The mean Cobb's angle for idiopathic pattern was 58°. For the neuromuscular group it was 73°. There was no correlation between SNIP value and curve severity in either the idiopathic or neuromuscular group. **DISCUSSION:** SNIP is a valuable test when used in conjunction with vital capacity and overnight oxygen saturation, height, comorbidities in the neuromuscular population. It is a sensitive indicator of respiratory muscle weakness. It does not appear to reflect increasing curve severity. It does not appear relevant in scoliosis without a neuromuscular disorder.

SIC18-P06**POSTERIOR SURGERY WITH DECOMPRESSION AND STABILIZATION USING TITANIUM MESH IN POST-TRAUMATIC KYPHOSIS WITH NEUROLOGIC COMPROMISED OSTEOPOROTIC FRACTURE**

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PURPOSE: To evaluate the effectiveness of anterior support with titanium mesh in neurological compromised post-traumatic kyphosis by posterior approach only. **INTRODUCTION:** Several options have been reported for post-traumatic kyphosis and neurological compromised osteoporotic fracture. However, the ideal surgical procedure remained controversial. **MATERIALS & METHODS:** Ten patients with post-traumatic kyphosis and neurological compromised osteoporotic fracture underwent single posterior approach. In posterior decompression, titanium mesh was inserted by posterior approach following transpedicular intracorporeal corpectomy. **RESULTS:** The mean kyphosis was 31.8 degrees before surgery, 2.6 degrees after surgery. At final follow-up, there was 28.7 degrees of correction in kyphosis with 6.3% loss of correction. The postoperative neurological improvement using Frankel classification was demonstrated in all patients. There was no new onset or progressive neurological deterioration, additional surgery or extrusion of mesh. **CONCLUSIONS:** The posterior insertion of titanium mesh for anterior support appears to maintain the length of anterior column, stabilize the injured vertebra and facilitate the spinal fusion. Although technically demanding, the posterior insertion of titanium mesh demonstrated a satisfactory surgical option.

SIC18-P07**NEW CLINICAL AND RADIOLOGICAL CLASSIFICATION OF THE SO-CALLED IDIOPATHIC SCOLIOSIS (2001-2006): THREE ETIOPATHOLOGICAL GROUPS (I EPG, II EPG, III EPG), WITH TWO SUB-TYPES (II/A EPG, II/B EPG)**

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INTRODUCTION: Through many years etiology of so-called idiopathic scoliosis ("adolescent idiopathic scoliosis" - AIS) was unknown. Biomechanical reasons of scoliosis were described in 1995 in Lublin/Poland. **MATERIAL:** Material for research: 1450 children. Etiological factor found in children was: limited adduction or abduction contracture of right hip (often with flexion and external rotation contracture). Asymmetry of movements between right and left hip influences growth of spine through asymmetrical gait and stand position "at ease" only on right leg. **RESULTS:** Depending on clinical and radiological examination authors give new classification of scoliosis. It makes clear therapeutic approach to every etiopathological group and gives possibility of causative prophylaxis. **CONCLUSIONS:** 1/Etiology of so-called idiopathic scoliosis is strictly biomechanical. Connection with right hip contracture/limitations resulting in asymmetry of walking, loading and growth of pelvis and spine. 2/There are three groups (I-st, II-nd (A & B) & III-rd epg) of development of scoliosis depending on range of asymmetry of movements of hips, connected with gait and stand position "at ease" on right leg. 3/Ist epg (double "S"; deformity): real abduction contracture of right hip and large adduction of left (40-50 degree). Stages: rotation deformity, rib hump on right side, curves. Development: gait and standing. Scoliosis- compensatory deformation. 4/IInd epg-deformity "C" shaped (IInd/A epg) and "S" shaped (IInd/B epg). Limitation of adduction of right hip. Development: standing "at ease" only on right leg for many years. 5/IIIrd epg-"stiffness of spine" (flat back). No curves, no rib hump or small. "Back pain" in adults. Development: gait.

SIC18-P08

ANALYSIS FOR ETIOLOGY OF CORRECTION LOSS AFTER SURGICAL TREATMENT OF OSTEOPOROTIC VERTEBRAL FRACTURE WITH NEUROLOGIC DEFICITS

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Objectives: To analyzed the degrees and causes of correction loss according to anterior decompression/posterior instrumentation and posterolateral decompression/posterior reconstruction (Eggshell operation). **Materials and Methods:** 23 patients were followed for mean 54 months after surgical treatment for osteoporotic vertebral fracture with neurologic deficits. In 16 cases of anterior decompression/posterior instrumentation (group A) and 7 cases of Eggshell operation (group B), kyphotic angle and end plate injury were evaluated on preoperative, postoperative and last follow-up radiography. Group A was subdivided into group A1 (correction>kyphotic angle on preoperative extension lateral view) and A2 (correction<kyphotic angle) and group Aa (presence of endplate injury) and group Ab (absence of endplate injury). **Result:** The average postoperative kyphosis correction was 13°^a in group A and 21°^a in group B (p>0.05). The average correction loss at last follow up was 10°^a (71%) in group A and 8°^a (38%) in group B(p>0.05). The average correction loss of group A1 (13°[±]AE) was significantly larger than group A2 (4°[±]AE) (p<0.05). The average correction loss of group A1a (18°[±]AE) was larger than group A1b (8°[±]AE) (p=0.05). The average correction loss was 6°[±]AE in group A2a and 3°[±]AE in group A2b (p>0.05). The average correction loss of group A1a (18°[±]AE) was significantly larger than group A2a (6°[±]AE) (p<0.05). The average correction loss of group A1b (8°[±]AE) was significantly larger than group A2b (3°[±]AE) (p<0.05). **Conclusion:** Loss of

kyphosis correction was related to the degrees of kyphosis correction and the presence of iatrogenic endplate injury. Kyphotic angle on preoperative extension lateral view is considered a useful guideline for determining amount of kyphosis correction.

SIC18-P09

CLINICAL OUTCOMES OF SURGICAL TREATMENT FOR OCCIPITOCERVICAL FUSION AND UPPER CERVICAL FUSION USING SPINAL INSTRUMENTATION

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PURPOSE: To evaluate clinical outcomes of surgical treatment for occipitocervical fusion (OCF) and upper cervical fusion using spinal instrumentation. **MATERIAL AND METHODS:** 12 patients (Male 8, female 4) were treated surgically using spinal instrumentation. Their mean age at time of surgery was 55 years old. Before operations, halo vest were applied while the patients are awake. Surgical procedures were induced C1-C2 fusion in 5, O-C2 fusion in 7, laminoplasty in 3. The average follow-up period was 35 months. Segmental spinal instrumentation (SSI) was used in 12 patients and Olerud cervical system (Olerud) in 5 patients. Surgical outcomes were evaluated by Ranawat's evaluation score, radiological exam, and complications. **RESULT:** Major complications did not occur. The Ranawat's evaluation score showed improvements in clinical symptoms. Radiological examination of the patients was satisfactory, and union rate was 100%. However, loosening of occipital screw was observed in 1 case. **DISCUSSION AND CONCLUSION:** The goal of surgical treatment of atlantoaxial subluxation is to relieve pain, reduction of deformity, and improvement of neurological function. Surgical treatment for occipitocervical and upper cervical fusion provided satisfactory results.

SIC18-P10

IS ILIAC CREST GRAFTING MANDATORY IN SURGERY OF IDIOPATHIC SCOLIOSIS?

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Having a stable, balanced and fused spine is the goal in surgical correction of Scoliosis. Getting fusion of the instrumented segment with the aid of copious autogenous iliac graft has been a corner stone in the goals of treatment. However, harvesting copious graft from teenage iliac bone has its own limitation in the form of quantity of graft, surgical time, blood loss and other complications of graft sites. Bone substitute is an appealing concept and since time immemorial Orthopaedic Surgeons are after an ideal bone substitute which can have all the characteristics of an autogenous bone graft. The limitations with bone substitutes are osteo-induction and osteo-conduction properties, strength, sterilization, chances of transmitting infective agents and cost. This prospective study was done in Khoula Hospital, Muscat, Oman from September 2001 to May 2002. 20 consecutive patients underwent posterior corrections for Idiopathic scoliosis using segmental fixation by Euros Titanium Implants. No autogenous iliac crest graft was taken instead Tutoplast graft (human cadaveric) mixed with spinous process of the patient was used as graft. All patients have minimum of three years follow-up. We had an excellent result, clinically all patients have fused no implant failure, no pain, no infection and no loss of correction. We conclude that bone substitute can be safely used provided meticulous care is taken to optimize fusion in the form of gentle tissue handling, stability of the construct, good decortications and destruction of facet joints.

SIC18-P11**ROLE OF ANTERIOR INSTRUMENTATION IN LUMBAR AND DORSO LUMBAR IDIOPATHIC SCOLIOSIS**

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This study was done in Khoulah Hospital, Muscat, Sultanate of Oman. 10 cases of Idiopathic Scoliosis had only anterior instrumentation during the year 2001-2002 using Euros anterior titanium implants. The average follow-up is more than three years. Out of the 10 cases, 4 were male and 6 female, average age was 17 years, average blood loss was 400 ml, no infection, no wake up test was done. No post operative neurovascular deficit, no infection. Rib was used as graft. No graft was taken from iliac crest, no pseudoarthrosis, no kyphosis or instrumented segment. No decompensation of the spine. One case of implant failure, no major medical complication. Good correction and balanced spine was obtained. Motion segment L4-L5 preserved in all cases except one where L4 was instrumented. The surgical management of Idiopathic Scoliosis particularly thoraco lumbar and lumbar is complex and controversial. Dilemma is the conflicting goals of stable balanced spine v/s normal lumbar lordosis with as many distal mobile segments as possible. Pain is a significant factor especially when the fusion extends to or below the fourth lumbar vertebra. Crankshaft phenomenon is an important complication of only posterior surgery. Anterior instrumentation addresses many of these concerns. Advantages of anterior instrumentations are motion segments are preserved, better correction, pseudoarthrosis rate is less, crankshaft phenomenon is averted, better cosmesis, less prominent hardware, less blood loss, chance of neurological deficit is less and additional morbidity of grafting is eliminated.

SIC18-P12**ANTERIOR VIDEO-ASSISTED THORACOSCOPIC RELEASE WITH POSTERIOR FIXATION IN TREATING RIGID THORACOLUMBAR SCOLIOSIS**

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BACKGROUND: Minimally invasive surgical techniques are widespread in different surgical subspecialties using different endoscopic techniques in dealing with major surgical problems in spine surgery is replacing open surgery to reduce the morbidity after extensive approaches and to improve the quality of life of the patients. **METHODS:** This study included 30 cases prospectively by VATS technique and 20 cases retrospectively by open surgery as first stage and the second stage was done by open posterior surgery in both groups, and the final results are compared regarding certain items that included the hospital stay, need for ICU admission, blood loss, cosmetic appearance, patient satisfaction and the surgical time in relation to the first stage surgery. Fifty cases (37 females and 13 males), with congenital scoliosis in 15 cases and idiopathic scoliosis in 35, were operated upon for the treatment of their scoliotic deformity to perform only anterior release (42 cases) or corpectomy (8 cases) with posterior stabilization either through an open thoracotomy (20 cases) or video assisted thoracoscopic surgery with the patient in the lateral decubitus position under fluoroscopic guidance (30 cases). **RESULTS:** After 24 months of follow-up, 36 patients showed excellent results (22 VATS cases, 14 thoracotomy cases), 12 cases had good results (8 VATS cases, 4 thoracotomy cases), and two thoracotomy cases had fair results according to the Oswestry disability questionnaire, and Cobb's angle measurements. **CONCLUSIONS:** We recommend video assisted thoracoscopic surgery instead of open thoracotomy in anterior release of thoracolumbar scoliosis.

SIC19-P01**GROSS KNEE DISLOCATIONS IN MULTILIGAMENOUS INJURIES: NEUROVASCULAR COMPLICATIONS AND SURGICAL OUTCOMES**

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Introduction: Gross knee dislocations represent a distinct subset of patients with multiligamentous injuries of the knee. Higher incidences of neurovascular injuries could lead to potential amputations and poorer clinical outcome. Aim: This study reviews the clinical presentations, neurovascular complications and management outcomes of patients presenting with gross knee dislocations. Materials & Methods: Patients with gross post-traumatic dislocations of the knee presenting from January 2000 to December 2005 were retrospectively reviewed in terms of direction of dislocation, ligamentous injuries, neurovascular injuries, surgical procedures performed, interval between index injury and definitive ligamentous reconstruction. Outcomes of early versus late reconstruction was reviewed. Results: Eleven patients (10 males, 1 female), aged 32 years (range 19-54, S.D.9.6), presented during this period. Two patients (18.1%) had popliteal artery injury with one presenting late due to progression of thrombosis from intimal injury. One patient had a complete rupture of the common peroneal nerve. The anterior and posterior cruciate ligaments were most commonly torn. No amputation was required. Patients undergoing multiligamentous reconstruction did slightly better than conservatively treated patients. Amongst patients with ligamentous reconstruction, early reconstruction (less than 2 months from injury) conferred better outcomes than late reconstruction (100% full recovery versus 33%) Conclusions: A high incidence of neurovascular injuries mandates the need for increased vigilance and possible routine angiography in patients with traumatic knee dislocations. Early multiligament reconstruction leads to improved recovery in patients with gross knee dislocation.

SIC19-P02**VALGUS INSTABILITY AFTER MONTEGGIA VARIANT INJURY IN ELDERLY**

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INTRODUCTION: Monteggia variant injuries in the elderly pose a difficult management problem due to factors such as osteoporosis, poor soft tissue cover over the injured area and collapse of the radial neck fracture. METHODS AND MATERIALS: We present two cases of Monteggia variant injury which were primarily dealt with by open reduction and internal fixation of the proximal ulna fracture with dynamic compression plating, assessment of ulnar collateral ligament and conservative management of the radial head fracture. Both cases had a competent ulnar collateral ligament primarily. Due to the late collapse of the radial head fracture excessive bending stresses were created at the ulnar fracture site leading to failure of ulnar fixation. Both cases were then treated with revision ulnar plating with bone grafting, as well a metallic radial head replacement. Satisfactory union was achieved in the ulna after the valgus instability caused by the absence of radial head was duly addressed to. DISCUSSION: The main valgus stabiliser of the elbow is the ulnar collateral ligament but around 30% of the stability is contributed to by the radial head. The absence of radial head leads to high valgus stresses at the ulnar fracture site leading to failure of ulnar fixation. CONCLUSION: The radial head injury should be primarily addressed in Monteggia variant injuries especially in the elderly.

SIC19-P03**COMPARATIVE CHARACTERISTICS OF INTRA-ARTICULAR INJURIES OF THE**

KNEE JOINT IN CHILDREN AND ADULTS

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We analyzed the results of arthroscopic diagnosis and treatment of 37 children and 62 adults that had been treated in the Minsk City Centre of Traumatology and Orthopedics during the period from December 2005 to November 2006. In children there were 17 boys and 20 girls, in adults 16 patients were female and 46 were male. The most common pathology, revealed in children, were osteochondral fractures of condyles of femur or patella (12 cases, 32%); in adults we found this pathology in 10 cases (only 6% of all injuries). In turn, in adult patients injuries of the meniscuses (external + internal) were the most frequent pathology observed – 24 cases (or 39%); in children and adolescents such injuries occurred in 9 cases (24%). Other pathology, revealed in children, includes: Koenig disease of the internal condyle of femur and patella – 10 cases; chondromalacia of joint surfaces of 1-3 degree – in 7 patients; injuries of the anterior cruciate ligament (ACL) – in 7 patients; syndrome of media patella plica – in 1 case. In adults, besides the pathology marked above, we revealed: chondromalacia of 1-4 degree – in 44 patients; injuries of the ACL – in 36 patients; Koenig disease – in 1 patient; injury of the internal collateral ligament – in 1 case; injury of the posterior cruciate ligament – in 1 case; hypertrophy and narrowing of supra patella plica – in 1 case.

SIC19-P04

EPIDEMIOLOGY OF MULTIPLY INJURED PATIENT DURING 2003-2005

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OBJECTIVES: To analyse the incidence of multiple injuries in order to evaluate the management of multiply injured patients to reduce morbidity and mortality. **MATERIALS AND METHODS:** Retrospective review of records of multiply injured patients admitted to intensive care unit at Al Jalla Trauma Hospital, Benghazi-Libya in the period from Jan. 2003 to Dec. 2005 was carried out. **RESULTS:** 2252 multiply injured patients were admitted to intensive care unit (ICU) over three years. 1553 patients (69%) were traffic victims, and almost all patients suffered blunt trauma. The male to female ratio was 5.07: 1 with the peak at age group 16-30 years (41%). 344 patients died, among these 258 within the first 48 hours with average age of 29 years, 67% of the expired cases had combined head injury and extremity fracture, patients with permanent disability figured as 1.34% of all cases, 205 cases died on arrival to the hospital and all sustained RTA, the average age was 33 years and 88% were males. **CONCLUSION:** Road traffic accidents are the most common cause of multiply injured patients associated with high morbidity and mortality, efforts should be directed mostly at prevention. There is urgent need to develop a trauma team and senior team leader, and well equipped emergency operation theatre for early fracture fixation.

SIC19-P05

TREATMENT OF CLOSED TIBIAL SHAFT FRACTURES BY UNREAMED INTERLOCKING INTRAMEDULLARY NAILING WITH DISTAL LOCKING DEVICE

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BACKGROUND: Intramedullary nailing is the standard treatment for closed tibial shaft

fractures. Distal targeting device can limit the operative time and the exposure to fluoroscopy. Also, using a small diameter nail without reaming has several advantages. **OBJECTIVE:** The purpose of this prospective study is to assess the results of treatment of closed tibial shaft fractures by unreamed interlocking intramedullary nailing with distal locking device. **PATIENTS AND METHODS:** Between 1998 and 2004 we treated 70 closed tibial shaft fractures (68 patients) with unreamed interlocking intramedullary nailing with distal locking device. There were 63 males and 7 females. The average age was 35.5 years (17-65 years). **RESULTS:** Sixty-five (93%) of the fractures healed in the proper time (3-6 months), while 5 (7%) exhibited delayed union (>6 months). There were no malunions in rotation, angulation, or length. Clinically, patients complained of occasional pain. All had full range of motion of the knee and ankle. No screw or nail failure was noticed. 65% of our patients were able to return to their usual activities within 4 months and the rest between 4-8 months. **CONCLUSION:** Immediate stabilization of closed tibial shaft fractures with unreamed interlocking intramedullary nailing with distal locking device; advances the healing of the fractures, helps early return to usual activities, is easier for the surgeon, easier to place the distal locking screws, and requires less operative time and less exposure to radiation.

SIC19-P06

ARTHROSCOPY IN DIAGNOSIS OF SINOVITISES IN CHILDREN AND ADOLESCENTS

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During the period of time from November 2005 to August 2006 we carried out diagnostic arthroscopies (AS) of the knee joints in 22 children (of the age 4-17 years) who suffered from synovitis of vague etiology. In order to elucidate the etiology of synovitis we evaluated the following indexes: 1) synovia - its quantity, color, viscosity, cytosis, pH, thickness of muciparous clot, synoviocytogram, presence of corneocytes, rheumofactor, crystals, antistreptolysin-O, C-RP. Investigation of the main electrolytes was also carried out, and inoculation was made; 2) examination of the joint ad oculus; 3) execution of target biopsy of synovium in the most "suspicious" place of existing of pathological process. If there was diffuse lesion of synovium, or if we did not see any alterations, then target biopsy was made in 3 areas: in intercondylar incisure, in superior part and in anteromedial sector of the capsule of the joint. In the result of our work we made the following conclusions: A) Arthroscopy is the most precise method of evaluation of intra-articular structures of the knee joint in children, such as synovium, cartilage, ligamentous apparatus; B) Information, obtained during the visual examination of the joint cavity with arthroscope, essentially adds to the data obtained after X-ray examination, MRI and supersonic scanning; C) AS can be used as a component of complex examination and treatment of children with rheumoorthopedic diseases, and is recommended (if there are no contraindications) for all children with mono- and oligoarthritis of the knee joint of vague etiology.

SIC19-P07

STUDY OF MANAGEMENT OF CLOSED COMMINUTED FRACTURES LOWER FOURTH TIBIA FIBULA WITH 1/3 TUBULAR PLATING AND ABOVE KNEE CAST APPLICATION

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The management of comminuted closed fractures of lower 4th tibia fibula has always been a difficult problem to solve. The results of conservative management are not satisfactory due to poor functional outcome and the surgical management in the form of open reduction and plating of tibia and fibula is wrought with complications of soft tissues. We have conducted a prospective and retrospective study of the management of comminuted fractures of lower 4th tibia fibula with plating of fibula with 1/3rd tubular plate and above knee cast application. We have 27 patients in our series treated over a period of 3 years, 10 males and 17 females with mean age of 52 yrs 4 months and mean follow-up period of 16 months. RESULTS: All the patients have achieved full functional recovery by the end of 6 months, no non-unions, mal-union in 3 cases and no soft tissue complications. Secondary benefits observed were reduced operative time and cost of treatment. We conclude that treating closed comminuted fractures of lower 4th tibia/fibula with fibula plating and above knee cast application is a safe and effective modality with excellent results and is not a technically demanding procedure which can be done in a peripheral setup.

SIC19-P08

GENERAL INFORMATION ON CAR ACCIDENTS IN POLAND. ARE THEY POSSIBLE TO AVOID?

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INTRODUCTION: Road accidents are statistically the third cause of deaths in Poland after heart failure and cancer. Each year from 7000 to 9000 people die and 100.000 more are injured in car accidents in Poland. In 2000 almost 60.000 car accidents took place. MATERIAL: On basis on material from Department of Pediatric Orthopedics and Rehabilitation in Lublin/Poland authors give general information on car accidents in Poland. They aim to give possible solutions to reduce the number of accidents and of victims. RESULTS: Authors underline different factors leading to road accidents. These are among others: incorrect infrastructure of local and district roads, not enough attention paid to vehicle conditions (technical state), people awareness and psychological conditions of drivers and pedestrians. CONCLUSIONS: 1/ In 1990's our Department presented proposals to Polish Government to act actively in the field of prophylaxis against road accidents. 2/ Most of these postulates have been introduced: reflective road marks, so-called black dots - most dangerous crossroads or road marked with signs informing about the number of accidents and victims, safe road junctions (germ.: Linksabbieger), safe petrol station drives, reflective markings in people clothing at night. 3/ Infrastructure planning (new roads and highways) and road restoration is now underway with support and supervision of the European Union.

SIC19-P09

OSTEOTOMY OF THE PATELLAR APEX AND THE BASKET PLATE OSTEOSYNTHESIS IN THE COMPLEX ARTICULAR FEMUR FRACTURE

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The basket plate is primarily used for a surgical treatment of the multifragmentary fracture of the patella apex. The technique underwent experimental testing on a human anatomical preparation. Biomechanical model is applied to the extension force, and the osteosynthesis with the basket plate after patellar apex osteotomy resisted to the force

over 1000N. We find the osteosynthesis which enables loading of the operated leg with the body weight. In more difficult repositions of a complex fracture of distal femur along with comminution of the femur condyla, minimally invasive surgery would not bear satisfactory degree for the reposition and osteosynthesis stability. There are arthrotomies of the knee available: medial and lateral parapatellar arthrotomy with patellar luxation, Y incision of the quadriceps tendon, Z incision of the patellar ligament. Taking into account benefits of osteotomy of the patellar apex and stable osteosynthesis with the basket plate, we find good operative access to the knee. Although this is an extensive surgery, it also enables an early rehabilitation without usual restrictions of knee joint movements. So far we have carried out 4 surgeries of this kind with good results as far as we are concerned. For detailed evaluation of the method would be required larger number of cases.

SIC19-P10

TWO-INCISION APPROACH IN BICONDYLAR AND COMPLEX (TYPE C) TIBIAL PLATEAU FRACTURES

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BACKGROUND: Surgical exposure represents a crucial step in open reduction and internal fixation (ORIF) of tibial plateau fractures (TPFs). There is controversy regarding the choice of the approach. Some authors use single midline exposure and others prefer two-incision approach. **AIM OF STUDY:** To assess outcome of ORIF of TPFs using two-incision approach. **STUDY DESIGN:** Prospective case series clinical study. **Patients' data:** Twenty-four patients were included. Age ranged between 20-65 years. **Inclusion criteria:** Bicondylar and complex (type C) tibial plateau fractures. **Exclusion criteria:** Associated vascular injuries or compartment syndrome, malunited fractures, and infection. **METHODS:** Two-incision approach, lateral and posteromedial, was used. Anatomic reduction of fracture was attempted, bone grafting on need and internal fixation by lateral buttress and medial anti-glide plates. **ASSESSMENT:** The following points were assessed: (1) Accuracy of reduction, (2) Wound complications, (3) Incidence of infection, and (4) Fracture union. **RESULTS:** Excellent and good reduction was achieved in 20 patients with excellent final clinical score. Fair reduction was reached in two patients and poor in two with fair final clinical outcome in three and poor in one. There was no wound problem. Infection was reported once with loss of initial reduction and fixation. All fractures achieved union between 12-20 weeks. **CONCLUSION:** Two-incision approach is effective in ORIF of bicondylar tibial plateau fractures but has limitations in complex fractures. It is less invasive and has minimal wound problems as it relaxes with knee flexion compared to the midline approach that is more invasive and becomes stretched on knee flexion.

SIC19-P11

MESS SCORE AND VASCULAR RECONSTRUCTION - VASCULAR DAMAGES AND LOWER LIMB FRACTURES

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INTRODUCTION: Lower limb fractures (particularly femoral diaphysal fractures and distal epiphysal femoral fractures) and fractures of the hip, acetabulum and pelvis can be associated with vascular damages, especially in the context with high trauma kinetic energy. **MATERIAL AND METHOD:** Between 2003 and 2007 we registered in Bucharest University Hospital 10 patients with vascular lesions in the context of politrauma with fractures of the lower limb, acetabulum and pelvis. The diagnostic is established by

clinical examination and by angiography. There were 4 lesions of the femoral artery and 6 lesions of the popliteal artery. Two vascular lesions were situated at distance from the fracture of the lower limb and a patient had a vascular injury without a fracture of the limb, in the context of a crush syndrome. All the patients were evaluated by MESS score. We made a retrospective analytic report using MESS score. RESULTS: The MESS score is highest than 7 points for 3 patients. We performed 4 amputations and 6 vascular reconstructions. CONCLUSIONS: The MESS score is a correct evaluation of the patient with vascular lesions. Reconstruction is possible within the first 4-6 hours after the polytrauma. It is important to decide between a limb with multiples surgical interventions and an amputation with an external prosthesis. It is important to obtain a rapid social integration of the patient and to have lower costs of medical procedures.

SIC19-P12

THE USE OF GASTROCNEMIUS MUSCLES FLAP IN TRAUMA

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Gastrocnemius flap is a common flap done in orthopaedic practise because of its simplicity and reliability. However, complications have happened when technical details and careful planning were not observed. We reported case series on gastrocnemius flap done in our institution over a four-year period. There were 11 cases of gastrocnemius flap which was done to cover soft tissue defect following infection after plate fixation, infected open fracture and open grade IIIB tibial fracture. Ten cases healed uneventfully while one case had early wound breakdown which was salvaged by repeated wound debridement and a fasciocutaneous flap. The clinical application, practical consideration, its advantages and limitations are discussed.

SIC19-P13

REPERFUSION SYNDROME OF THE LIMBS - FROM AN ORTHOPAEDICAL POINT OF VIEW

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INTRODUCTION: Modern traumatology is characterized by high energy traumatic agents, which produce complex trauma of the limbs, affecting the bones and the muscles, but also the vascular system of the injured region, the most severe being represented by closed and open fractures and dislocations complicated with Acute Peripheral Ischaemia (API) which need surgery in order to preserve the vitality of the injured limb. Following this, Reperfusion Syndrome can complicate both local and general prognosis of the patient and, in the most severe cases, MSOF and demands sustained treatment in order to preserve the life of the patient. MATERIAL AND METHOD: The authors present 6 cases of Reperfusion Syndrome (following ischaemia of the inferior limb), treated in the Emergency Hospital, Bucharest, during the last 4 years. The patients are presented and their evolution is analysed concerning:-the moment of surgical repair of the artery,-post-operative treatment,-the clinical aspect and the treatment of the reperfusion syndrome. RESULTS: Unfortunately, 2 of the patients died and another 1 developed renal chronic failure after reperfusion. The onset of the reperfusion syndrome was associated, in these cases, with late surgical arterial repair and with incomplete fasciotomy. Complex treatment was necessary in all these cases in order to minimize the consequences of

reperfusion. CONCLUSION: Early surgical restoration of the arterial axis, fasciotomy and complete renal sustaining treatment are absolutely necessary in order to avoid Reperfusion Syndrome. Once appeared, this is a life-threatening disorder and needs a large amount of therapeutical means in order to keep the patient alive.

SIC19-P14

LONG TERM RESULTS AFTER SURGICAL TREATMENT OF TIBIAL PILON FRACTURES

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INTRODUCTION: The authors intended to point out the factors which influence the results after surgical treatment of pilon fractures using two methods - open reduction followed by fixation after AO standards versus minimal invasive surgery with external fixation. MATERIALS AND METHODS: 60 patients with closed displaced tibial pilon fractures were operated in our clinic between 1.01.1995-1.01.1999. According to Ruedi-Allgower classification, there were 11 (18.5%) Type I, 20 (33.3%) Type II and 29 (51.2%) Type III fractures. The patients were divided into two groups: group 1 - 36 patients operated following AO principles and group 2 - 24 patients for whom minimal invasive surgery and external fixation was used. After a minimum 2 years follow-up, the two groups were evaluated according to subjective, objective and radiological findings established by Burwell and Charnley. RESULTS: The authors' evaluation showed: Group 1 - good results 20 (55.5%), fair results 10 (27.8%), poor results 6 (16.6%). Group 2 - good results 14 (58.3%), fair results 6 (25%), poor results 4 (16.6%). According to the type of the fracture (Ruedi-Allgower), the results were correlated both with the type of procedure but mainly with the aspect of the fracture; this seemed to influence the results more than the surgical procedure. CONCLUSION: Tibial pilon fractures are difficult injuries to be treated successfully by any method. The type of the fracture is the most important factor which influences the results of the treatment.

SIC19-P15

THE IMPORTANCE OF 3D RECONSTRUCTION AFTER CT SCAN IN ASSESSMENT AND MANAGEMENT OF ARTICULAR FRACTURES

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Articular fractures are considered to be serious injuries, which, due to disturbances of the articular cartilage, are often followed by arthritic complications. That is why treating these fractures means restoring local anatomy as good as possible, which can sometimes be difficult, especially when the fractures are displaced. 3D reconstruction after CT scan offers a complete image of the fracture and so, improves the pre-operative planning. This study evaluates the influence of computerised tomography followed by 3D reconstruction upon pre-operative planning and operative treatment of articular fractures. The authors studied 136 displaced articular fractures treated between 1.06.2001-1.06.2002: -44- humeral head (group A); -32- distal tibia (group B); -56- tibial plateau (group C). The first pre-operative planning was established after routine X-rays at admission. After that, 3D reconstructions after CT scan were used for a complete evaluation of the fracture and a final pre-operative planning was made. The authors study the differences between the initial and the final pre-op planning in all three groups. RESULTS: The initial and final plannings were similar only in: 22% (group A), 26% (group B), and 24% (group C). The rest of the cases showed significant differences between X-ray evaluation and 3D

reconstruction. The differences concerned: type of incision (group A - 12%, group C - 5%), additional screws (group A - 31%, group B - 38%, group C - 44%), type of the plate (group A - 26%, group B - 11%) and bony stabilisation (group A - 21%, group B - 25%, group C - 17%). CONCLUSIONS: Pre-operative planning and final treatment are often influenced by 3D reconstructions after computerised tomography.

SIC19-P16

RESULTS AFTER SURGERY FOR DISTAL HUMERAL FRACTURES

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INTRODUCTION: Distal Humeral Fractures (DHF) have become nowadays more frequent and, due to high energy trauma, increasingly comminuted; many methods are used for decreasing their negative consequences upon elbow function. Authors present in this prospective study the results after surgery for DHF. MATERIALS AND METHODS: 65 patients were operated in our Clinic between 1.01.1999-1.01.2003 for DHF (loss of follow-up - 5 cases). According to AO Classification, there were: 9 cases - type A, 6 cases - type B, and 45 cases - type C. 44 fractures were uncomplicated, 16 were complicated: 14 open fractures, 8 vascular injuries, 2 cubital injuries. Bone fixation was achieved using: 2 plates (reconstruction plate on the external border, semitubular plate on the internal) - 36 cases; "Y" plates - 8 cases; minimal invasive fixation + external fixation - 16 cases. RESULTS: According to Mayo Clinic Performance Index for the Elbow (MEPS), the results were good in 40 cases (66.6%); significant impairment of elbow function appeared in 20 cases; from these, in 12 cases, radiological aspect was better than the functional one. The incidence of other complications after surgery: osteoarthritis - 16.6%; compartment syndrome - 3.3%; superficial infection - 3.3%; aseptic non-union - 6.6%; malunion - 13.3%. CONCLUSIONS: DHF are difficult injuries to treat, by any method. Functional impairment on the elbow depends on the type of the fracture; there is not a strict correlation between radiological findings and functional outcome.

SIC19-P17

REAMED VS. UNREAMED INTERLOCKING NAILS FOR TIBIAL SHAFT FRACTURES

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PURPOSE: The authors evaluate long-term results after closed tibial shaft fracture, the advantages and disadvantages of reamed and unreamed interlocking tibial nails. MATERIAL AND METHOD: 650 patients were operated in our clinic between 1.01.2000-1.01.2002 for tibial fractures using interlocking nails - 300 with reamed nails (group 1) and 350 with unreamed nails (group 2). The retrospective study analyzed the quality of healing for the 2 groups. RESULTS: There was no significant difference between the two groups about radiological healing (mean period - 18 weeks). The incidence of pseudarthrosis was the same (1.6%) for both groups. The main complications had the following incidences: septic complications - 5.1% group 1, 3.7% group 2; deep venous thrombosis - 4% group 1, 2% group 2; pulmonary embolism - 3% group 1, 1% group 2; reflex sympathetic dystrophy - 5.1% group 1, 1.6% group 2; implant failure - 0.4% group 1, 0.6% group 2; compartment syndrome - 2.6% group 1, 0.6% group 2; reinsertion period - 10 weeks for group 1, 12 weeks for group 2. CONCLUSIONS: When choosing reamed or unreamed nails for tibial fractures, the surgeon must be aware that reamed nails have more mechanical advantages, while less septic and thrombotic complications seem to

appear after unreamed nails.

SIC19-P18

PERITALAR DISLOCATION

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We report a case of a patient with a closed peritalar dislocation in which closed reduction was performed. A 46-year-old male patient was referred to our emergency department after having sustained an ankle injury presenting with swelling and inversion deformity. Closed reduction without anaesthesia was performed using the following manoeuvres: plantar flexion, traction by the heel and foot eversion. Examination of both vascular and nervous system revealed no pathology. A below-knee cast was applied for a six-week period. One year after the injury the patient has no clinical or radiological signs of avascular necrosis of the talus or arthritis of the subtalar joint and has full range of motion. He is pain-free. Closed reduction of a peritalar dislocation is rarely mentioned in the bibliography. Very good results are expected with conservative treatment.

SIC19-P19

PLEURAL ANALGESIA

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The effect of pleural analgesia has been prospectively measured in the group of 319 injured patients, aged 47.06 years, suffering thoracal trauma over a period of 19 months. Pleural analgesia has been applied on 101 (61.58%) out of 164 injured who all suffered unilateral thoracal injuries. Furthermore, pleural analgesia has been applied on 24 (56%) out of 37 injured who all suffered bilateral thoracal trauma and on 26 (22.03%) out of 118 injured suffering polytrauma. 1-3 x 40ml of 0.125% bupivacaine have been applied during 24 hours period. Total analgesia has been reached after 8 minutes in all cases.

SIC19-P20

SEPTIC WOUND SITUATION IN A POLY TRAUMATISED PATIENT TREATED WITH A NEW VACUUM-ASSISTED CLOSURE [VAC] AND INSTILLATION DRESSING

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We report the case of a 17-year-old boy who got hit by a high velocity train. The poly traumatised patient suffered of a III° open femur defect fracture with a substantial loss of the lateral femoral muscles and significant disruption of the soft tissue of the lower leg. The enormous wound areas on the thigh and the lower leg were infected by *Pseudomonas aeruginosa*, *Enterobacter cloacae* and *Stenotrophomonas maltophilia*. The enormous tissue defects and the super infection did not leave any hope to save the limb from amputation. After rapid aggressive debridement, pulsatile lavage we covered the wounds in a last hope and chance situation with a new technique of vacuum-assisted closure [VAC] and instillation (V.A.C. Instill®) dressings. In sequences of one minute we instilled Lavasept, kept it for 20 minutes on the wound surface and exhausted the liquid. We repeated this for three consecutive days and then changed the dressing. In the

follow-up examinations the number of germs was significantly reduced. In the follow-up treatment we used the VAC treatment without instillation and finally we transplanted skin on the clean wound surface and could save the leg of this young patient. We discharged him with a good function of his lower leg. This technique of VAC instill seems to offer great possibilities in critical infected wound situations.

SIC19-P21

ALTERNATIVE PELVIC/FEMORAL PIN INSERTION OF EXTERNAL FIXATOR FOR A PELVIC FRACTURE WITH UNILATERAL ACETABULAR AND ILIAC CREST COMMINATION

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AIM: To present a case of alternative pelvic/femoral pin positioning of external fixator used for a pelvic fracture with unilateral acetabular and iliac crest comminution and to evaluate system stability and efficacy of acetabular reduction. **MATERIAL/METHOD:** A 78-year-old woman with a history of coronary disease and atrial fibrillation was admitted in our department after a severe car accident suffering from mild cranio-cerebral injury, pneumothorax, spleen rupture, left kidney bruising, bladder contusion caused by pelvic fracture, ulnar-radial fracture and open tibial fracture. Due to patient's general condition severity the pelvic fracture was treated with an external fixator. Under a mini-open approach, two pins were inserted into the right[contralateral] iliac crest while another two pins were inserted into the upper third of left femur due to severe left[ipsilateral] acetabular and iliac crest comminution. **RESULT:** The patient was admitted to ICU for 39 days because of pulmonary deficiency and cardiovascular abnormalities. Post operative pelvic X-rays and CT scans revealed a satisfactory outcome of the pelvic ring stability and reduction. **DISCUSSION:** Pelvic external fixators allow two locations of pin purchase: anterosuperior (into the iliac crest) and anteroinferior (into the supraacetabular dense bone). Stable fixation is mainly accomplished by an anterior iliac surgical exposure using lag screws and plate combinations. **CONCLUSION:** Ectopic pin positioning of an external fixator used to stabilize a pelvic fracture, should be considered only in cases of iliac and supraacetabular comminution.

SIC19-P22

PROXIMAL HUMERAL SPIRAL FRACTURE WITH HUMERAL HEAD INVOLVEMENT - RESULTS OF TREATMENT WITH A LOCKED LONG TIBIAL HEAD BUTTRESS PLATE

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Spiral fractures of the proximal humerus reaching into the humeral head are difficult to treat. Conservative treatment often leads to pseudarthrosis, malunion and reduced shoulder movement. Intramedullary osteosynthesis is difficult with head involvement and also bears the risk of nonunion. **MATERIAL/METHODS:** Since 2001 we use a locked long tibial head buttress plate for the ORIF of these types of fractures (TiFix® Fa. Litos, Hamburg). A consecutive group of 22 patients during 2001-2005 has been treated via an extended deltopectoral approach. 9 patients were female, median age 46.4 years. Clinical and radiological follow-up was at mean 26 months and included a Neer and

Constant score. RESULTS: Bone healing was achieved in all cases although once a bone transplant for delayed union was required after 4 months. As a complication we saw one radial nerve palsy that was undetectable at follow-up. A superficial wound infection healed under conservative measures. At follow-up ROM of the shoulders was only slightly decreased. According to Neer, 17 patients had a good or very good result; the Constant score was good or very good in 15 patients. CONCLUSION: A locked long tibial head buttress plate shows good results with a high union rate in the treatment of these complex fractures. Compared to the literature, shoulder function appears superior to conservative treatment and intramedullary nailing.

SIC19-P23

REPLANTATION SERVICES IN A MALAYSIAN PUBLIC HOSPITAL

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Replantation services are a highly specialized field and are usually rendered by a tertiary centre in most hospitals around the world. Usually these centres would have an existing established plastic surgery unit or dedicated hand department. In a developing country like Malaysia, replantation services also do exist and are mainly taken care by few centres with established hand units. This service is offered by our hospital, which is a public hospital with no established plastic surgery or hand surgery unit. This service was started in early 2005 and we would like to share our experiences. Majority of the cases are from industrial injuries and most of these cases are from remote areas. We have about 11 cases of partial amputation injuries and 7 total amputations. For the revascularization cases, we obtained 100% success rate, and about 80% of replantation cases. We would like to share our experience of success and failures in building up a highly specialized field of orthopaedic sub-specialization.

SIC19-P24

MICROSURGICAL SERVICES AT THE DEPARTMENT OF ORTHOPAEDIC

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Microsurgery is an area of specialization needed in the field of reconstruction. It enables complex procedures like replantation, revascularization, free flaps and vascularised bone grafts to be done. The microsurgical services in our department started after the arrival of the microsurgical microscope in 2003. With the availability of such a service, we are able to independently deal with most of the complex and complicated injuries of the limbs with neurovascular involvement. This case series is our early experiences in handling such cases which require microsurgical expertise. To date, this centre has managed amputated, partially amputated limbs and vascular injuries with a reasonable success rate.

SIC19-P25

SHOULD HUMERAL NAILING BE HISTORY?

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Nailing in fracture shaft humerus is a very contentious issue. In fact the operated treatment of fracture shaft humerus has many detractors. With all said and done, operative treatment has specific indications and interlocking nail has a role in a small selective group of patients. This prospective study was done in Khoula Hospital, Muscat, Oman from August 1999 to December 2004 involving 27 patients and 28 humerus. Closed Inter-locking nailing using Russell Taylor Humeral nail was done by ante-grade technique. After critically reviewing and analysing the literature and our research, we are of the opinion that humeral nail should not be consigned to the dust bin of history as it has a role in a small selective group of patients. Closed Interlocking nail humerus is an additional weapon in the armamentarium of the Orthopaedic Surgeon.

SIC19-P26

RARE COMPLICATION AFTER FEMORAL SCREWED PLATE: FALSE ANEURYSM OF A DEEP FEMORAL ARTERY BRANCH - CASE REPORT

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INTRODUCTION: A false aneurysm of deep femoral artery branches after a screwed femoral plate is a rare but real risk due to the proximity of vascular structures and the operatory site. **CASE REPORT:** 25-year-old man, victim of a motor vehicle collision 2 months ago, that caused femoral fracture. The patient was treated with osteosynthesis with screwed plate. Unexplained bleeding in the second week following surgery was the only alarm sign. Diagnosis was confirmed via arteriography. The treatment was surgical using ligature of the source artery and MISE A PLAT of the false aneurysm. Postsurgical recovery was incidentless. **DISCUSSION:** False aneurysms of the deep femoral artery or of its branches are rarely reported in literature, but recognized as a surgical complication in orthopedics. The deep location and the fixed and immobile character of the deep femoral artery make it more vulnerable to injury than its more superficial counterpart. Most patients are initially asymptomatic. Diagnosis circumstances are variable and clinical signs misleading. Doppler ultrasound and arteriography are the basis of surveillance and detection of false aneurysms. Treatment is generally surgical, but small false aneurysms can spontaneously clot. **CONCLUSION:** The possibility of vascular lesions after femoral surgery should always be remembered. Perfect control of anatomical relations is necessary.

SIC19-P27

IMMEDIATE UNREAMED INTRAMEDULLARY NAILING FOR OPEN TIBIAL SHAFT FRACTURES

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PURPOSE: The timing and method of the nailing for the treatment of open fractures will be discussed based on the results of surgical operations we have undertaken for open tibial shaft fractures since 2000 in which the method of immediate unreamed intramedullary nailing was adopted. **METHODS:** Among the cases treated since 2000, we selected 17 cases of which open tibial shaft fracture were operated and monitored for more than a year after the operation. There were 11 male and 6 female patients whose ages range from 17 to 67 years old (average 36.1). Types of open fractures were as follows; Gustilo Type I (3), II (8), IIIA (4) and IIIB (2). All cases were treated on the day of fracture by using an unreamed intramedullary nail after a sufficient treatment of irrigation and debridement. A rotation flap was created to treat two cases of Gustilo Type IIIB, as it

was impossible to cover the fracture site. RESULTS: The bone union was observed in all cases without any post-operative infection. No malfunction in the tibial shaft was observed. CONCLUSION: Good results of our cases show that the immediate unreamed intramedullary nailing for open tibial shaft fractures is considered to be a safe method of treatment. As to the way and timing of treating cases of Gustilo Type IIIB for reconstructing soft tissue, our study also suggests that the immediate nailing could be a solution for a case in which a local flap such as a rotation flap could be used.

SIC19-P28

TRADITIONAL BONE SETTING (TBS) IN AFRICA: COUNTING THE COST

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BACKGROUND: Traditional Bone setting (TBS) is popular in Africa because its practitioners lay claims to supernatural powers. Superstition, ignorance and poverty are the basis for patronage despite complications. AIM: Complications of TBS in a sub-Saharan African community highlighted. PATIENTS AND METHODS: Major complications of TBS among patients seen in a Nigerian hospital evaluated. Patients' demographics, pattern of complications and the comparative costs of treatments were analyzed. RESULTS: Posters with photographs of some complications of TBS presented. 185 patients had corrective procedures. 84 (45%) of these had complications from TBS interventions as follows; 22 nonunion, 24 malunion, 7 chronic osteomyelitis, 9 gangrene, 12 joint ankylosis, 4 contractures, 2 nerve palsy and 4 burns from native herbs. Male:Female ratio was 5:1. Average age was 38 years. Corrective treatments included open reduction and internal fixation with or without bone grafting, Sequestrectomy, skin grafting, Manipulation under anaesthesia/contractures release and amputations. Twenty complications occurred in the femur, 28 in the tibia, Humerus-8, foot (4), elbow and knee joints 10 and 6 respectively. Forearm and wrist were affected in 8 patients. Financial cost of the corrective treatments ranged between 50,000 and 300,000 Nigerian Naira (400-3000). This was high compared to the estimated cost of treating uncomplicated cases which was about 7,500-70,000 Nigerian Naira ('60-'500). CONCLUSION: Above complications post economic, physical and social burden to the affected individuals and the society. Sustained public enlightenment, reduction of poverty as well as establishing a workable health insurance policy to include rural dwellers may reverse this trend.

SIC19-P29

THE EPIPHYSIS CALLUSES VICIOUS

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The epiphysis calluses vicious are notably frequent in our context because of the traditional treatment of fractures. So we operated between January 2003 and June 2006, 106 metaphysis calluses vicious and/or épiphysaires, after a variable delay of 03 months to 02 years after the initial traumatism. The middle age of the patients was 25 years in majority of the children (60%), the dominant aetiology was the traditional treatment (80%), and it was essentially about fracture of the elbow (65 cases) and of the ankle (19 cases). The osteotomy of correction was plane, oblique or curvilinear and associated to a gesture of arthrolysis in 70% of the cases. The fixation of the osteotomy was variable either using the skewers, staples, screw material to support epiphysis. The global results appreciated with a middle receding of 02 years (6 months to 4 years), and judged on anatomical criterion (quality of correction, articular functional modifications, satisfaction of the

patients, mobility, muscular strength and social and professional rehabilitation). These results were good in 20%, medium in 70% and bad in 10%.

SIC19-P30

INTERTROCHANTERIC VALGUS OSTEOTOMIES IN THE TREATMENT OF FEMORAL NECK NONUNIONS

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The dynamic hip screw "DHS" which is routinely used for intertrochanteric hip fractures, also provides a technically simple means of fixation for intertrochanteric valgus osteotomies in the treatment of femoral neck nonunions. Eight patients underwent intertrochanteric valgus osteotomy for femoral neck nonunion using a dynamic hip screw for fixation. We return a set eight patients who underwent an intertrochanteric valgus osteotomies without subtraction of the external corner for femoral neck nonunion using a dynamic hip screw for fixation. The 8 patients were followed with a middle receding of 18 months. The funding of femoral neck nonunion has been gotten in all cases. The clinical result was excellent. On radiographic review, no cases of osteonecrosis were identified postoperatively. The valgus osteotomy has the goal of transforming the strengths of shearing into strengths of compression. For the fixation of the osteotomy several authors use the blade plates that are technically demanding. The fixation by the DHS provides a simple and steady fixation and permits the compression of the femoral neck non-union.

SIC19-P31

A COMPARISON ACCORDING TO INSERTION METHOD FOR INTRAMEDULLARY NAILING IN PROXIMAL TIBIAL FRACTURES

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PURPOSE: To compare clinical and radiological results between standard insertion method and semi extended method which was designed to improve proximal fixation and alignment in proximal tibia fracture. **MATERIALS AND METHODS:** A retrospective review 24 extraarticular fractures in proximal tibia, initially treated with locked intramedullary nails at least 1 year follow up. Semiextended method was used in 10 fractures and standard insertion method which is cephalad to tibial tubercle in 14. Follow up clinical assessment consisted of review of associated injuries and complications and these two methods were compared by postoperative angulation and displacement in anteroposterior and lateral radiographs. Data were analysed by t-tests. **RESULTS:** In semiextended group, average angulation was 2.3° in coronal and 2.8° in sagittal plane and average displacement was 4.5mm in coronal and 5.3mm in sagittal. In ordinary group, average angulation was 5.1° in coronal and 7.4° in sagittal plane and average displacement was 6.1mm in coronal and 5.3mm in sagittal. In semiextended group, there were significant reduction in coronal angulation ($p=0.006$) and sagittal angulation ($p=0.001$), but there was no significant difference in coronal ($p=0.344$) and sagittal ($p=0.99$) displacement. Both groups showed anterior, valgus angulation and posterolateral displacement in most cases. There were 14 associated injuries and one patient developed nonunion and was treated by nail exchange with autogenous bone graft. **CONCLUSION:** Our retrospective analysis demonstrated that semi extended method is effective for reducing coronal and sagittal angulation, but is not helpful for reducing displacement in both planes.

SIC19-P32

COMPREHENSIVE TREATMENT OF TIBIAL PLATEAU FRACTURES - OUR EXPERIENCES IN 132 CONSECUTIVE CASES

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The results of comprehensive treatment of tibial plateau fractures in 132 patients in average age of 50-year-old are presented. All patients were treated in Orthopaedics and Trauma Clinic of Collegium Medicum UJ Cracow - Poland between 1997 and 2006. The following factors were considered: age, accompanying injuries, coexisting diseases, type of fracture according to AO CCF and Schatzker classification, time since injury to the surgery, rehabilitation programme, time since injury to full weight bearing, range of motion, gait sufficiency. All patients were also assessed with the use of Lysholm knee score. All patients were operated according to the AO rules of articular fracture care. In all cases standard antithrombotic prophylaxis with low-molecule heparines and routine antibiotics prophylaxis were used. The following surgery techniques were used in presented group of patients; lag screws, buttress plates and locking plates. Bone defects in cancellous metaphyseal bone, if necessary, were filled with bone grafts in order to prevent secondary dislocation of articular surface especially in cases with it, depression. Immediately after surgery the passive motions were introduced to the injured knee joint using the CPM system. The minimal follow-up was 12 months. The aim of treatment was not only the restoration of supporting function of the lower extremity but also restoration of kinesthesia and maintaining or restoration of the proper gait mechanisms. To achieve these aims different exercises enhancing proprioception were introduced. Established model of decision making, treatment and rehabilitation requires time and patients cooperation but leads to decreased handicap.

SIC19-P33

NEW APPROACH BY WAR AMPUTATION

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INTRODUCTION: Within the period from 1st April to 1st January 1996 we operated 508 patients and performed 528 amputations (three duplex and 17 bilateral operations).
METHOD OF TREATMENT: Guillotine amputation: N^o16; 3,03%; Open method: N^o93; 17,61%; Primary delayed suture: N^o49; 9,28%; Closed method primary suture: N^o37; 70,07%. Primary closing in the war surgery is considered to be a mistake (Vitium Artis). Our surgeons, without war experience, use the method of primary suture of amputation wound. I was following the mistake in our casuistry. Healing Per primam intentionem and working in the room for practice before prosthetic treatment made me write the book. Further results and positive experience have shown it was not a mistake.
RESULTS:- Healing: Per primam; N^o273; Upper limb: 61; Lower limb: 212. -Healing: Per secundam; N^o255; Upper limb: 33; Lower limb: 222. The closed method-Primary suture-was used with 37 patients the wound healing Per primam happened with 273 patients (51,7%) of which 61 patients (64,9%) had injury of the upper limb and 212 (48,9%) had injury of the lower limb. The results achieved in 1995 were better than the ones from 1992 and 1993.
CONCLUSION: Primary suture of the war amputation wound is possible. The following conditions are necessary:-Civil hospital;-Skilled team and equipment;-Transportation (shorter than 6 hours);-Shock prevention (immobilisation, tournique, compensation of the lost blood, analgesics).

SIC19-P34
WEAPON WOUND

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In our country weapon wounds are infrequent, however it is observed like a frequent injury in urgency traumatologic services. It depends on the kind of weapon and on the anatomic zone. Let present some patient whom different injuries let us use diverse technical repairs. There were two different cases of brachial Plexus harm that had needed an immediate roots decompression and one of these cases precised a trapezius muscles transposition. We also present another case of bone injury with radial nerve affection that required an external fixation in a first act and a nerve repair in a second one. In the leg's case it needed a vascular repair and a sciatic nerve in a second time. In the foot case wants plastic surgery collaboration. CONCLUSIONS:- The actuation in the weapon wounds depends on the kind of weapon and anatomic area.- A multidisciplinary team is required for an integral treatment of those injuries.

SIC19-P35
RADIATION EXPOSURE TO OPERATING THEATRE PERSONNEL DURING FLUOROSCOPIC-ASSISTED ORTHOPAEDIC SURGERY

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Fluoroscopy has been increasingly used for a large number of orthopaedic operations. Intramedullary nailing of tibia (ILN T), femur (ILN F) & dynamic hip screw (DHS) are the common procedures requiring fluoroscopy. We conducted a study to measure shallow (skin) dose to operating theatre personnel & deep (whole body) dose to surgeons during the above 3 procedures. We also estimated cumulative skin dose to operating theatre personnel & cumulative deep dose to surgeons over 1 year. The study was conducted over a period of 4 months (22 October 2004 - 15 February 2005). In total, 25 procedures (10 DHS, 7 ILN tibia & 6 ILN femur) were examined using Thermoluminescent Dosimeter (TLD) badges. All the TLDs showed positive result for radiation. The shallow (skin) radiation dose per case detected was in the range of 0.19 mSv - 0.61 mSv. The deep (whole body) dose for the surgeon was 0.28, 0.55 and 0.81 mSv for 7 ILN Tibia, 10 DHS and 6 ILN Femur, respectively. Maximum permissible annual dose limit of 500 mSv for shallow dose and 50 mSv for deep dose are recommended under Radiation Protection (Basic Safety Standards) Regulations 1988. Our study showed that during all 3 procedures, operating personnel were exposed to variable small degrees of radiation. The surgeon received the highest skin dose. The whole body dose rate for DHS was the highest compared to ILN T & ILN F. The estimated accumulative dose for skin & whole body were still well below the maximum permissible annual dose limit.

SIC19-P36
MINIMAL OSTEOSYNTHESIS IN TREATMENT OF TIBIAL CONDYLE FRACTURES

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Purpose of these studies was to evaluate the results of Minimal Osteosynthesis (MO) in treatment of Tibial Condyle Fractures (TCF). MATERIAL AND METHODS: From 1993 to

2007, 145 cases with TCF were treated in Orthopaedic Clinic and Traumatology Clinic - Uneversity Clinical Centar Skopje, with MO. In selected cases (Scatcker tip: 1, 2, 3), we have used closed indirect reduction and percutaneous screw fixation with AO cannulated screws. The operative technique includes fluoroscopic controlled reconstruction and arthroscopic assisted reconstruction of articular surface. RESULTS: Functional evaluation after operation was done according to FEKROM (Functional Evaluation of Knee Range of Movements), which is a modification of knee-rating scale of Sanders et al. (from 1991) and Rasmussen functional criteria. X-ray and CT imaging was done after operation. Overall 88% patients had good to excellent results, fair 8%, poor 4%, based on clinical and radiological parameters. CONCLUSION: MO under arthroscopic guidance is well established for treatment of TCF, decreased incidence of postoperative complications, allowed patients to be discharged earlier from the hospital and decreased rates of infections.

SIC19-P37

OCCULT SUB-TALAR JOINT FRACTURE-DISLOCATIONS WITH CONCOMITANT STABLE ANKLE FRACTURE CONFIGURATIONS

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Emergent reduction of suspected ankle fracture dislocation in the presence of ankle hind-foot deformity, prior to radiological evaluation, is seen as an increasing trend in emergency department practice. Gross anatomical deformity is an indicator of an unstable fracture configuration. Stable fracture configuration noted at the level of the ankle joint on post-reduction radiological assessment indicates that the level of the concomitant dislocation had not occurred at the level of the ankle. Reduction of the dislocated joint is usually achieved at the time initial manipulation. If the level of the dislocation is not identified accurately then the patient is subsequently treated, inappropriately, as an isolated, stable ankle fracture. We present three cases referred to our orthopaedic trauma clinic as fracture-dislocations of the ankle joint which required manipulation in the emergency department prior to cast immobilisation. An occult injury to the sub-talar joint was identified in each patient which required subsequent orthopaedic treatment. Sub-talar joint fracture or dislocation is often associated with other foot injuries. The outcome following sub-talar joint dislocation has wide variance but there is a high incidence of ankle, sub-talar and mid-foot joints arthritis. A review of the current orthopaedic literature is presented and demonstrates the morbidity experienced by patients in whom a sub-talar fracture or dislocation has occurred. The significance of accurate diagnosis, appropriate treatment and providing these patients with reliable prognoses is emphasised. It is our recommendation that all patients with suspected ankle fracture-dislocations have urgent radiological assessment performed prior to reduction of their deformity.

SIC20-P01

UNUSUAL PRESENTATION OF TUBERCULOSIS: A CASE REPORT

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Bone and joint tuberculosis of the hand and wrist is a rare condition. Approximately 15% of tuberculosis cases involve extra-pulmonary sites and 1-3% of patients have bone and/or joint tuberculosis. Here in we reported a case of a 39-year-old lady with recurrent wrist pain and swelling, diagnosed as tuberculosis wrist infection, who responded well to anti-tuberculous drugs. Tuberculous wrist tenosynovitis should be suspected especially in

our endemic areas. The ideal way is to do biopsy and tissue culture and the useful treatment is a combination of triple medical therapy.

SIC20-P02

ASPERGILLUS VERTEBRAL OSTEOMYELITIS DIAGNOSED BY A NOVEL PANFUNGAL PCR METHOD

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BACKGROUND CONTEXT: Vertebral osteomyelitis and discitis caused by aspergillus spp. is a unique and rare event. Early diagnosis and early antifungal therapy are critical in improving the prognosis for these patients. The diagnosis of invasive fungal infections is, in many cases, not straightforward, and requires invasive procedures, so that histological examination and culture can be performed. Furthermore, current traditional microbiological tests (i.e. cultures and stains) lack the sensitivity for diagnosis of invasive aspergillosis. We present a case of vertebral osteomyelitis caused by *Aspergillus* spp. diagnosed using a novel PCR assay. *Aspergillus* DNA was detected in DNA extracted from the necrotic bone tissue by using a "Panfungal" PCR novel method. Treatment with voriconazole was started based on the diagnosis. Using this novel technique enabled us to diagnose accurately an unusual bone pathogen that requires a unique treatment.

SIC20-P04

THE EFFECT OF GROWTH FACTORS IN THE HEALING OF CHRONIC ULCERS

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PURPOSE: The purpose of the study is to show the beneficial effect of the growth factors in the healing of chronic ulcers, by improving the local conditions and the possibility of healing the trauma. **MATERIAL & METHOD:** We report the case of a 47-year-old man who was operated because he suffered from acute rupture of the Achilles tendon while he was training. Two weeks after the operation, the surgical trauma presented some symptoms of infection that led to its rupture. The patient presented 2 ulcers, having the dimensions 4x2.8x1.5cm and 3.5x2x1.5cm accordingly along the surgical cut, without any progress of healing for 6 weeks. In our hospital as soon as we treated the infection of the trauma, we made 2 infusions of growth factors with the distance of between two weeks from one another. The infusion was done in the edge of the ulcers perimetrically and the bed of them. The ulcers remained closed for a week after the infusion. **RESULTS:** Two weeks after the performance of the second infusion we noticed that granulated tissue fully covered the trauma. The restoration of the area was done with grafting of skin of partial thickness. **CONCLUSION:** The growth factors constitute the basic means of the success of the healing of chronic ulcers. Moreover we would like to add that growth factors reduce the cost of hospitalization of such patients and contribute towards their return to their previous activities.

SIC20-P05

POSTERIOR ONLY APPROACH IN PYOGENIC SPONDYLITIS OF LUMBAR SPINE

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14 patients with lumbar pyogenic spondylitis were managed with posterior lumbar

interbody fusion using transpedicular screw system. Ambulation was started on the 6th (2nd-19th) postoperative day. Serologically infection was controlled within 8 weeks postoperatively. All the cases showed complete interbody fusion within 6 months and mean loss of correction in sagittal alignment was within 1 degree compared to preoperative status. Posterior interbody fusion seems to be one of effective method in managing pyogenic spondylitis enabling early rehabilitation and maintaining sagittal alignment.

SIC20-P06
TUBERCULOSIS OF THE STERNOCLAVICULAR JOINT

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TB of sternoclavicular joint is rare; insidious onset, unusual location and lack of awareness delay diagnosis. Over 10 years, 12 infections in 11 cases (8 males, and 3 females, age 18-50 years) were seen. Commonest presentation was pain, vague swelling; 1 case had discharging sinus, and 2 had some joint subluxation. Diagnostic delays ranging from 6 to 32 months. All were given a standard regimen of Anti TB chemotherapy (ATT); the bilateral case needed surgical debridement. CT was done in 6 and MRI was done in 3 cases. OBSERVATIONS AND DISCUSSION: Initial diagnosis is difficult; with joint destruction noted in CT, debridement at biopsy maybe indicated. ATT heals most cases, and early therapy prevents joint destruction, minimizing problems related to shoulder motion restriction. Cases with significant joint destruction and where MRI/CT shows large retro-sternal abscess should be decompressed and debrided. We hope to increase awareness levels; suspicious cases should have early CT/MRIs and biopsy. Our bilateral case is unique, with no similar previous reports. In some cases spontaneous subluxation with pain maybe the presenting feature. The mechanism of infection seems to be blood borne and not contiguous spread from a pulmonary focus, as none of our cases had evidence of pulmonary TB. CONCLUSIONS: Awareness of this condition seems to be the key to early diagnosis; this disease should be included in the differential diagnosis of all unexplained swellings, pain, or spontaneous subluxations at the sterno-clavicular area. Multi-drug chemotherapy seems adequate for healing.

SIC20-P07
SEPTIC ARTHRITIS OF THE KNEE JOINT TREATED BY DIRECT INJECTION OF GENTAMICIN

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We report the case of a 35-year-old drug-addicted man who suffered a severe knee empyema that was spread from a self-induced abscess of the forearm. The standard procedure of arthroscopic treatment with lavage and surgical debridement was unsuccessful. In the microbiological evaluation we found a high number of Staphylococcus aureus in the fluid of the knee joint, which we also found in the abscess of the forearm. The Drainage and the intravenous antibiotics (amoxicillin and clavulanate) did not change the clinical findings. Neither the inflammation laboratory values nor the clinical situation changed and we still found significant numbers of Staphylococcus aureus in the drainage fluid. In a last chance situation we injected 600mg of gentamicin

directly into the knee joint. We left the antibiotic in the joint for 60 min. and then flushed it with saline. Following this treatment the clinical status of the patient improved significantly. In follow-up microbiological examinations bacterial infection could no longer be shown. We discharged the patient without any clinical symptoms, free range of motion, and no pain.

SIC20-P08

SAME, BUT IS IT SIMILAR? A CASE REPORT

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Tuberculous spondylitis may be impossible to differentiate from pyogenic vertebral osteomyelitis and other primary or metastatic tumours based on clinical and radiographic findings. There are no specific features that are pathognomonic of tuberculous spondylitis. Common findings that arouse suspicion are rarefaction of the vertebral endplates, disc-space narrowing, anterior wedging and paravertebral mass. However, these findings are also presence in other condition such as metastases. Two patients of different age groups with almost similar presentation and imaging findings and the issues affecting their clinical course are discussed. They were a 56-year-old man and a 28-year-old man respectively who presented with history of bilateral lower limbs weakness of grade 3 and reduced sensation from T7 and T6 respectively. MRI showed infective process with large paravertebral mass at the level of T6-8 and T4-9 respectively. In case one, a histopathology examination supported the diagnosis of adenocarcinoma; and CT scan of the thorax and abdomen showed small lung lesion and right adrenal mass. In case two, the histopathology supported the diagnosis of TB. Both cases presented with similar complaint although from the different age group. In this region, tuberculosis is very common. However, a high index of suspicion, together with biopsy will increase the chances of correct diagnosis. It is difficult to differentiate spinal tuberculosis and spine metastasis clinically. The imaging findings are not diagnostic. A decision to get tissue biopsy increases the chances of the accurate diagnosis. Management is depending on individual patient.

SIC20-P09

PALM-OIL THORN INDUCED TUMOUR-LIKE LESION: A REVIEW OF 4 CASES

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It is not widely recognized that palm-oil thorn injuries can produce progressive and persistent reaction in the bone, joint and surrounding soft tissue. The natural history is unique and most of the investigations are inconclusive. We reviewed four cases of tumour-like lesion; two cases were around the elbows and two cases at the foot, which developed following injuries caused by palm-oil thorns. The typical clinical presentation is transient acute synovitis followed by a relatively asymptomatic period. It can also manifest later with chronic or recurrent inflammation mimicking septic arthritis, osteomyelitis or bone tumor often after the thorn injury was forgotten. The hand is the most commonly affected. Lesions of the elbows and foot are very rare. The tissue for culture and histopathological examination together with administration of broad spectrum antibiotics are needed for the treatment although they are negative and inconclusive. The definitive

treatment includes operative debridement and removal of thorn particles, even though in most cases the particles cannot be found either due to irrigation or because they are too small to be seen.

SIC20-P10

10 YEARS OF EXPERIENCE IN SURGICAL TREATMENT OF THE THORACOLUMBAR SPONDYLODISCITIS

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INTRODUCTION: The vertebral column is the most frequent location of bone and joint TB and represents 30-45% of bone and joint TB. **MATERIAL AND METHOD:** We treated 187 patients with thoracolumbar TB. There were 117 men and 70 women with median age of 44 years. We used for the diagnosis the clinical exam, X-ray, CT and also laboratory, bacteriology and pathology. All the patients followed preoperative and postoperative chemotherapy according to the WHO directives. In all the cases we used the anterior transthoracic and retroperitoneal approach in 81 cases on the left and in 65 cases on the right side. In all the cases we performed debridement of the lesions, the restoring of the vertebral column anatomic axes and somatodesis with iliac bone autograft. At 19 patients the surgical procedure was associated with posterior transpedicular segmentary fixation XIA. Postoperatively the patients are mobilized at 4-7 days without another external fixation. **RESULTS:** We had good results at 171 patients with complete healing of the lesion, restoring of the anatomical axes and resuming the anterior activity. The results were satisfactory in 15 cases and unsatisfactory in only one case with recurrence of the infection, dislodging of the bone graft that necessitated reoperation. **CONCLUSIONS:** The surgical treatment associated with chemotherapy makes possible the permanent healing of the TB spondylodiscitis. The iliac crest autograft has a good mechanical resistance and maintains the normal axes of the column. The retroperitoneal approach makes possible a better exposure of the lesion. Posterior transpedicular fixation makes possible the easy mobilization of the patients.

SIC20-P11

TWO-STAGE REVISION - ALTERNATIVE OR NECESSITY IN TREATMENT OF PERIPROSTHETIC INFECTIONS

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One-stage revision in our days is a standard procedure for treatment of infections. Nevertheless two-stage revision is a successful sometimes necessary option. Indications for two-stage revisions are e.g. situations with unknown bacteria, emergency procedures, revisions needing custom-made implants, necessity of high local antibiotic effect.

SIC20-P12

THE VALUE OF THE IMAGERY IN OSTEOARTICULAR TUBERCULOSIS

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In Morocco, tuberculosis is still a major public health problem that in other developed countries has nearly vanished but it started to increase because of HIV. The osteoarticular tuberculosis represents 30 to 45% of extra pulmonary locations. The aim of

our study is to highlight the imagery given in the different forms of the osteoarticular tuberculosis in the light of medical folders (58 cases) from the university hospital centre Ibn Rochd of Casablanca and a literature review. We observed that rachidial locations represented 50%; osteoarthritis represented 30% and osteitis 20% of cases of the osteoarticular tuberculosis. A rigorous imagery analysis permits a precocious diagnosis in order to start the treatment to diminish the morbidity and the mortality related to this infection.

SIC21-P01

MAGNETIC RESONANCE IMAGING OF ENTRAPMENT NEUROPATHIES

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The purpose of this study was to evaluate possibility and accuracy of magnetic resonance imaging (MRI) in patients with clinical symptoms of entrapment neuropathies which may be caused by extrinsic or intrinsic pressure on the peripheral nerve or its branches and specific symptoms depend on the extent of nerve involvement and places of compression. We present six different cases of entrapment neuropathies or so-called tunnel syndromes, all patients were imaged using a 2T MR system. Median nerve was compressed in the fibro osseous tunnel with Struthers' ligament, creating symptoms of the syndrome of the supracondylar process. In another case the compression of median nerve occurred passing between two head of pronator teres muscle. The compression of the median nerve by flexor retinaculum in carpal tunnel was very obvious. The compression of the sciatic nerve passing through two heads of divided piriformis muscle produced clinical picture of the piriformis muscle syndrome. The common peroneal nerve was compressed by ganglion cyst in a fibro-osseous tunnel at the level of the fibular neck with characteristic clinical picture of peroneal tunnel syndrome. Plantar medial nerve compression at the level of medial malleolus caused clinical symptoms of tarsal tunnel syndrome. All MRI findings were confirmed surgically. MRI imaging helps understanding complex relationship and making nerve visible. The method is reliable for detecting the causes of entrapment neuropathies.

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