

Case of the month

March 2010 - 1

A 35-year-old young man was involved in a motorcycle accident 2 weeks ago, where he suffered a massive hemothorax.

After improvement of his chest injury 2 weeks after trauma, he is presented to the orthopaedic department for management of his sacral injury (Fig. 1). He reports paraesthesia of both feet.

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- (Fig. 1) At time of presentation the a.p. X-ray shows sacral fracture on the left and right side.

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- In view of this information, what might be a good diagnostic possibility at this time?
 - X-ray outlet view
 - pelvic CT scan
 - 3-dimensional reconstruction CT scan
 - MRI

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- A CT scan is necessary for the diagnosis and exact classification of the sacral fracture (Fig. 2)

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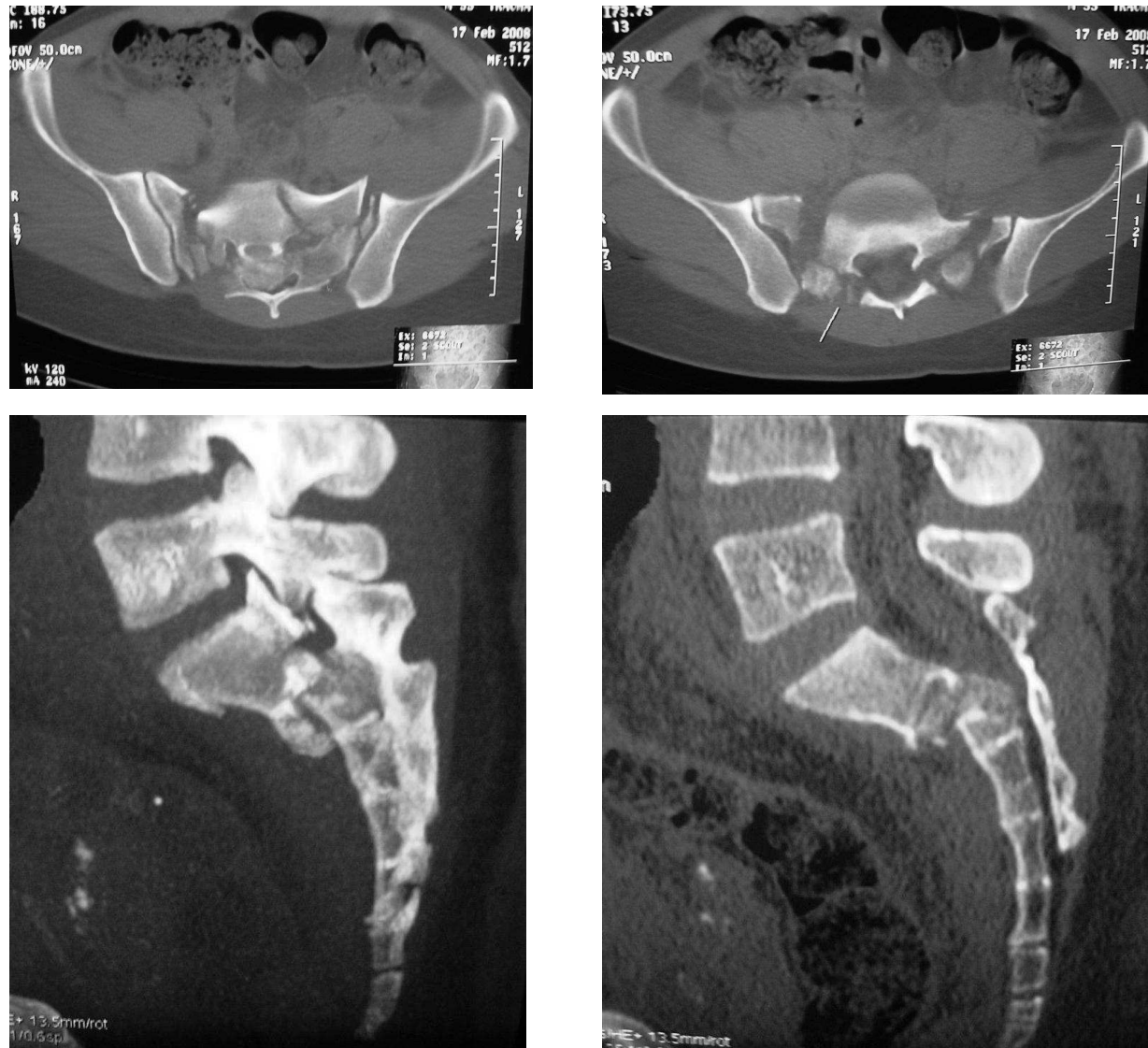


Fig. 2

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- Comment: A 3-dimensional reconstructional CT scan simplifies the imagination of the sacral fracture for correct classification and treatment (Fig. 3 and 4).

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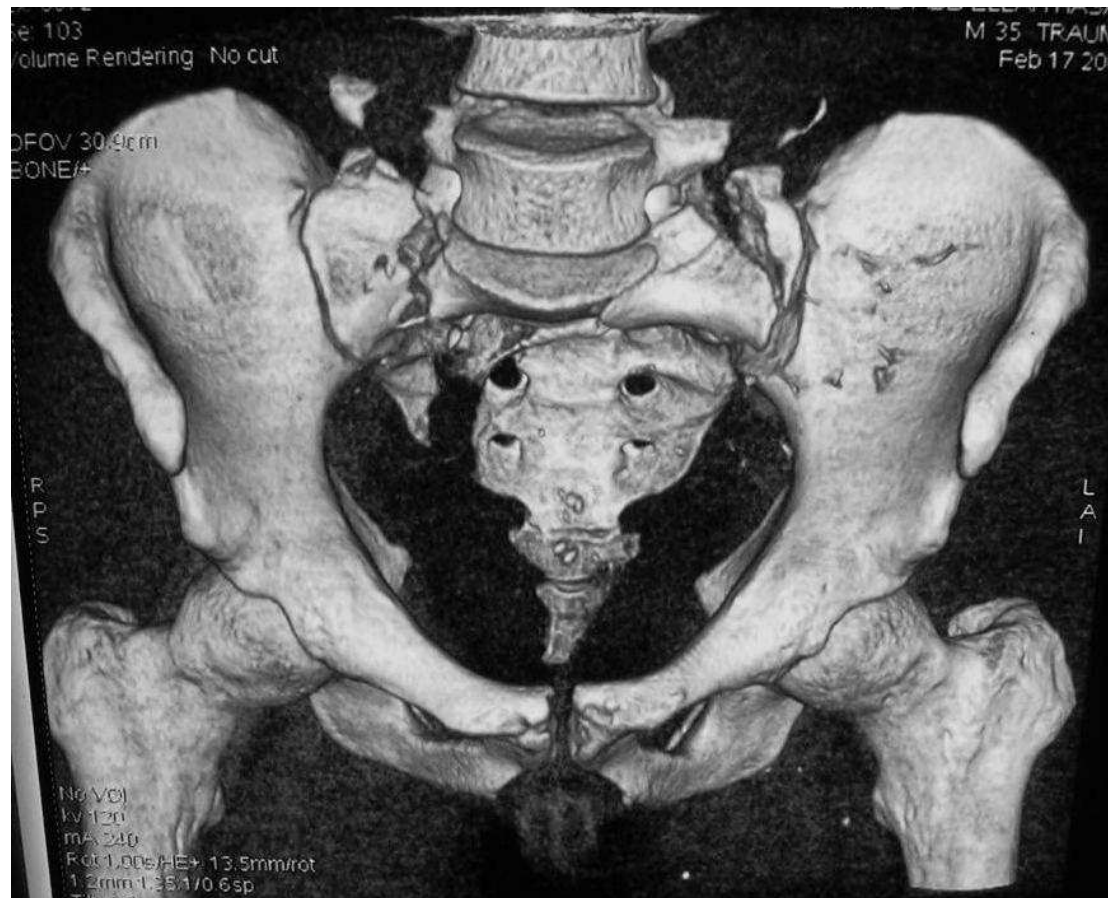


Fig. 3

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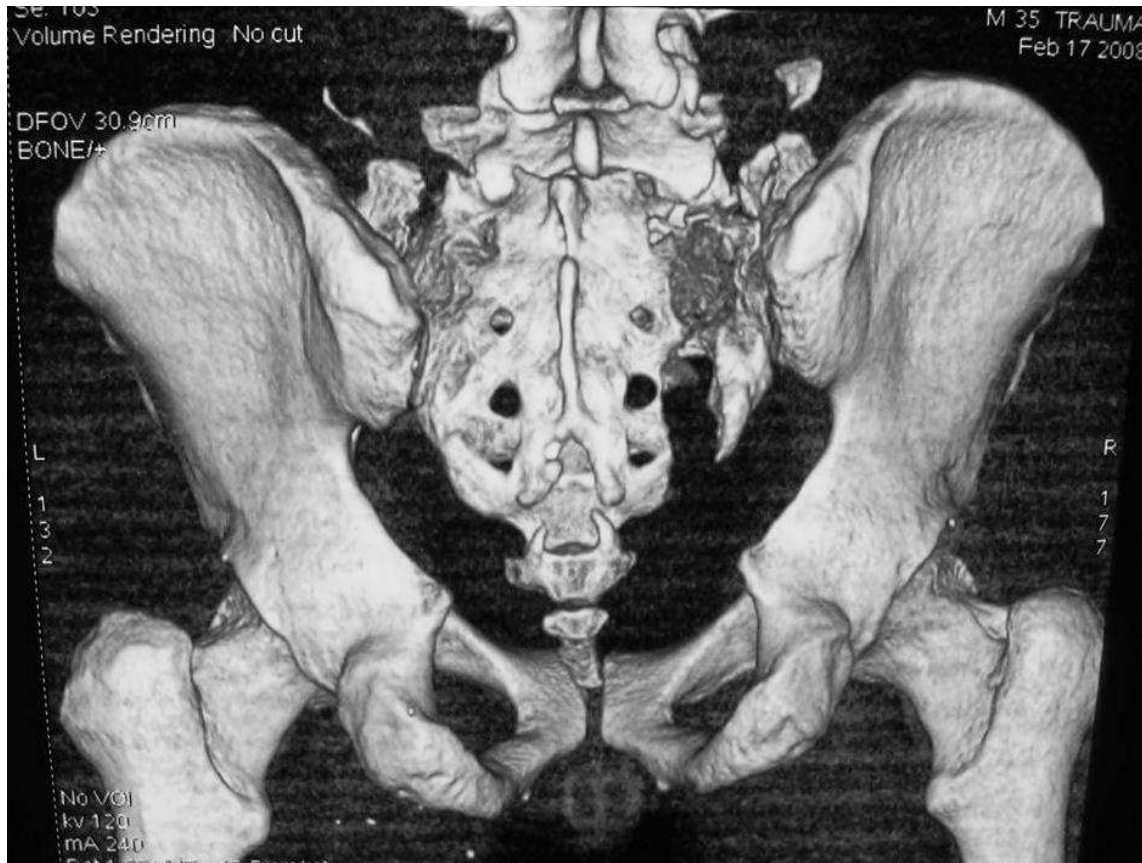


Fig. 4

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- The CT scan shows a "spinopelvic dissociation"

- Comment:

There are several different fracture classification systems for the wide range of sacral fracture patterns and their frequent association with pelvic and lumbar involvement.

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- Sacral fractures can be categorised using the Denis classification system¹, which divides the sacrum into 3 zones (Fig. 5).
 - Zone 1 fractures are lateral to the neural foramina
 - Zone 2 fractures pass through the foramina
 - Zone 3 fractures are to the foramen and involve the spinal canal

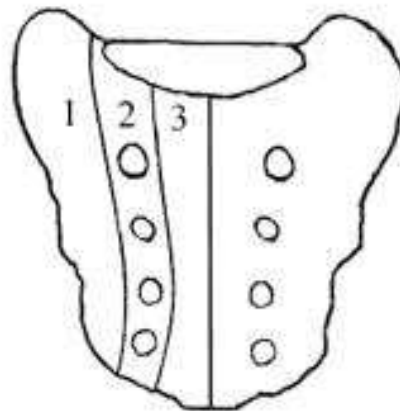


Fig. 5

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- Comment: Transverse sacral fractures traverse the spinal canal and are classified as Denis 3 fractures. If they traverse all 3 zones, they can be described as H-, U-, Lambda- or T-shaped fractures (Fig. 6).

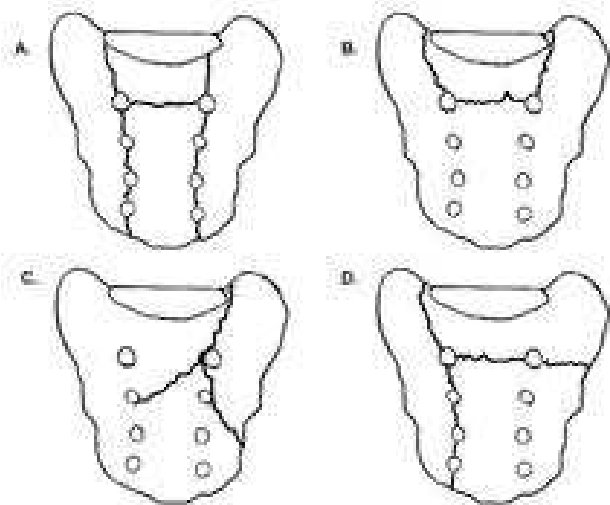


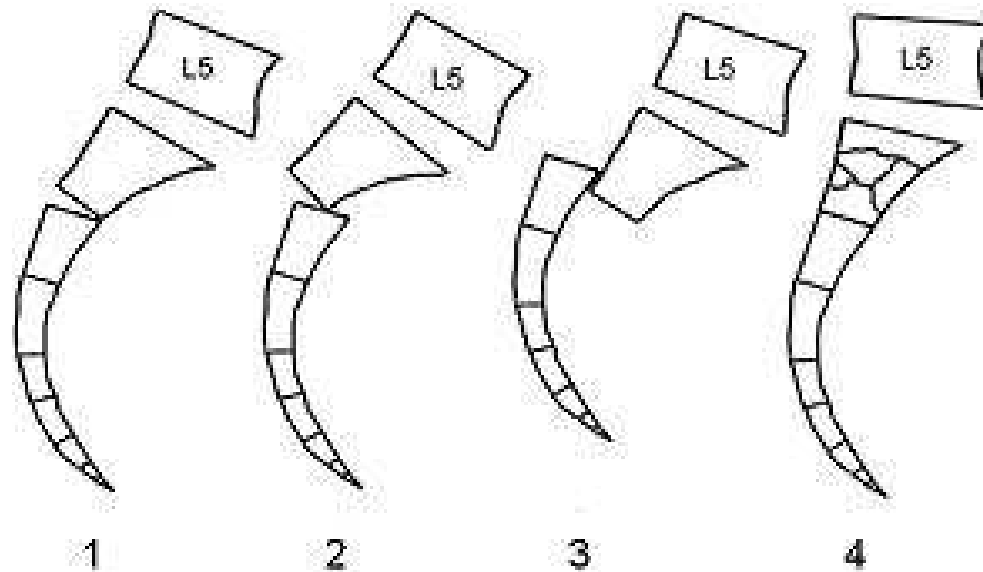
Fig. 6

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- Further classified transverse Denis 3 zone-fractures are described by Roy-Camille² et al. or Strange-Vognsen³ et al.
 - Type 1: only kyphotic angulation at the fracture
 - Type 2: kyphosis with partial anterior translation
 - Type 3: kyphosis with complete translation
 - Type 4: axial compression with segmental comminution of the S1-body (Fig. 7)

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- Fig. 7: Subclassification of Denis 3 zone injuries, described by Roy-Camille et al. and Strange-Vognsen et al.



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- Comment: Fractures involving the lumbosacral junction may impair the stability.
- The Isler-classification (Fig. 8) is based on the location of the fracture line relative to the L5/S1-facet:
 - Type 1: fracture is lateral to the facet
 - Type 2: fracture exits through the L5/S1-facet
 - Type 3: fracture exits medial to the facet

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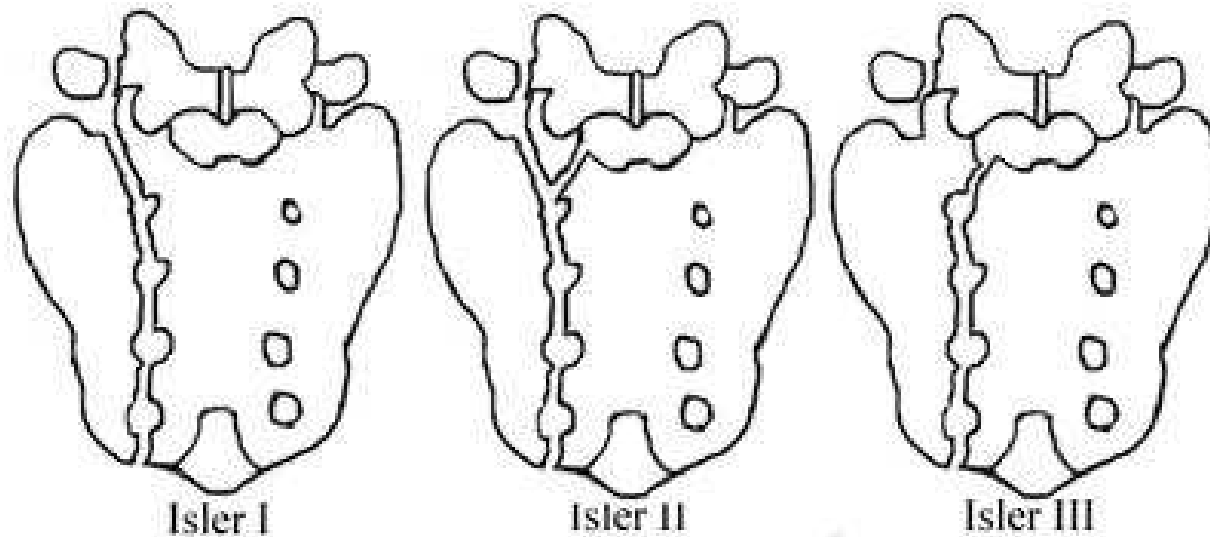


Fig. 8

- Comment: Bilateral Type III Injuries may represent lumbosacral dissociation.

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- Which aspects of treatment should be taken into consideration?
 - conservative treatment
 - closed reduction and percutaneous iliosacral screws
 - open reduction and posterior sacral tension band plate
 - lumbopelvic fixation using transpedicular screws
 - Triangular osteosynthesis (lumbopelvic fixation together with iliosacral screws)
 - including neural decompression

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- Triangular osteosynthesis was done, using lumbopelvix fixation with transpedicular screws and rods, fixing L5 to the iliac-bone together with iliosacral screws. A neural decompression was performed (Fig. 9 and 10)

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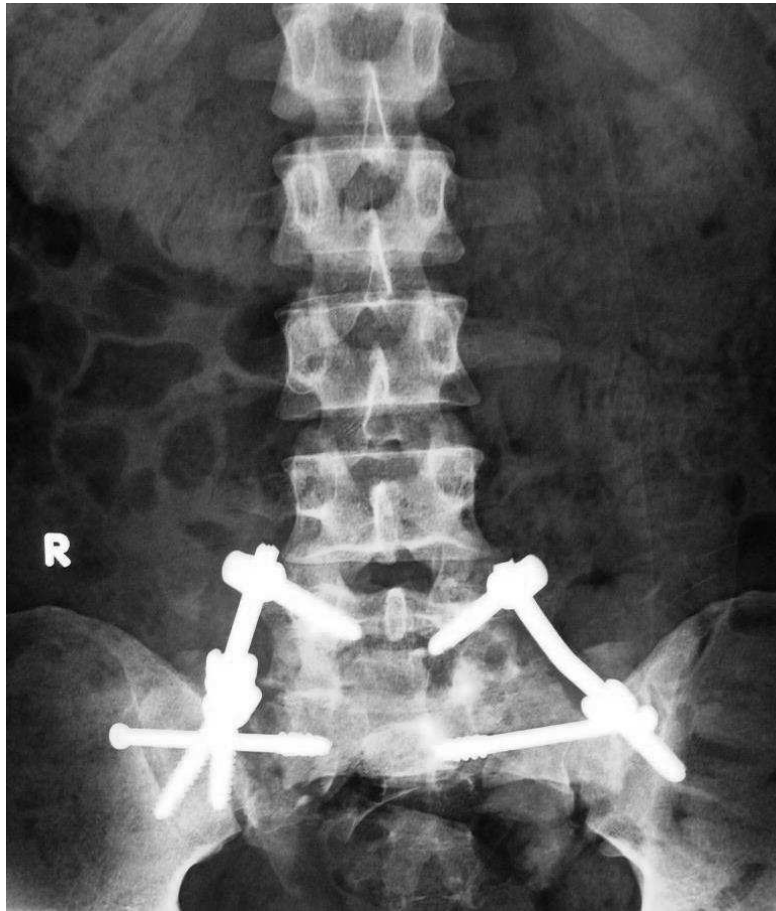


Fig. 9



Fig. 10

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- Follow-up:

After 16 weeks the patient recovered his neurological symptoms. He reports only occasional sacral pain and gait was regained with complete fracture union (Fig. 11 and 12).

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Fig. 11



Fig. 12

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- Comment: Sacral fractures often result from high-energy mechanisms and frequently result in neurologic symptoms and deficits to the lower extremities and urinary and rectal dysfunctions. These neurologic problems often remain the major chronic sequelae after the more obvious pelvic trauma lesion has healed. Specific surgical treatments aimed at neurologic problems are available and may allow the patient functional recovery.

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References:

1. Denis F, Davis S, Comfort T. Sacral fractures: An important problem: Retrospective analysis of 236 cases. Clin Orthop Relat Res. 1988; (227):67-81.
2. Roy-Camille R, Saillant G, Gagna G, Mazel C. Transverse fracture of the upper sacrum: Suicidal jumper's fracture. Spine. 1985; 10(9):838-845.
3. Strange-Vognsen HH, Lebech A. An unusual type of fracture in the upper sacrum. J Orthop Trauma. 1991; 5(2):200-203.
4. Hak DJ, Baran S, Stahel P. Sacral fractures: current strategies in diagnosis and management. Orthopedics. 2009 Oct;32(10).
5. Isler B. Traumatic spondylopelvic dissociation: a case report and literature review. Spine 1997 Jun 1;22(11):1276.

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