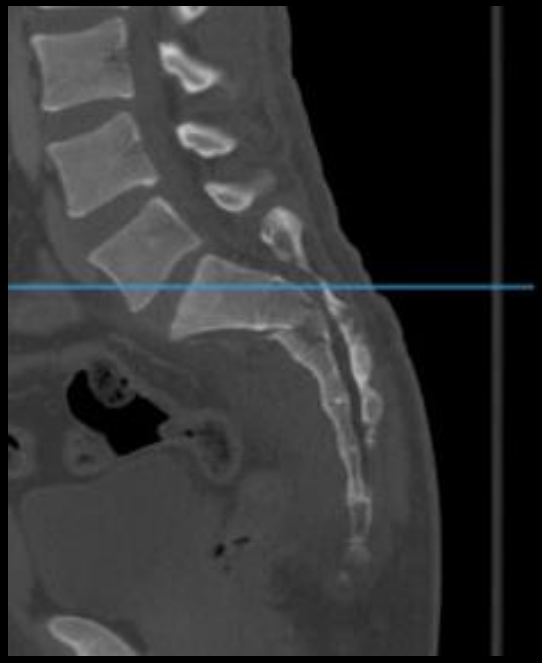
Lumbopelvic Dissociations: Recognition and Recommendations

Friday, May 26, 2023



Ashraf N. El Naga
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University of California, San Francisco

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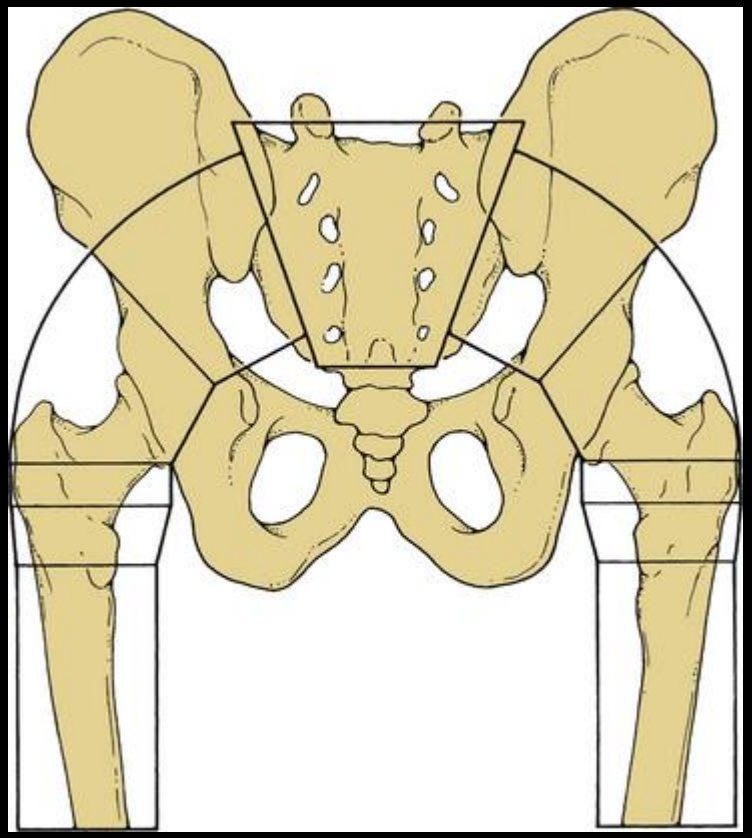
Spinopelvic injury patterns

- Injuries that relate to the ability of transmit load between the spine and the pelvis



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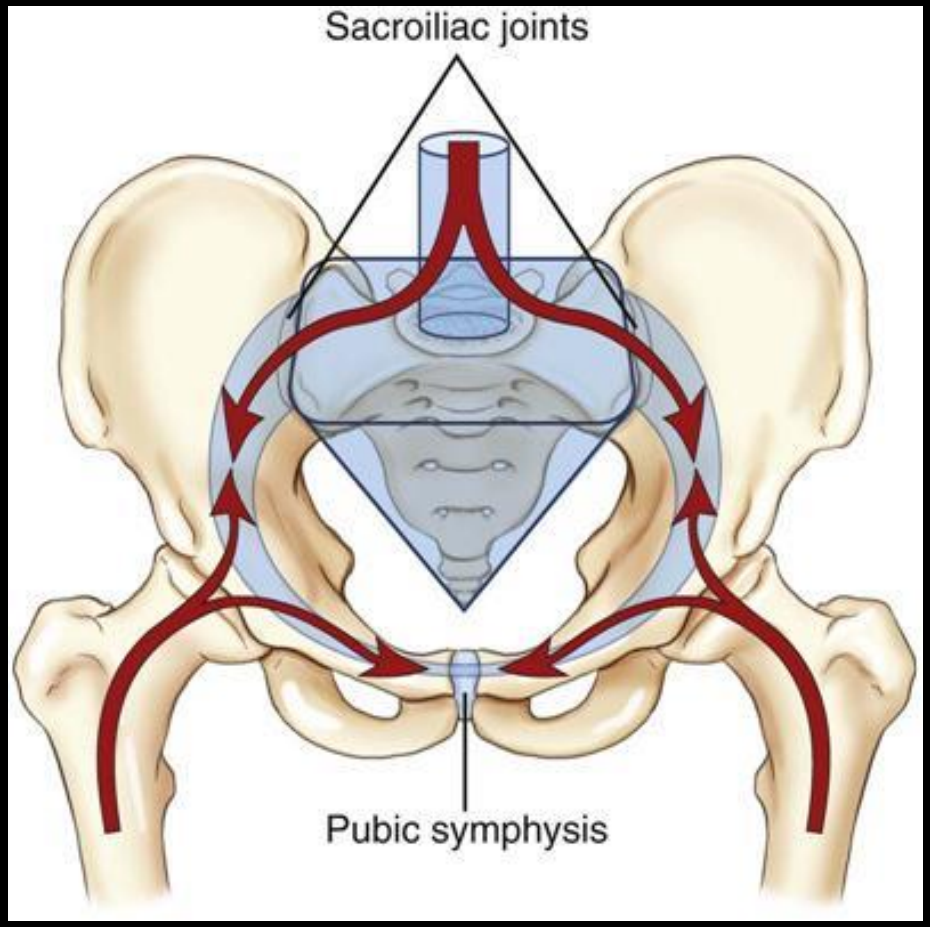
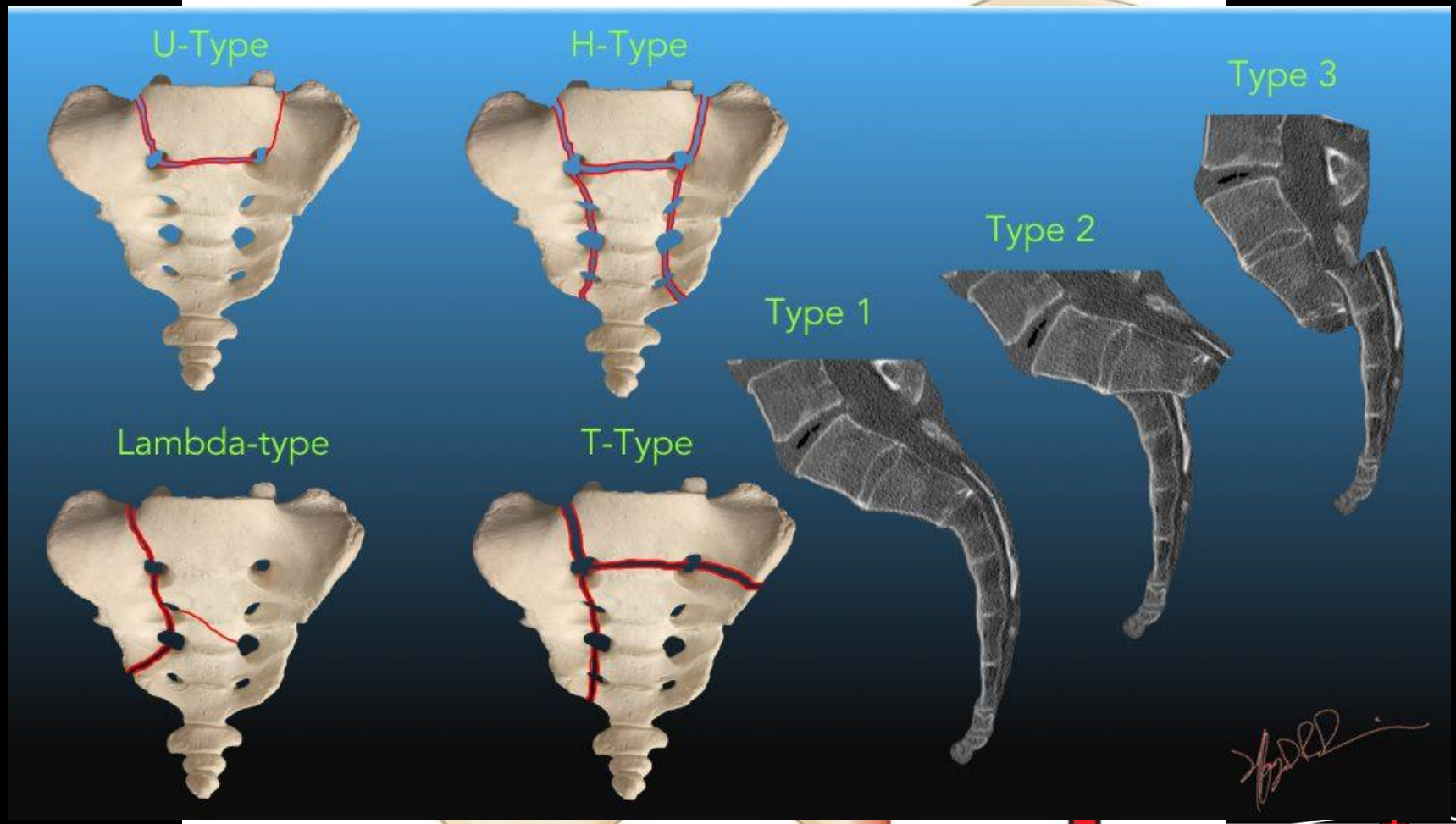


Spinopelvic injury patterns



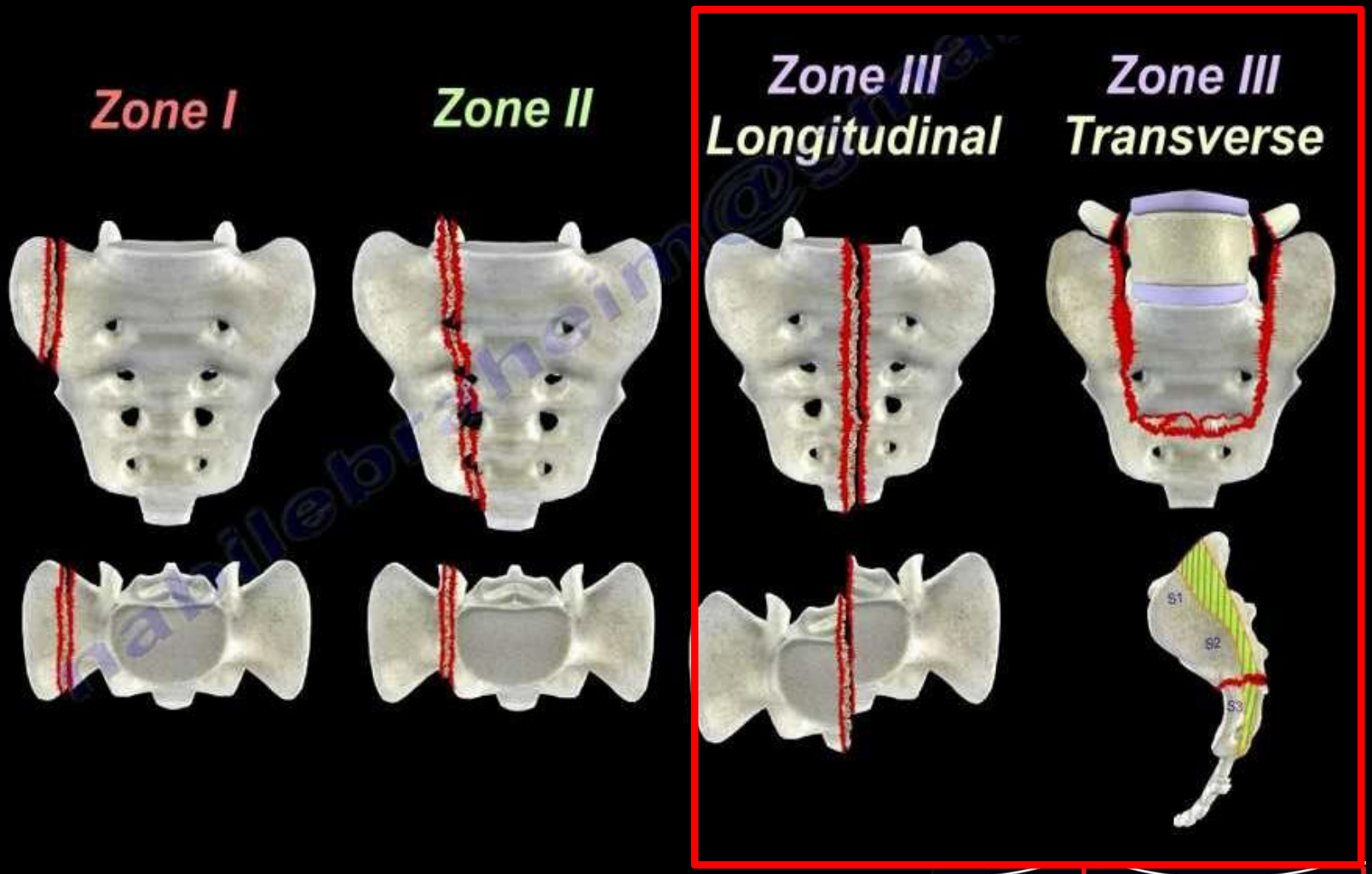
Objectives

1. Understand the salient clinical features of these injuries
2. Review the most impactful studies related to spinopelvic injuries
3. Discuss the clinical factors that guide treatment for spinopelvic injuries

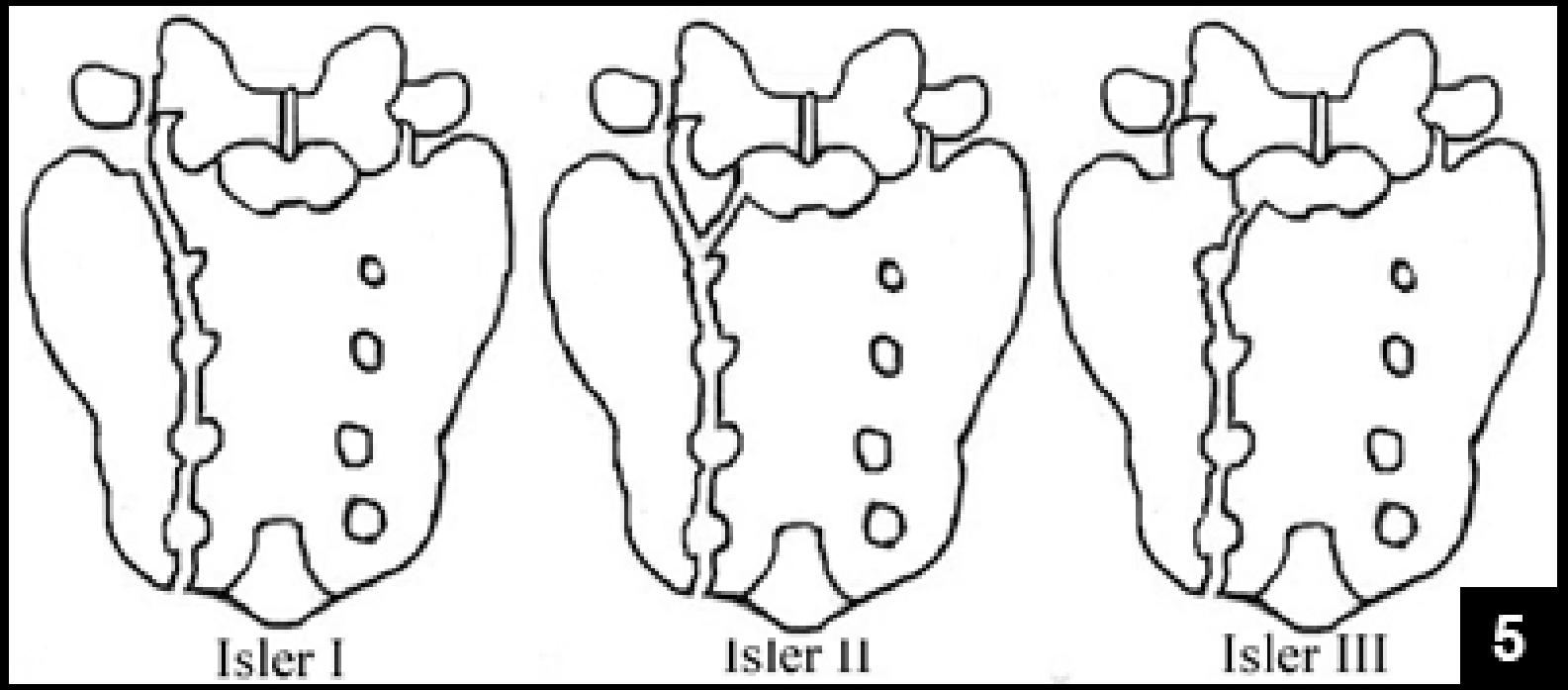
Classification Systems

- Denis Classification
- Isler Classification
- Roy Camille classification

Denis Classification



Isler Classification



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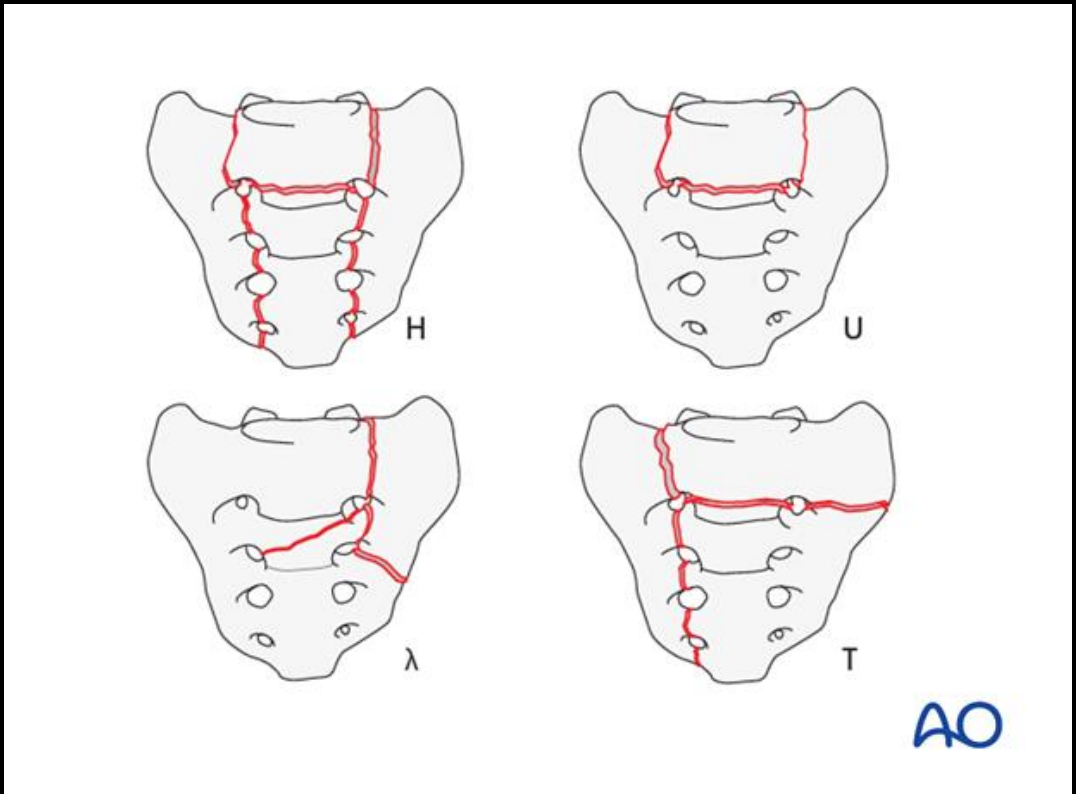
Lumbosacral Lesions Associated with Pelvic Ring Injuries

Balz Isler

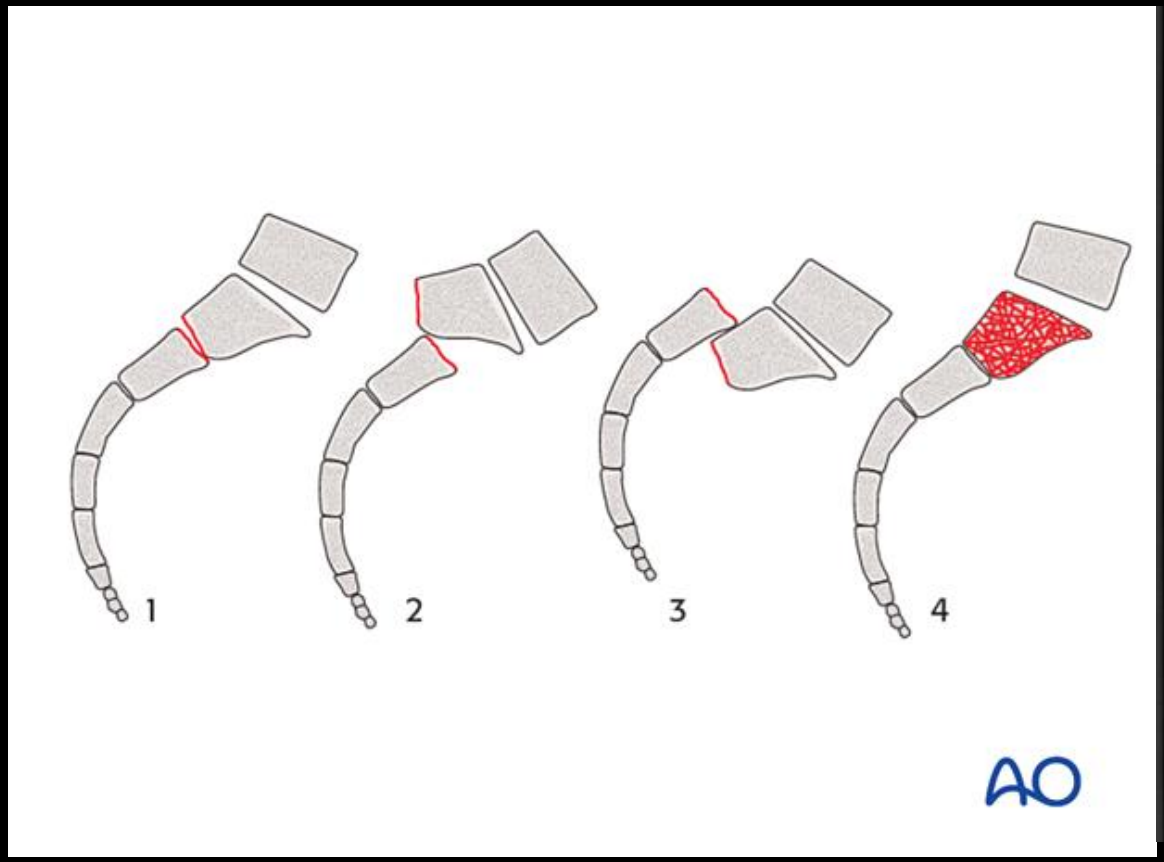
Department of Orthopaedics, University of Berne, Inselspital, Bern, Switzerland

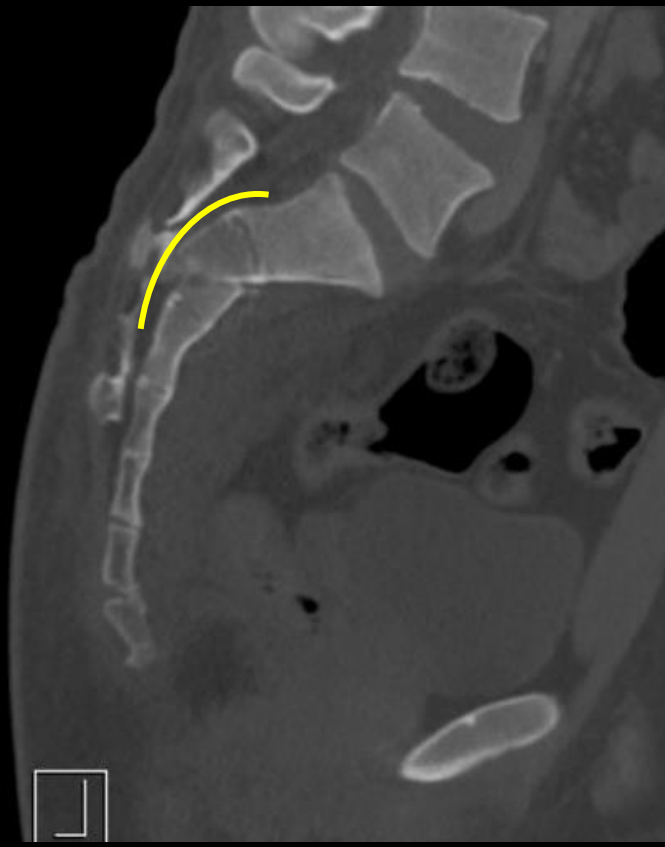
Descriptive Classification

- Transverse Zone III fractures

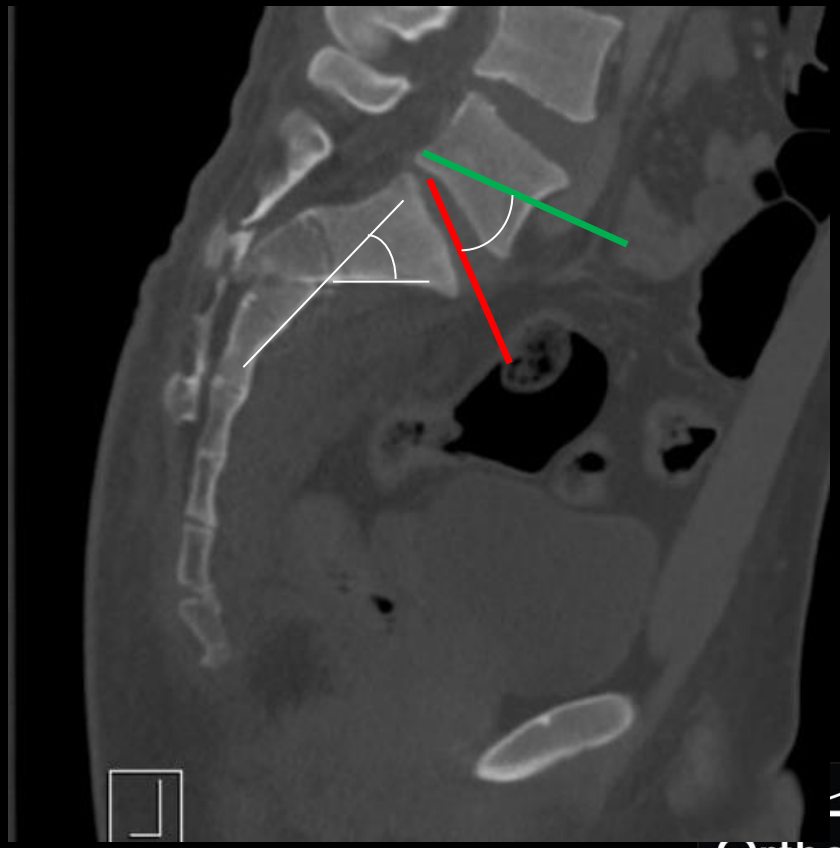


Roy- Camille Classification





Sacral Kyphosis

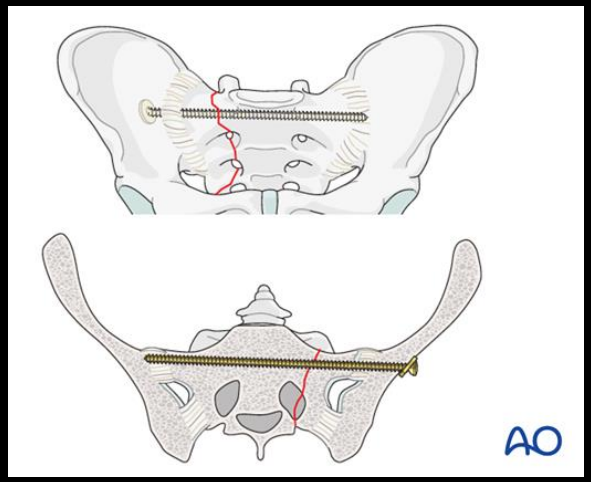


When to call spine?

1. Neurologic deficits (bowel/ bladder deficits, perianal sensory changes)
2. Significant sacral kyphosis
3. Displaced facet fracture

Operative Treatments

Iliosacral screw fixation



Operative Treatments

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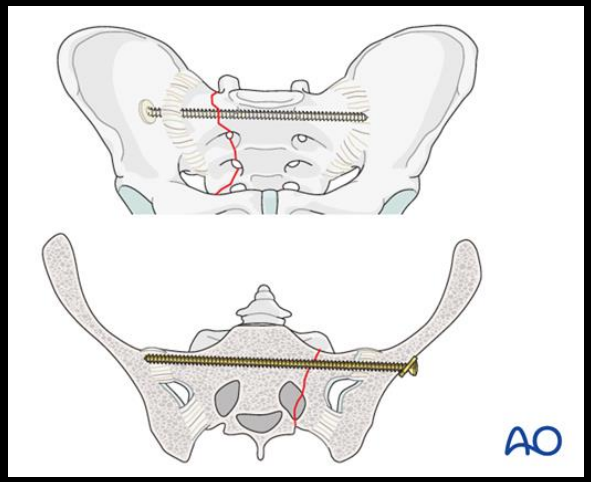

Posterior lumbopelvic fixation

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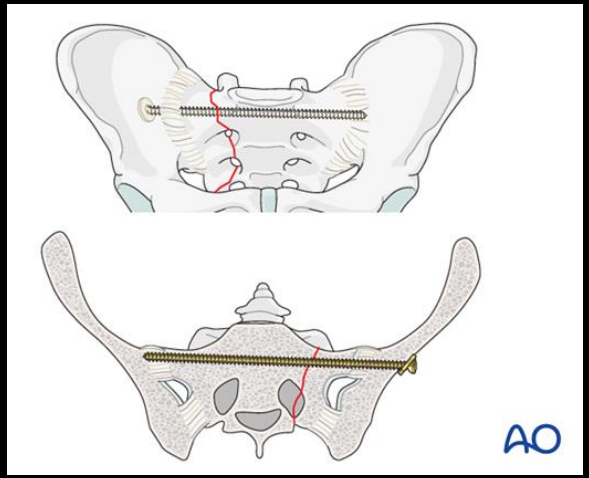
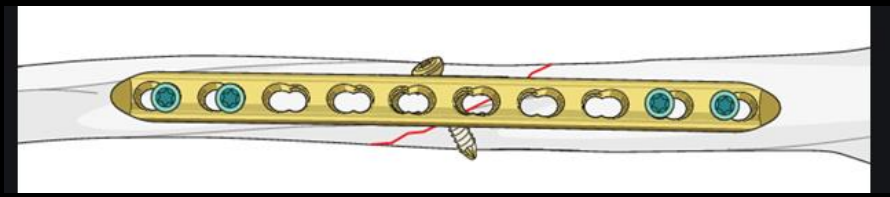
Iliosacral Screw Fixation

- Pros
  - Safe
  - Minimally invasive
  - Prone or supine
  - Fracture compression





Iliosacral Screw Fixation

- **Pro**
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  - Minimally invasive
  - Prone or supine
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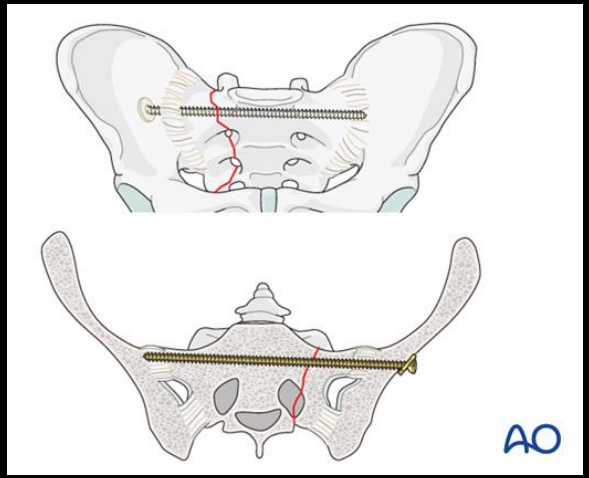
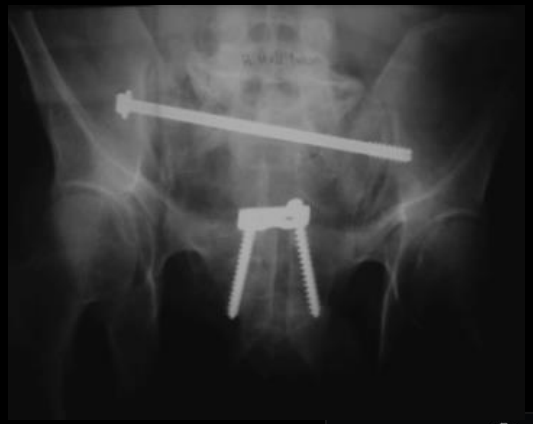


- **Con**
  - Poor at resisting shear forces
  - Need good flouro images



Sagi, H Claude MD; Militano, Ulises MD; Caron, Troy DO; Lindvall, Eric DO A Comprehensive Analysis With Minimum 1-Year Follow-up of Vertically Unstable Transforaminal Sacral Fractures Treated With Triangular Osteosynthesis. Journal of Orthopaedic Trauma: May 2009 - Volume 23 - Issue 5 - p 313-319

Lumbopelvic fixation

Lumbopelvic fixation

- Pro
  - Can be minimally invasive (if no reduction needed)
  - Superior to resisting flexion extension, axial rotation, especially in models with sacral comminution

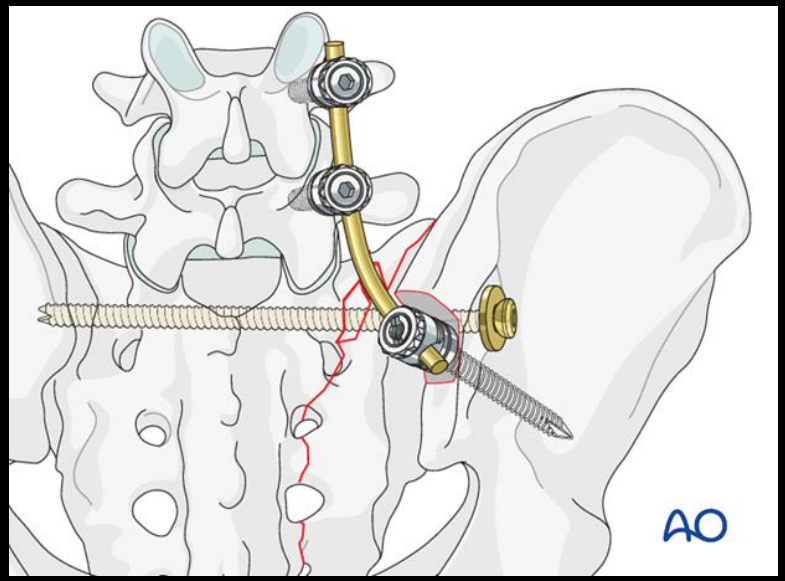
Lumbopelvic fixation

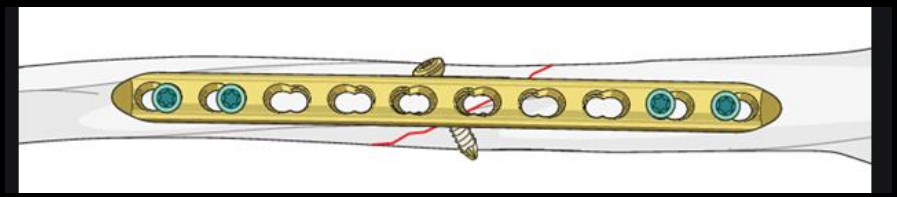
Lumbopelvic fixation

- Pro
  - Can be minimally invasive (if no reduction needed)
  - Superior to resisting flexion extension, axial rotation, especially in models with sacral comminution
- Con
  - Invasiveness
  - Limit lumbar motion
  - Increased hardware irritation
  - Necessitates prone position
  - Posterior incision may overly Morel lesion

Triangular osteosynthesis

- Combined techniques
  - LPF acts like neutralization plate





Complications and Outcomes

- A tale of two studies …

Decompression and Lumbopelvic Fixation for Sacral Fracture-Dislocations With Spino-pelvic Dissociation

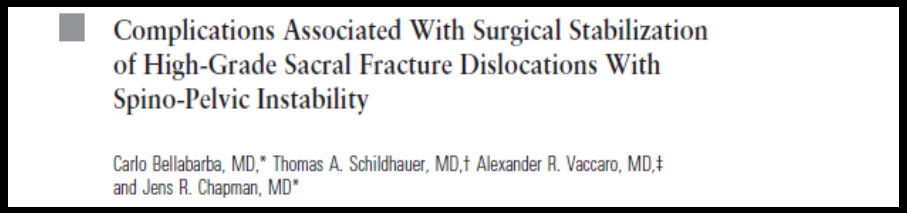
Thomas A. Schildhauer, MD, PhD, Carlo Bellabarba, MD,†‡ Sean E. Nork, MD,† David P. Barei, MD, FRCS(C),† Milton L. Chip Routt, Jr MD,† and Jens R. Chapman, MD†‡*

Percutaneous Stabilization of U-Shaped Sacral Fractures Using Iliosacral Screws: Technique and Early Results

Sean E. Nork, *Clifford B. Jones, †Susan P. Harding, Sohail K. Mirza, and M. L. Chip Routt, Jr.

*Department of Orthopaedic Surgery, Harborview Medical Center, Seattle, Washington, U.S.A.; *Michigan State University, Grand Rapids, Michigan, U.S.A.; †Atlantic Shore Orthopaedic Associates, Northfield, New Jersey, U.S.A.*

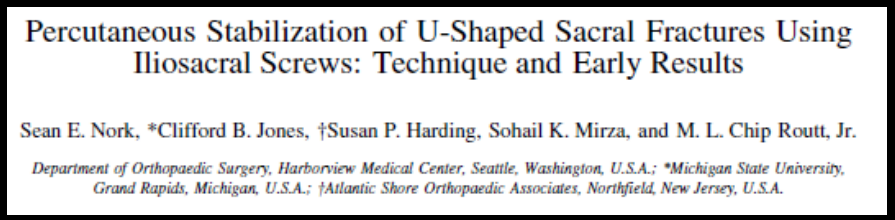
U-type sacral fracture



Complications Associated With Surgical Stabilization of High-Grade Sacral Fracture Dislocations With Spino-Pelvic Instability

Carlo Bellabarba, MD,* Thomas A. Schildhauer, MD,† Alexander R. Vaccaro, MD,‡ and Jens R. Chapman, MD*

- 19 pts undergoing open LPF and decompression
  - 83% with full or partial bowel bladder recover
  - No loss of reduction
  - 74% with traumatic dural tear or avulsion
  - HWF in 31%
  - Wound healing issues - 26%
  - Unplanned 2nd Surgery – 42%
    - Wound infection, seroma, pseudomeningocele



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- 13 patients percutaneous
  - HWF in 1 pt
  - All fractures healed at final f/u
  - 7/9 with preop deficits had resolution
  - No wound infections
  - 1 unplanned surgery for HWR

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U-type sacral fracture

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Carlo Bellabarba, MD,* Thomas A. Schildhauer, MD,† Alexander R. Vaccaro, MD,‡ and Jens R. Chapman, MD*

- 19 pts undergoing open LPF and decompression
  - Pre-op kyphosis: 43 degrees
  - Post-op kyphosis: 20 degrees

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- 13 patients percutaneous
  - Pre-op kyphosis: 29 degrees
  - Post-op kyphosis: 28 degrees

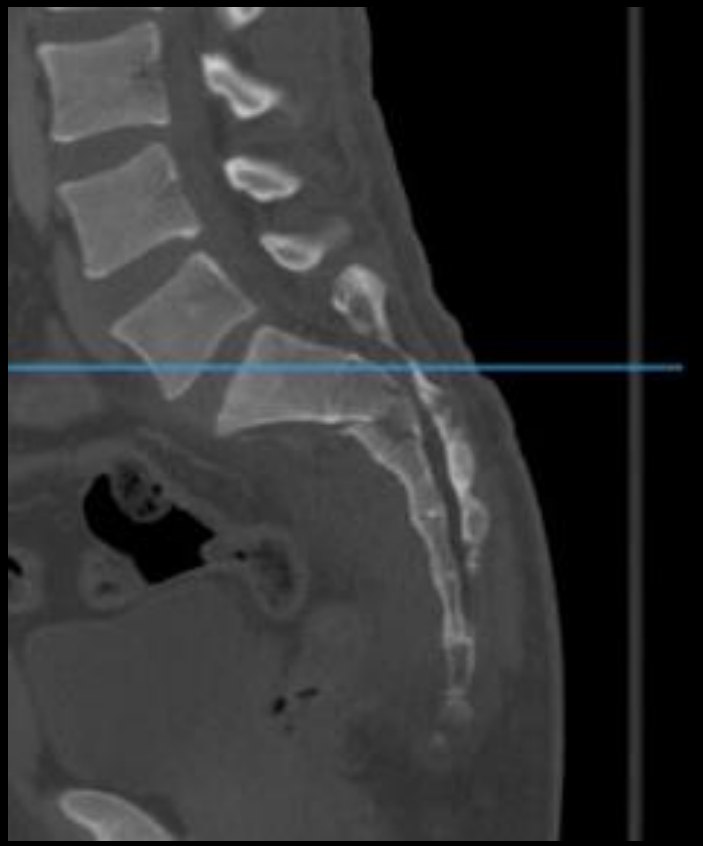
Goals of Treatment

- Bony union of the fracture in physiologic alignment
- Optimize the potential for recovery of neurologic deficits if present
- Minimize potential complications associated with prolonged recumbency and bedrest (early mobility/weight bearing)

Choosing a fixation strategy?

Choosing a fixation strategy?

- Is a neurologic decompression needed?
  - Ongoing nerve compression?



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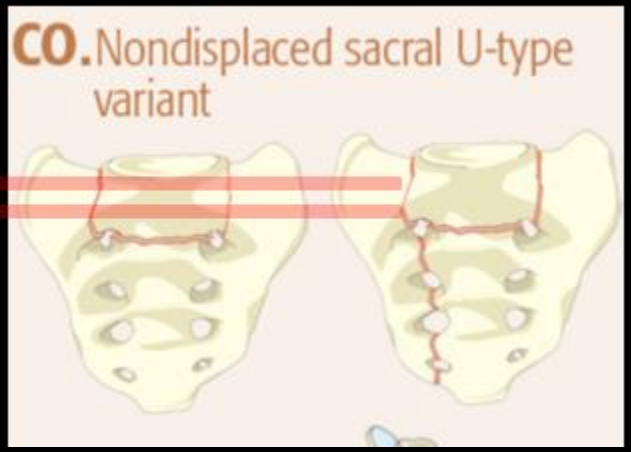
- How will we reduce the fracture?
  - Closed
  - Percutaneous
  - Open



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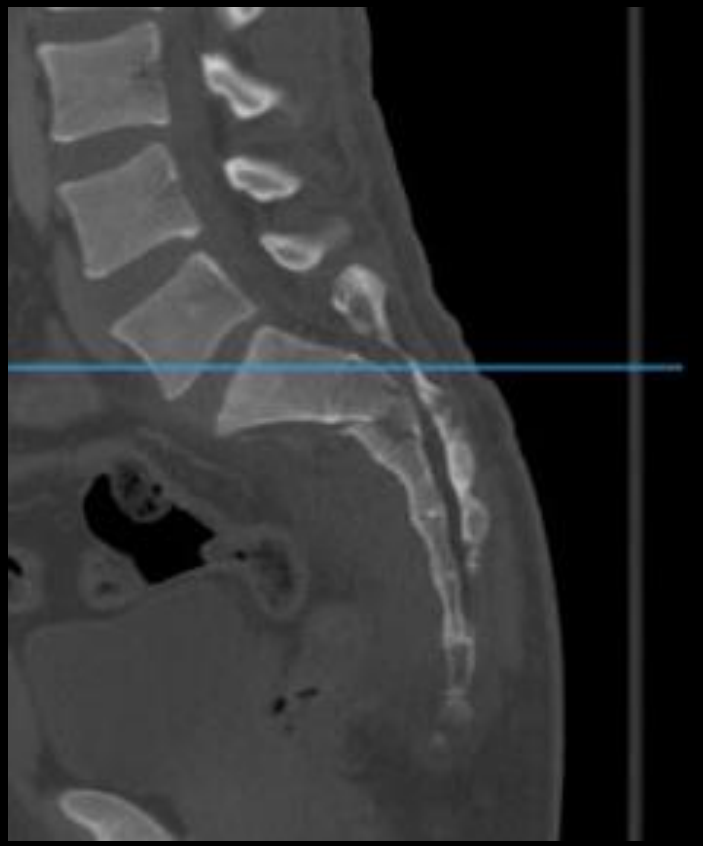
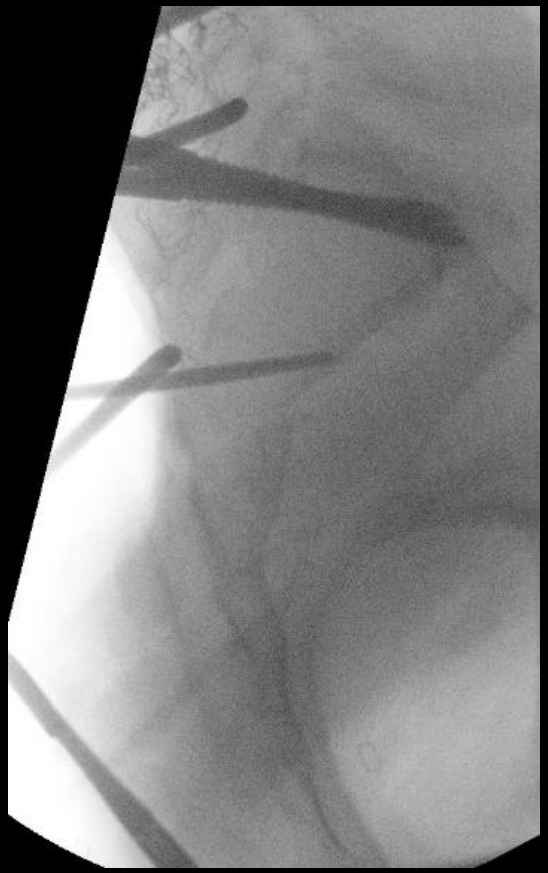


Case # 2



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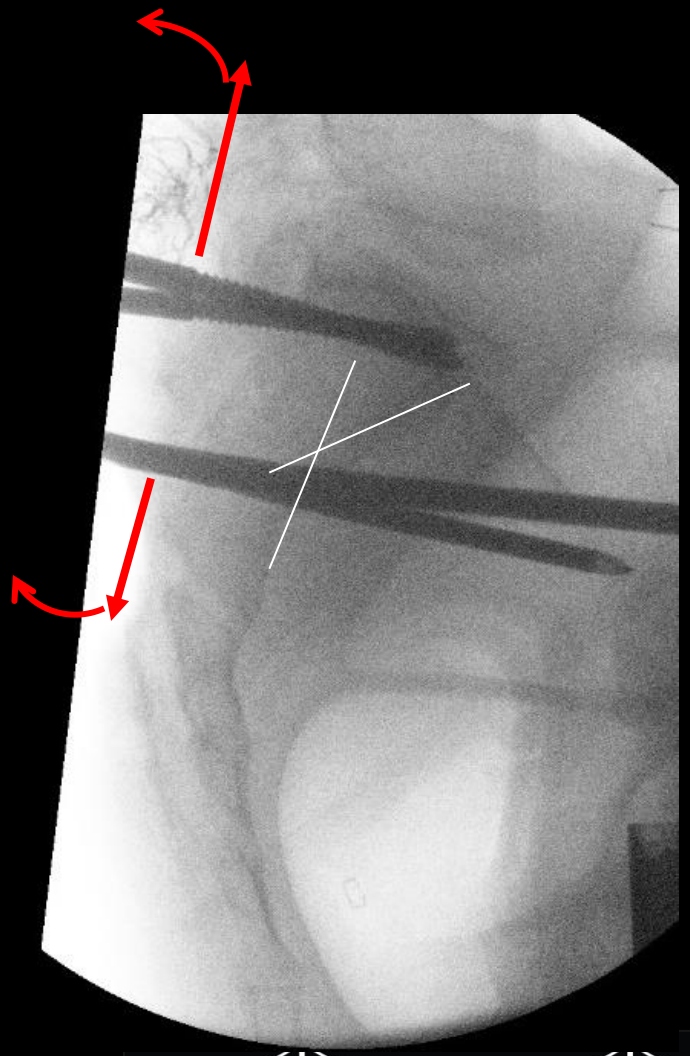
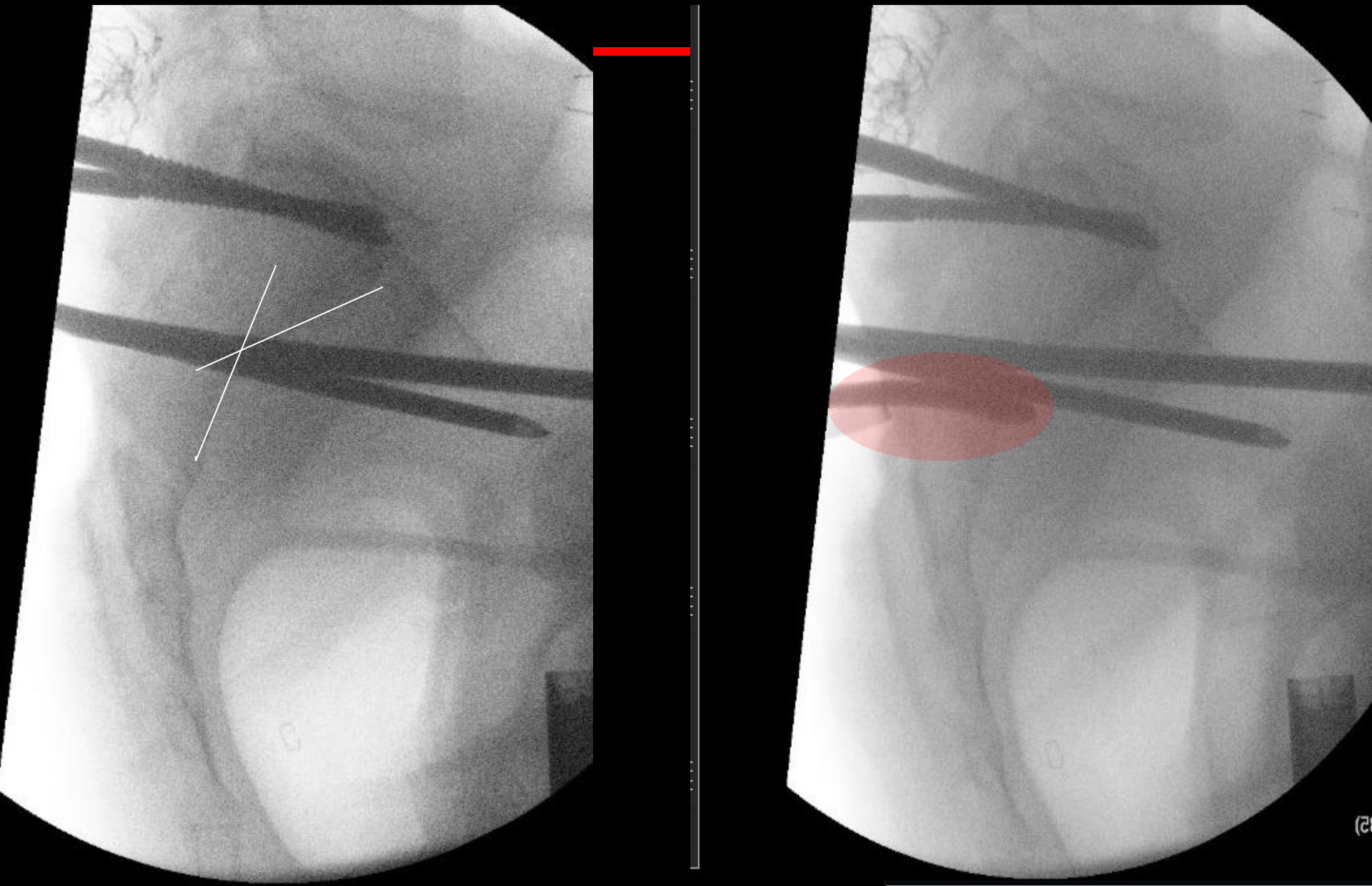
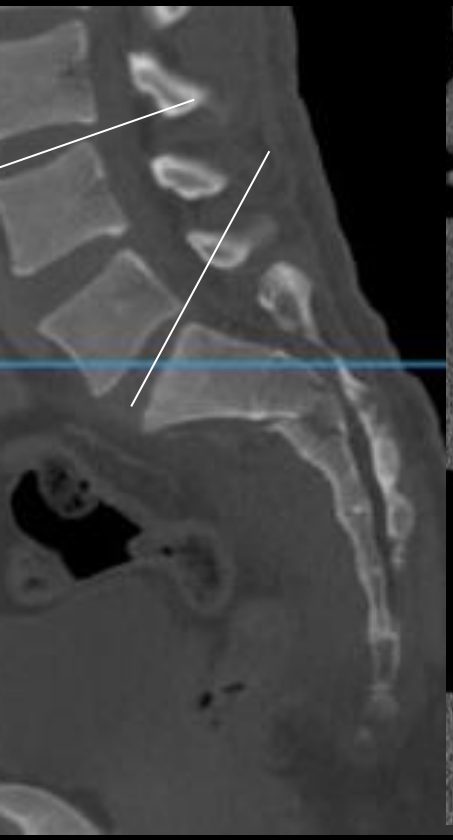
Reduction

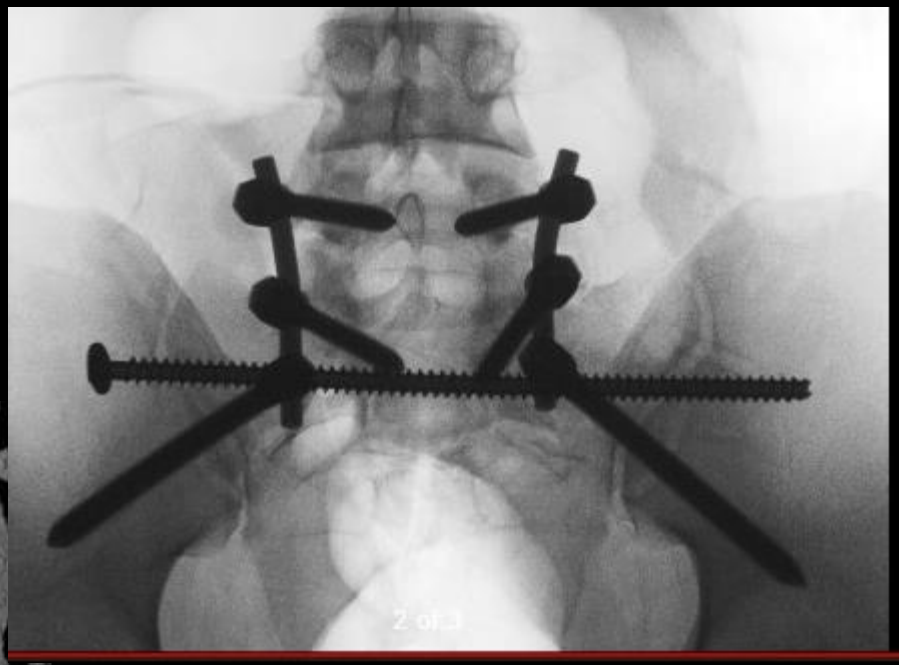


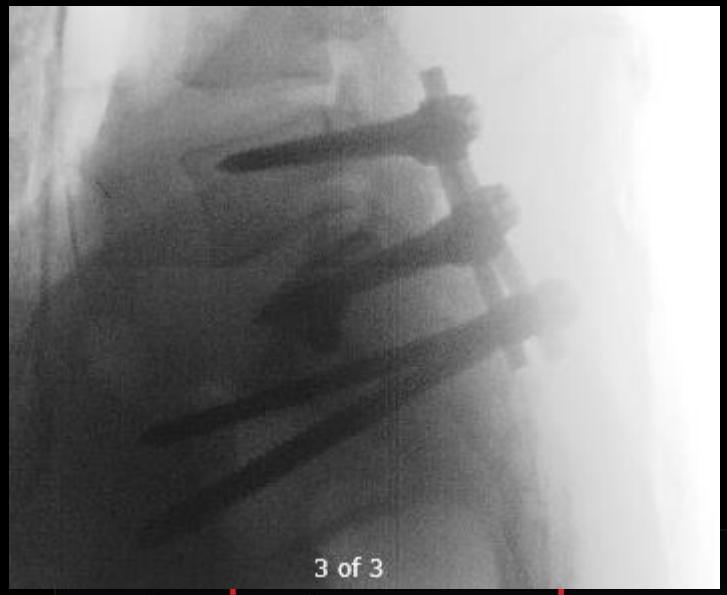
Short
Kyphosis

Reduction









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  - Displaced L5/S1 facet?

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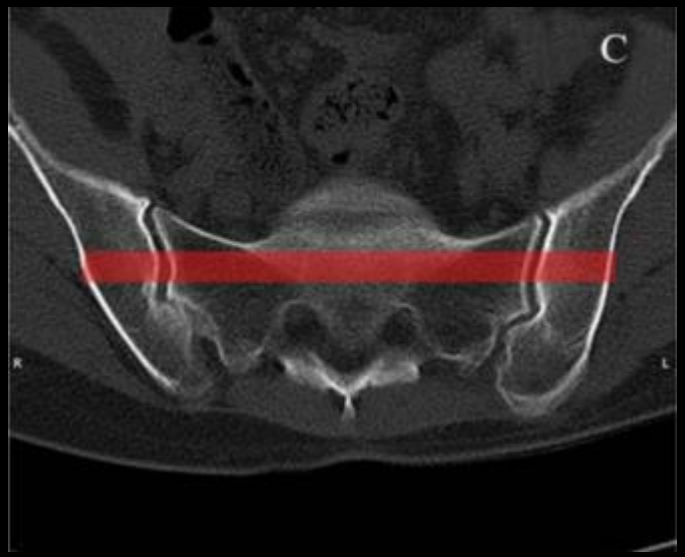
- How will we instrument?
  - Osseous corridors available (sacral dysmorphism?)
  - Percutaneous or open

Upper Sacral Segment Variability

Non Dysmorphic



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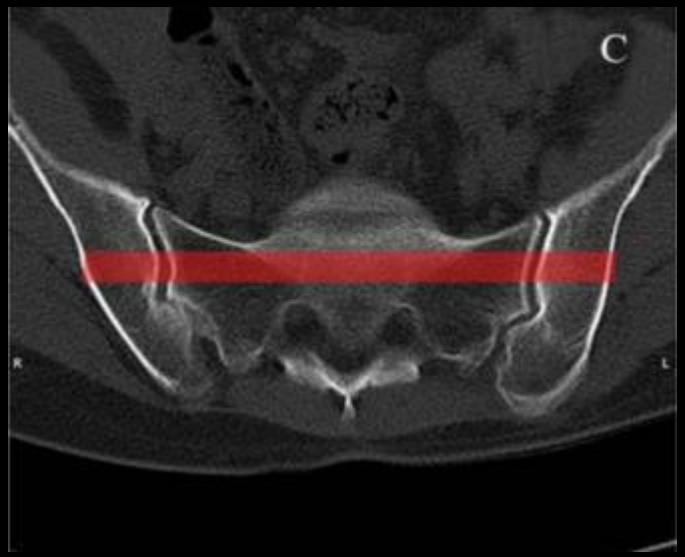
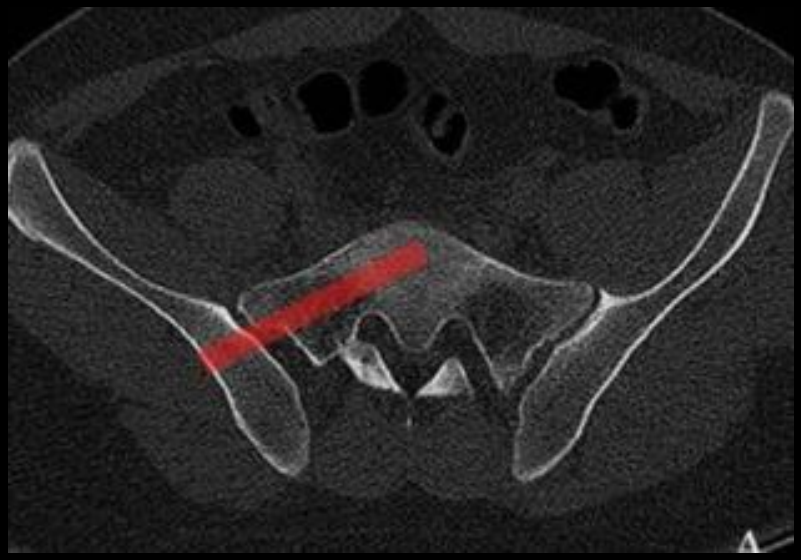


Dysmorphic



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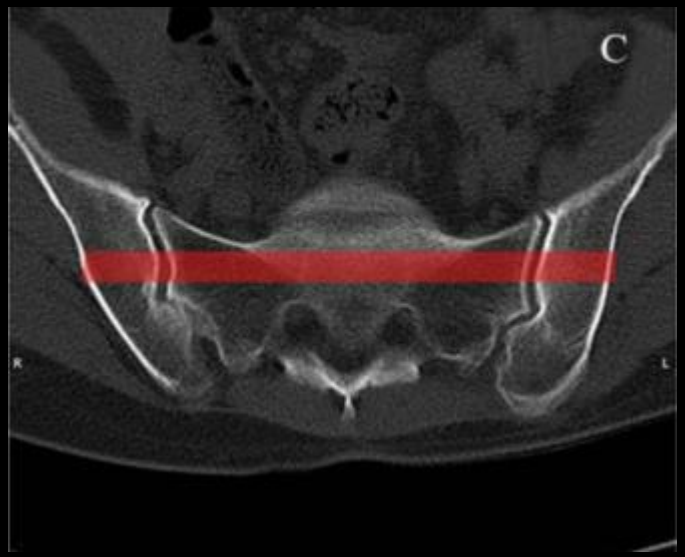
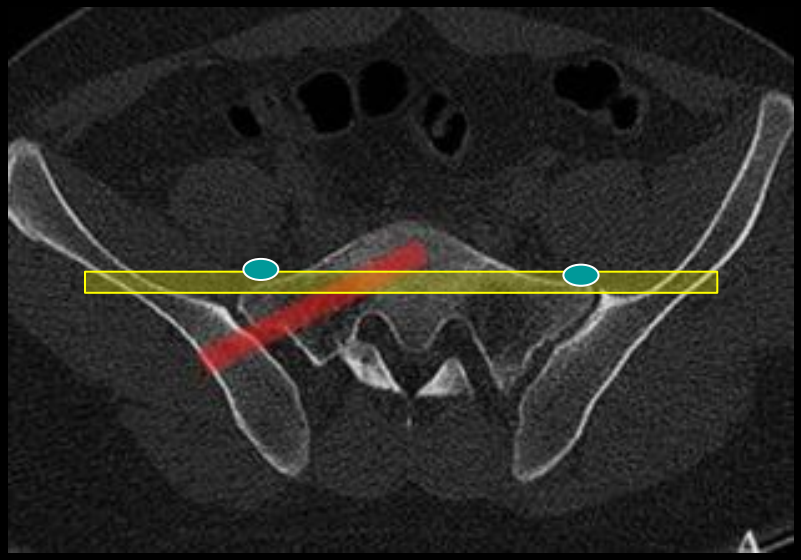


Dysmorphic



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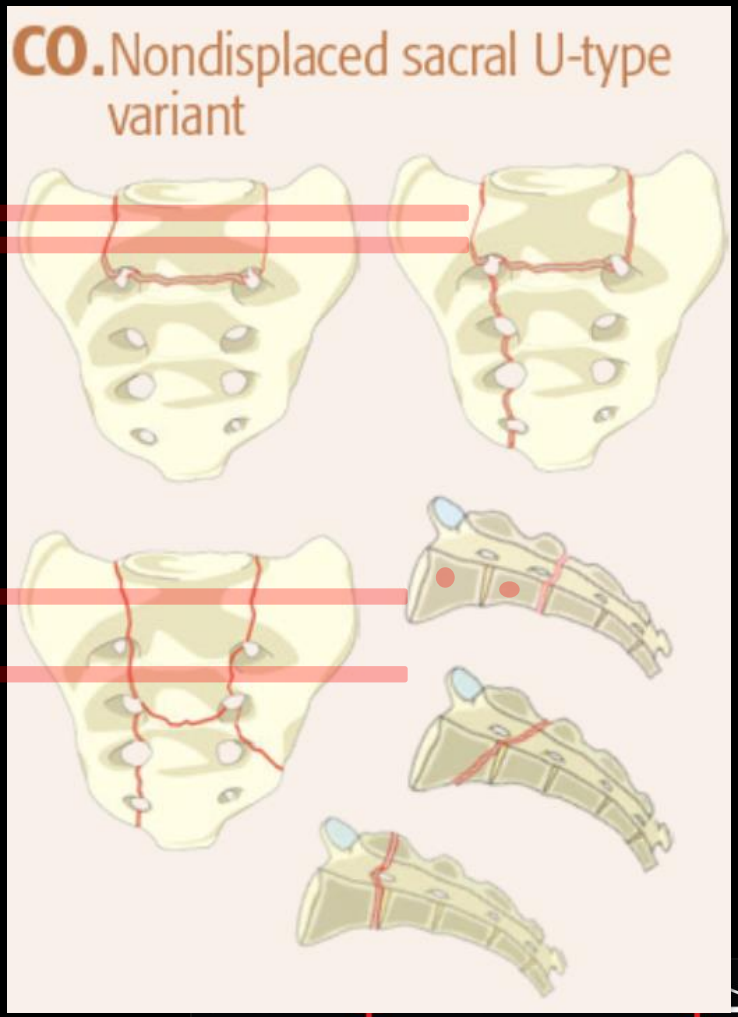
  - Displaced L5/S1 facet?
- How will we instrument?
  - Osseous corridors available (sacral dysmorphism?)
  - Percutaneous or open
- Weight bearing considerations?

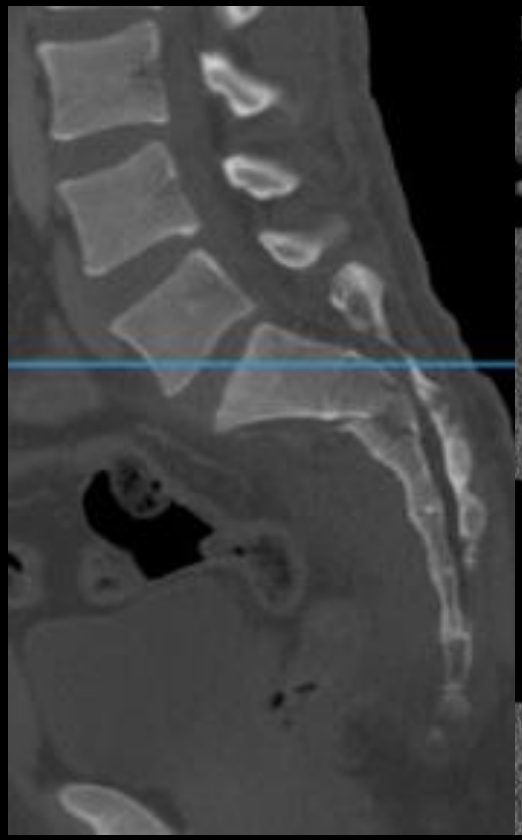
Minimally displaced fractures

- Generally treated with transiliactrans-sacral screws



Displaced fractures

- Generally treated with lumbopelvic fixation



Summary

- Wide spectrum of injuries
- Development of a comprehensive classification scheme
- Goals of fracture reduction and decompression of any compressed nerves

Thank You

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