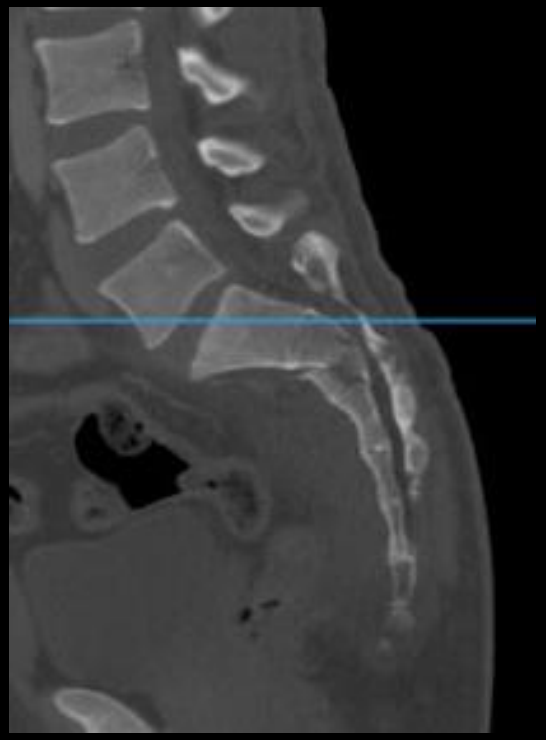
Spinopelvic Injuries: Recognition, Recommendations, and Treatment Options

Thursday, April 16, 2026



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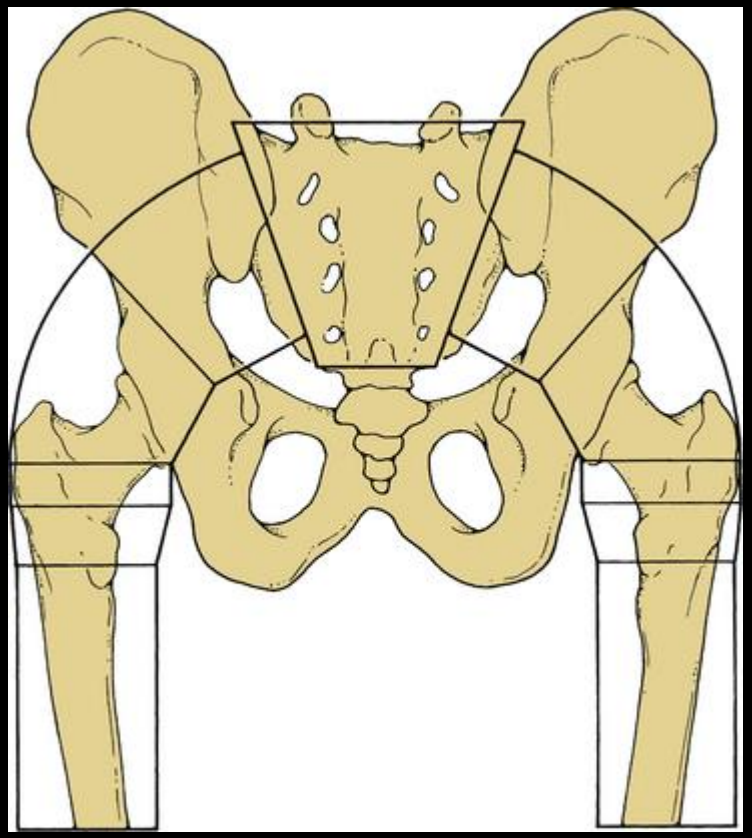
Spinopelvic Injury Patterns

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



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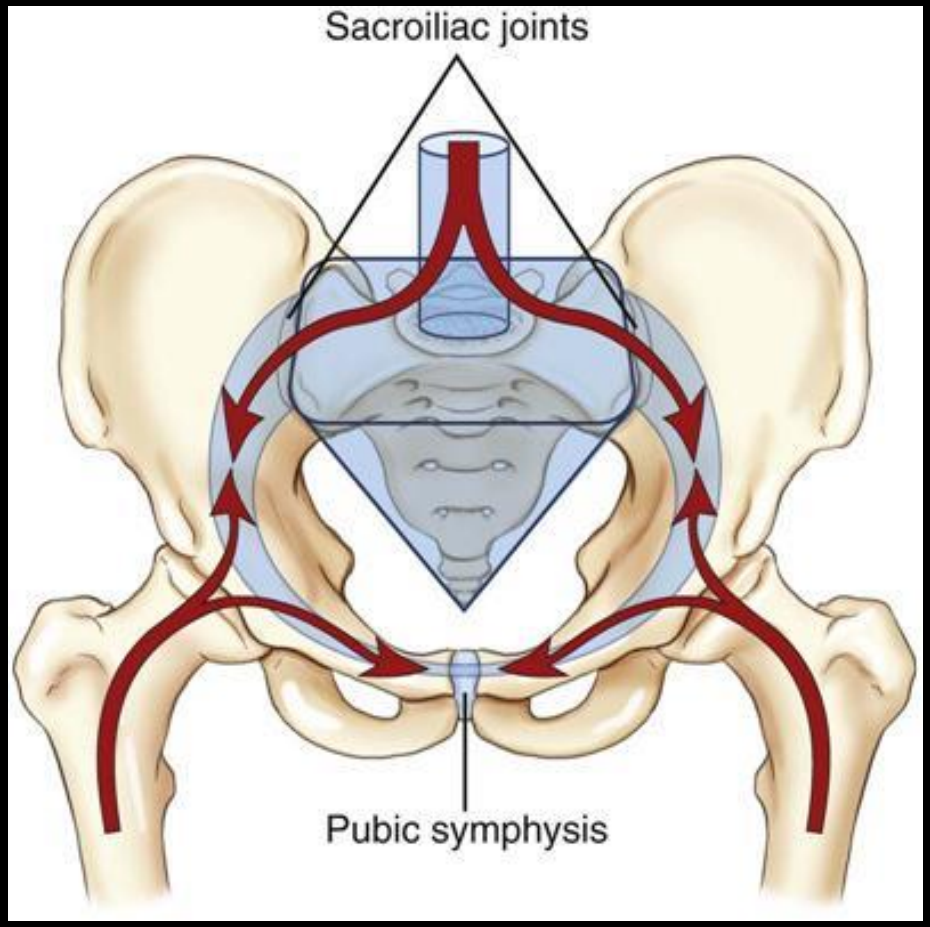
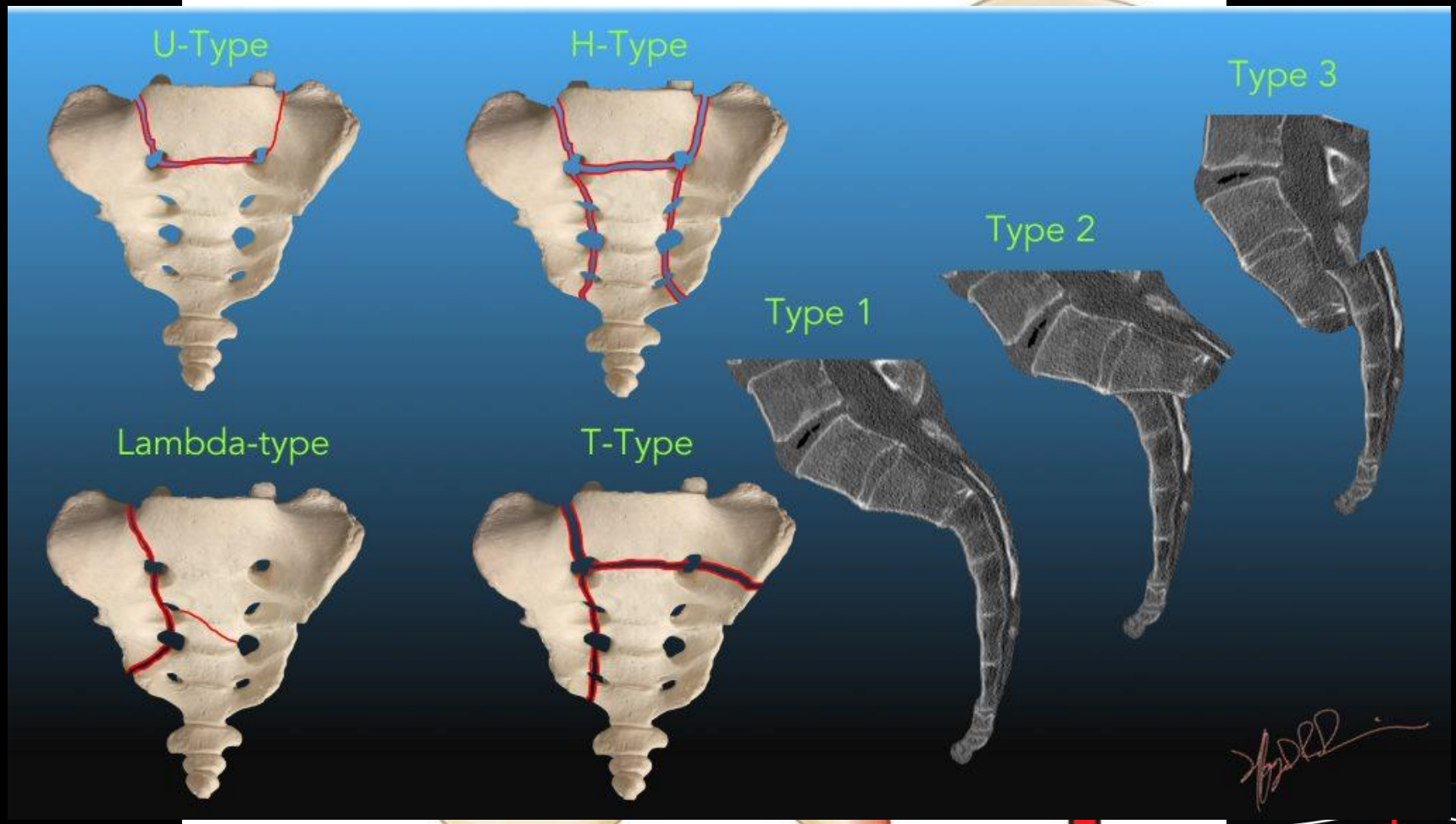


Spinopelvic Injury Patterns



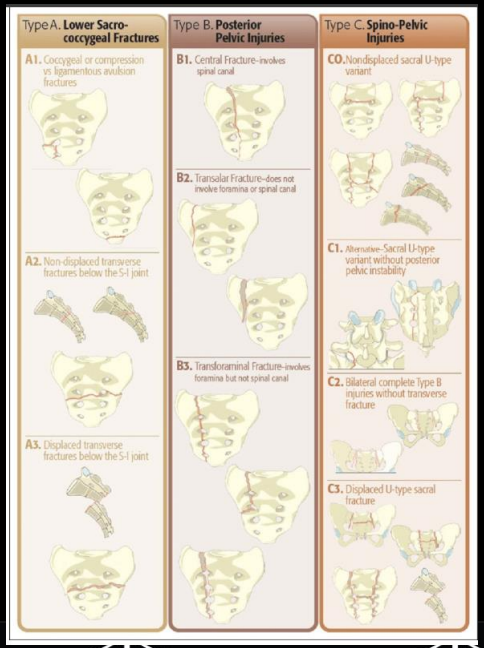
Objectives

1. Understand the salient clinical features of these injuries
2. Discuss the clinical factors that guide treatment for spinopelvic injuries
3. Understand to potential benefits of spinopelvic fixation

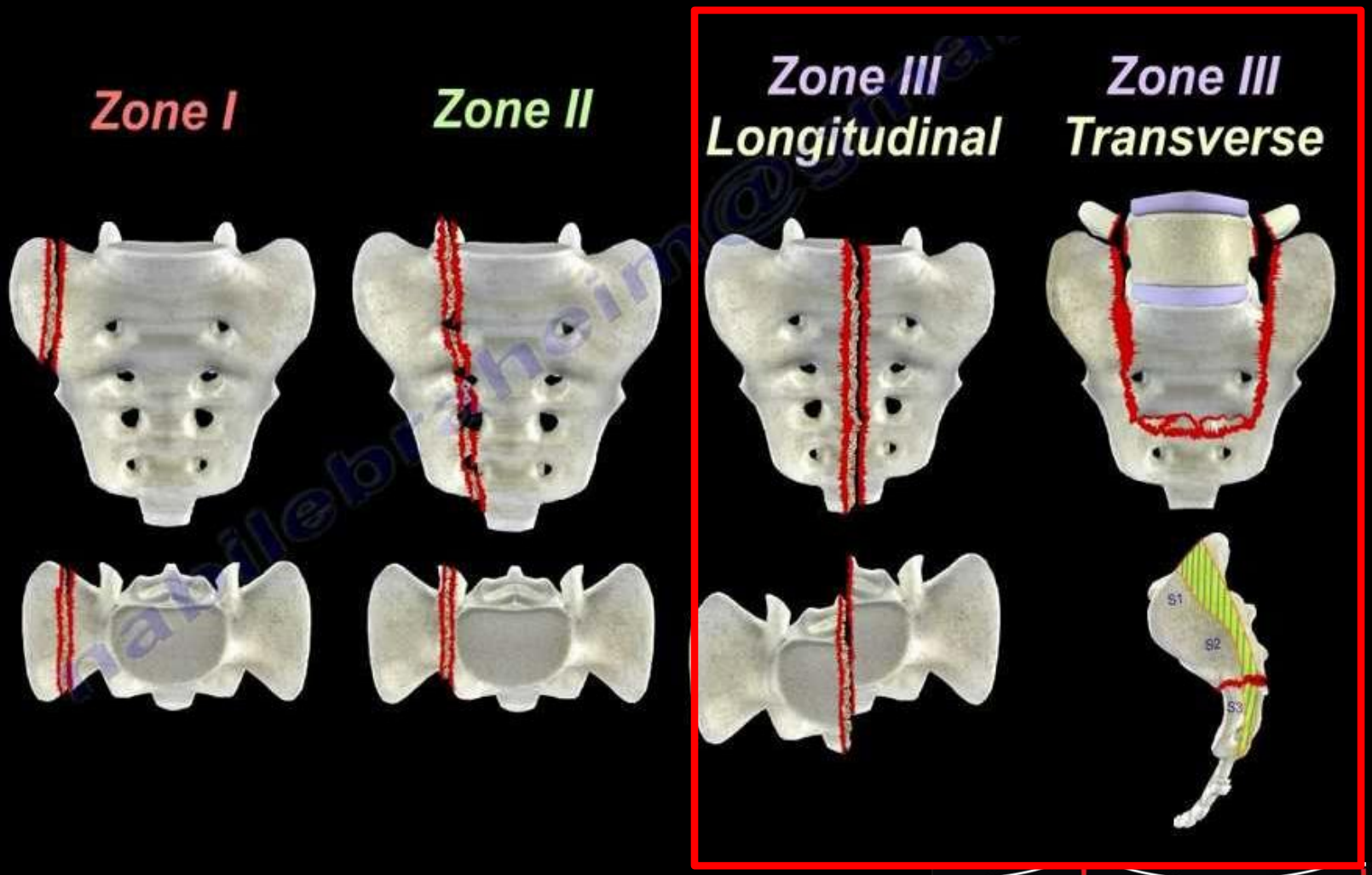
Classification Systems

- Denis Classification
- Isler Classification
- Roy Camille classification

AOSpine Sacral Classification

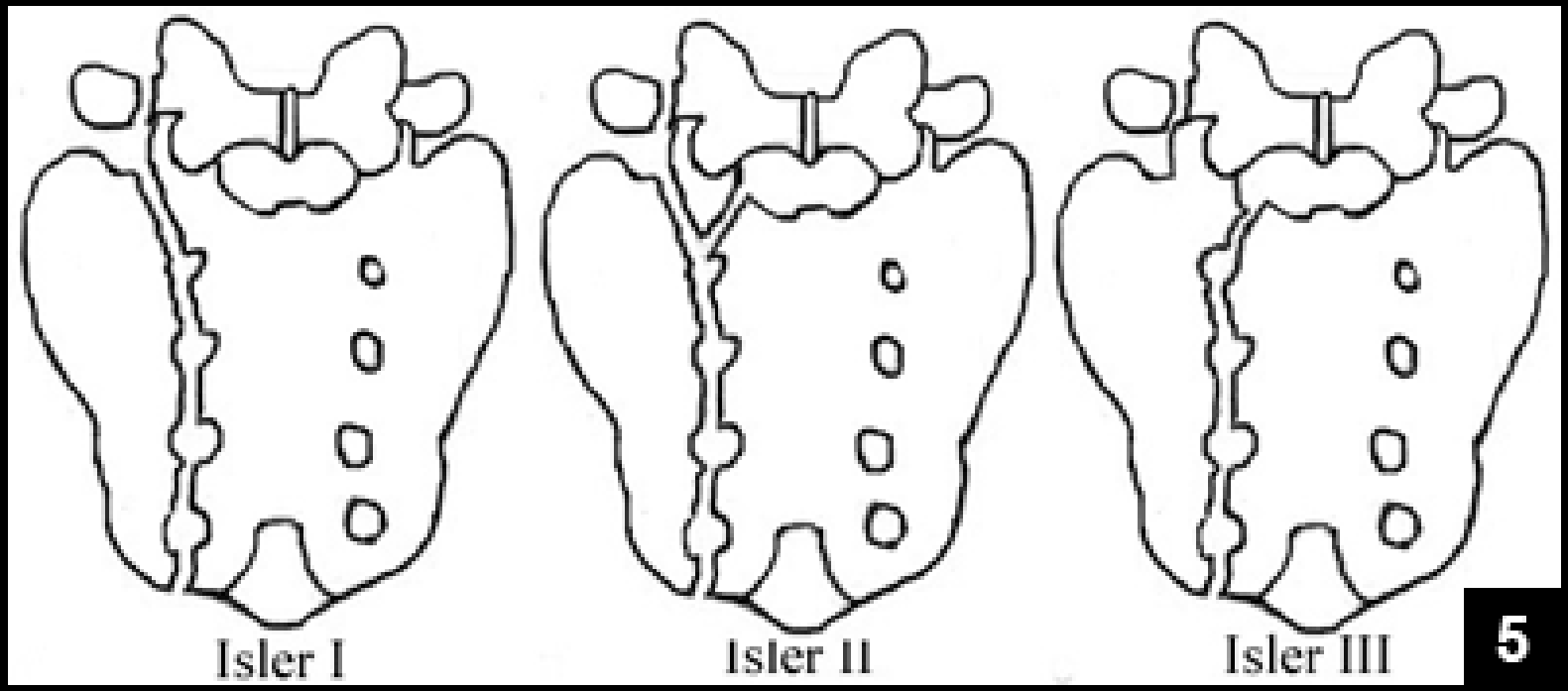


Denis Classification



Outcome: Neurologic injury

Isler Classification



Outcome: Lumbosacral stability

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Lumbosacral Lesions Associated with Pelvic Ring Injuries

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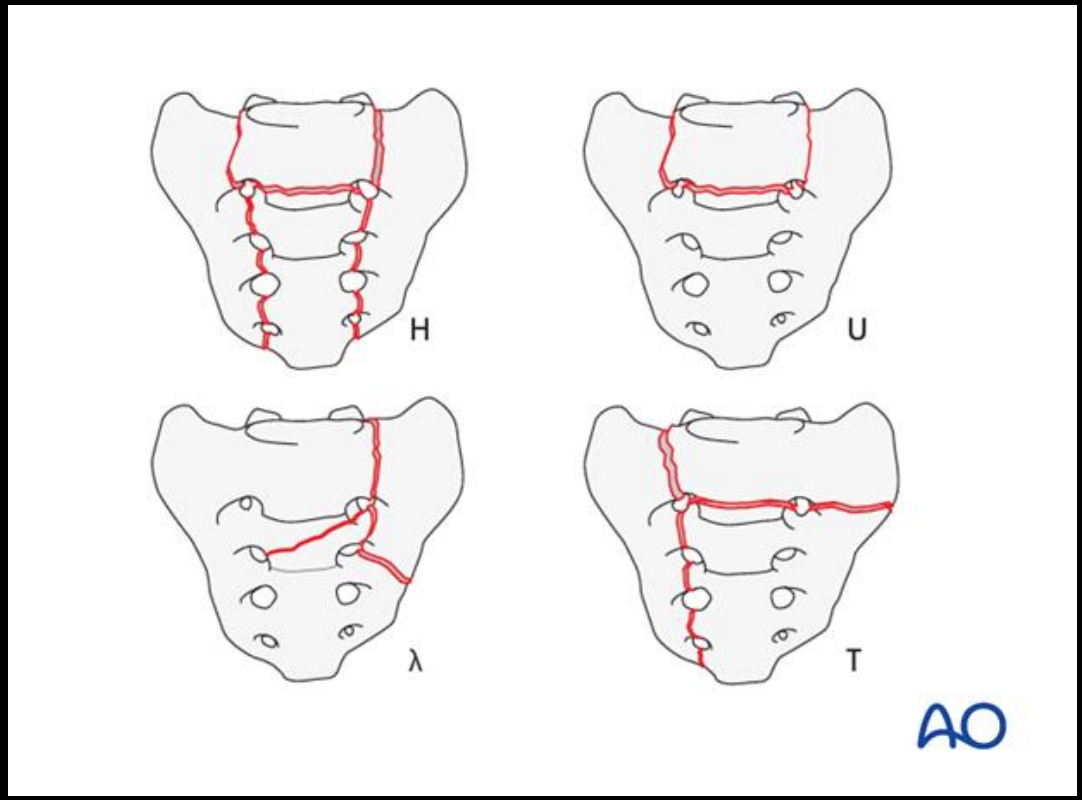
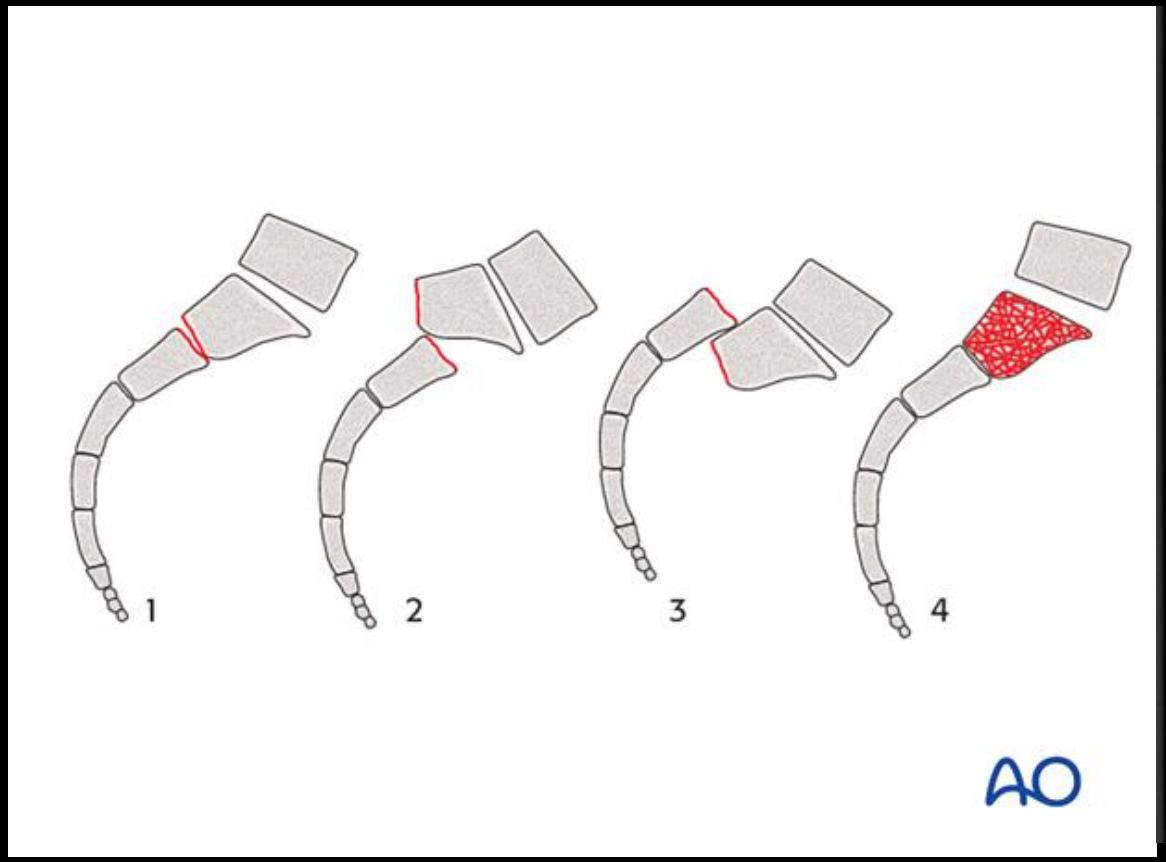
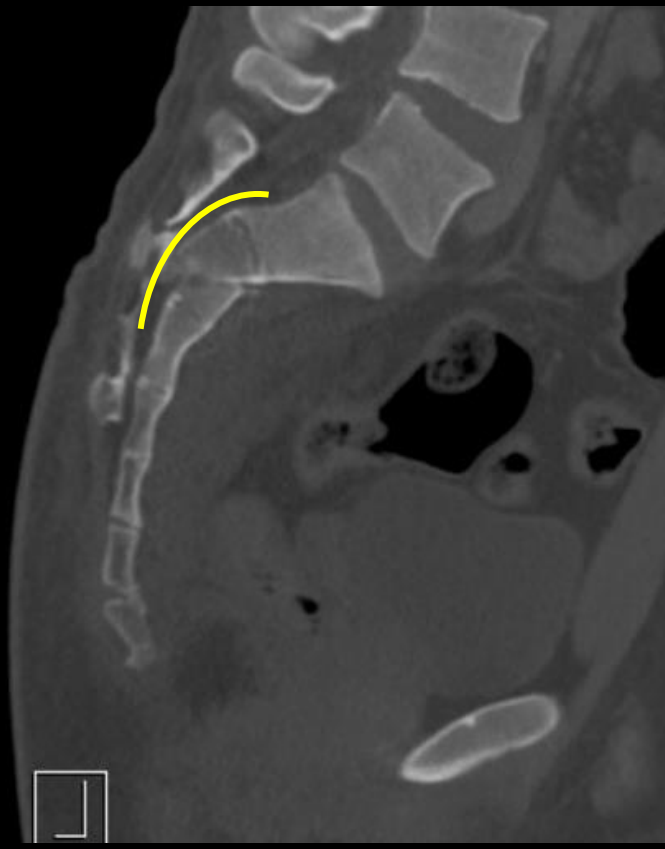
Descriptive Classification

- Transverse Zone III fractures

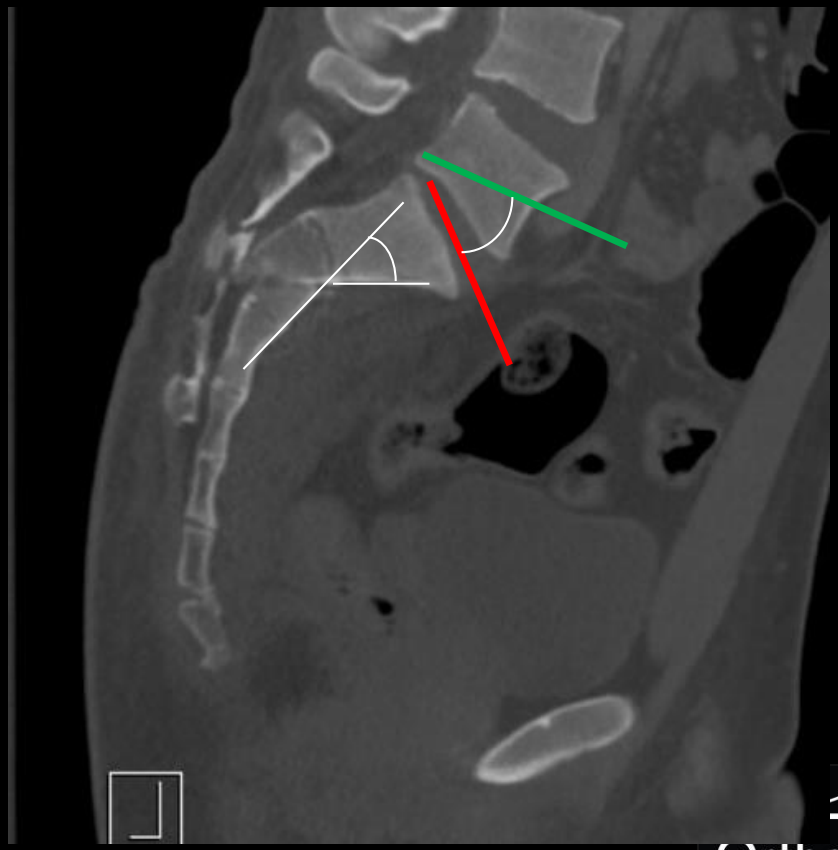


Roy- Camille Classification





Sacral Kyphosis

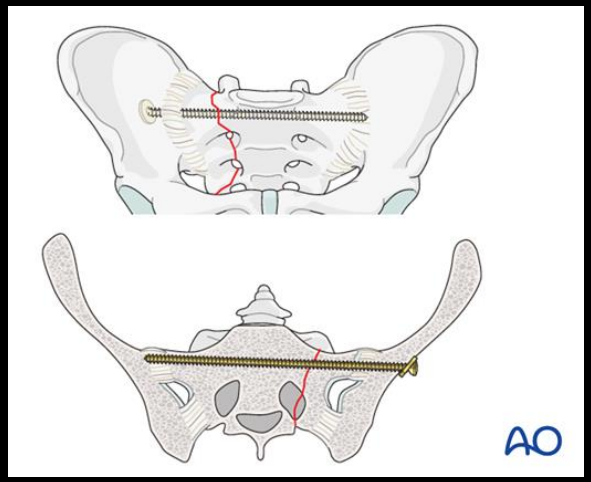


When to call spine?

1. Neurologic deficits (bowel/ bladder deficits, perianal sensory changes)
2. Significant sacral kyphosis
3. Displaced facet fracture
4. **Supplemental fixation to enable weight bearing after pelvic ring fixation**

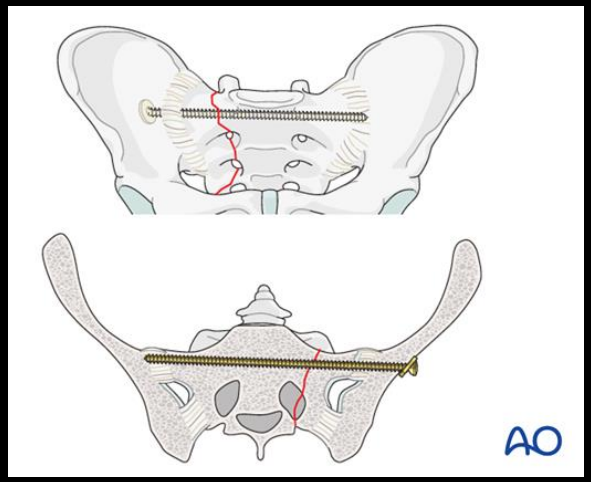
Operative Treatments

Iliosacral screw fixation



Operative Treatments

Iliosacral screw fixation



Posterior lumbopelvic fixation

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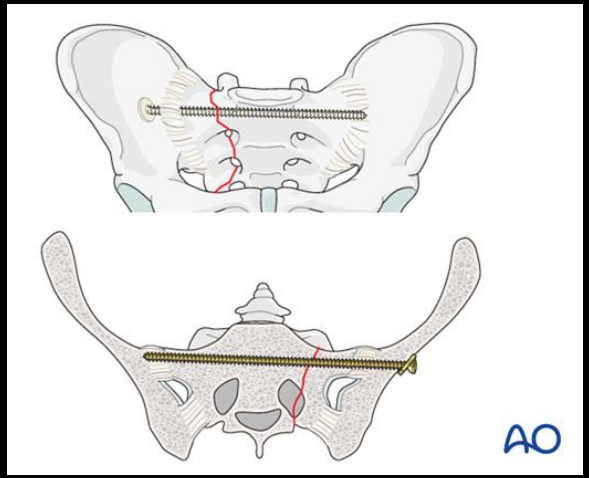
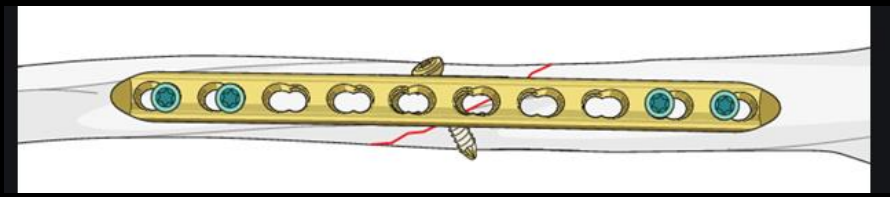
Iliosacral Screw Fixation

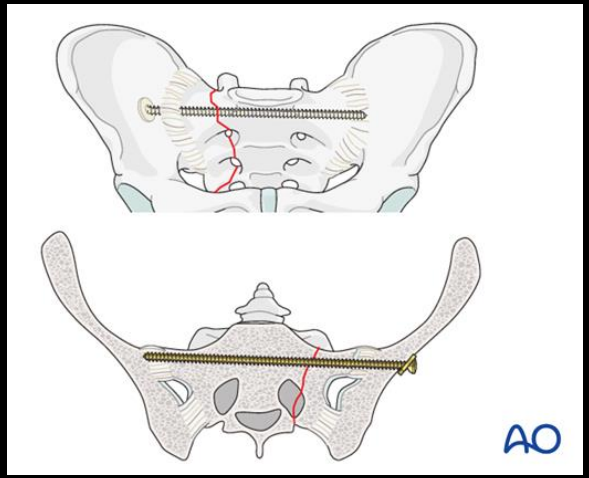
- Pros
  - Safe
  - Minimally invasive
  - Prone or supine
  - Fracture compression

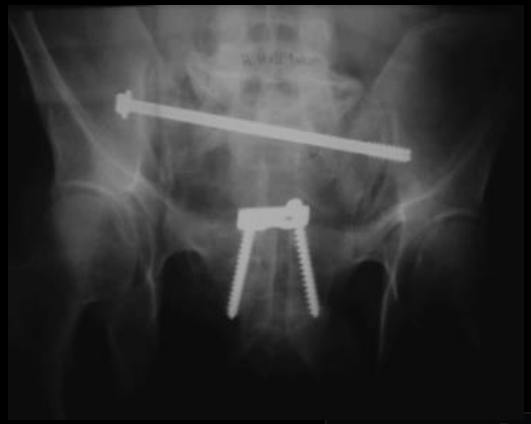




Iliosacral Screw Fixation

- Pro
  - Safe
  - Minimally invasive
  - Prone or supine
  - Fracture compression
- Con
  - Poor at resisting shear forces
  - Need good fluoro 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

Spinopelvic Fixation

Spinopelvic fixation

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

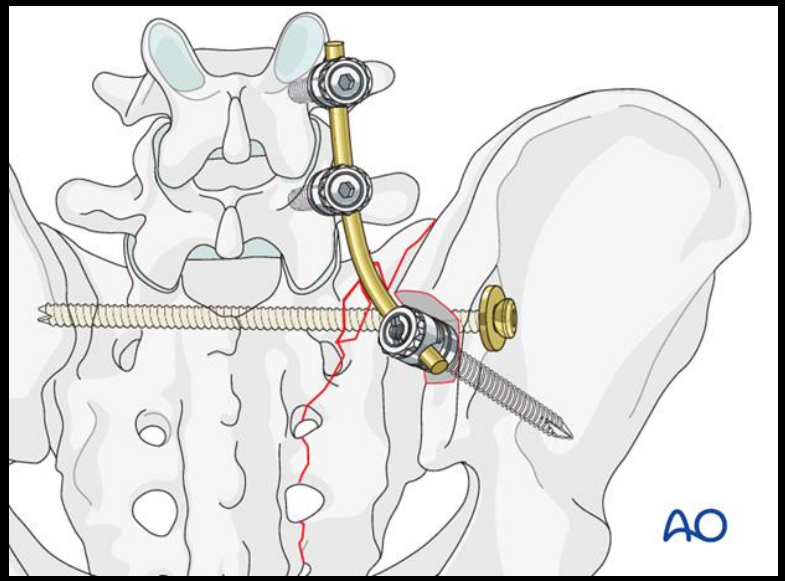
Spinopelvic fixation

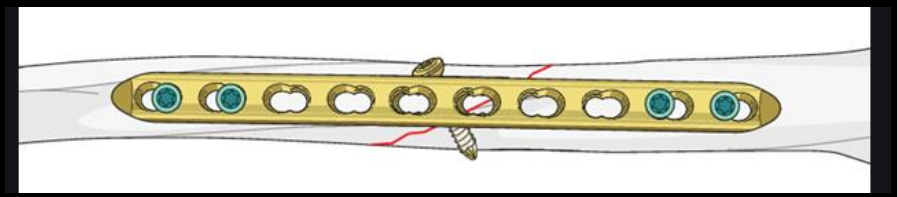
Spinopelvic fixation

- 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 (if extended up to lumbar spine)
  - Increased hardware irritation (technique dependent)
  - Necessitates prone position
  - Posterior incision may overly Morel lesion

Triangular osteosynthesis

- Combined techniques
  - LPF acts like neutralization plate





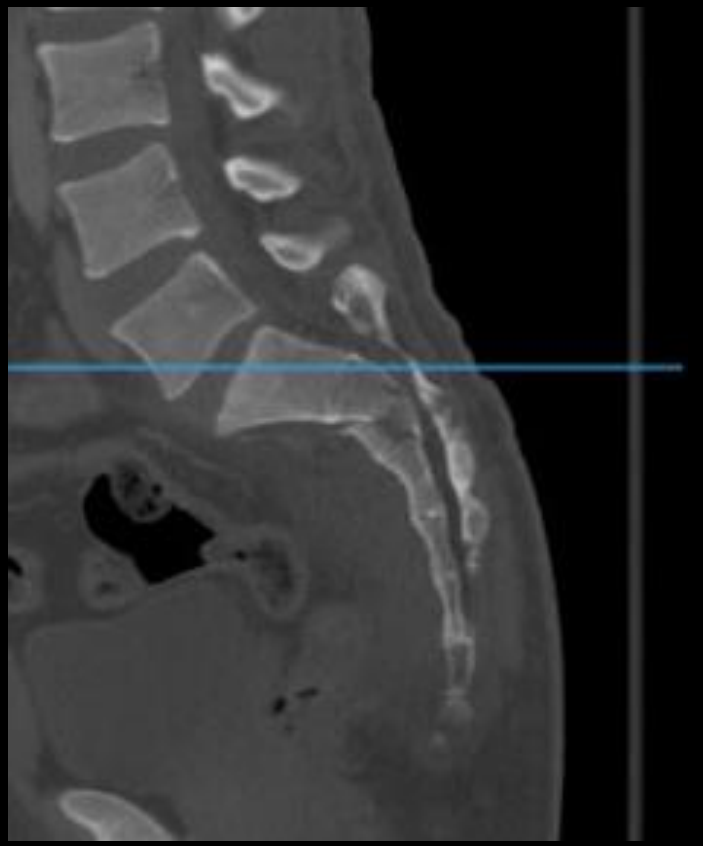
Goals of Treatment

- 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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Choosing a Fixation Strategy?

- Is a neurologic decompression needed?
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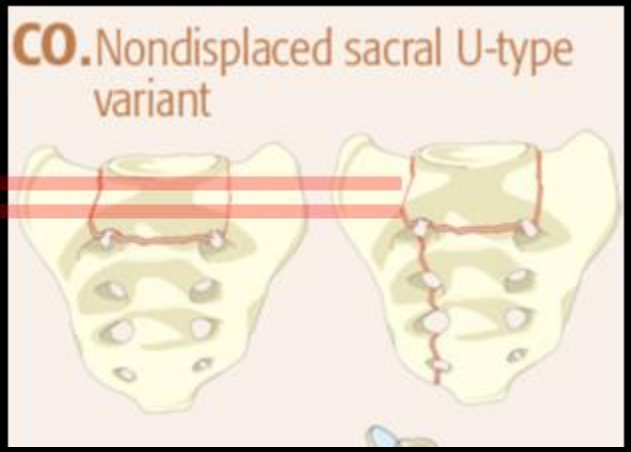
- How will we reduce the fracture?
  - Closed
  - Percutaneous
  - Open



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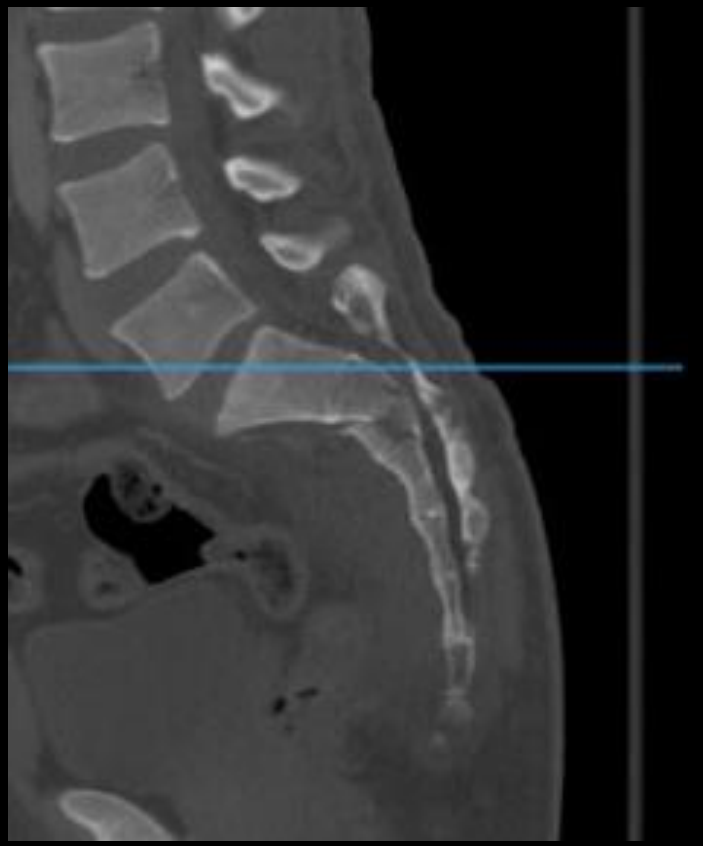

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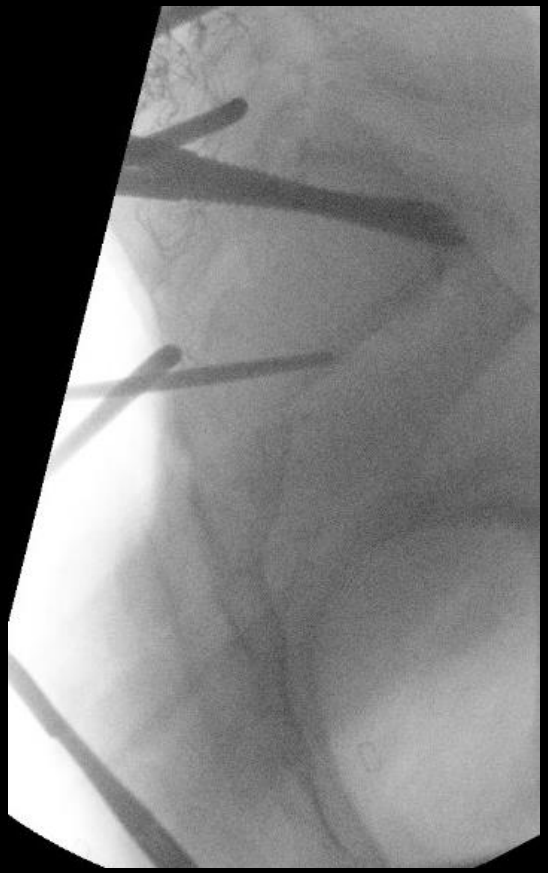
Case # 1: H type with Sacral Kyphosis



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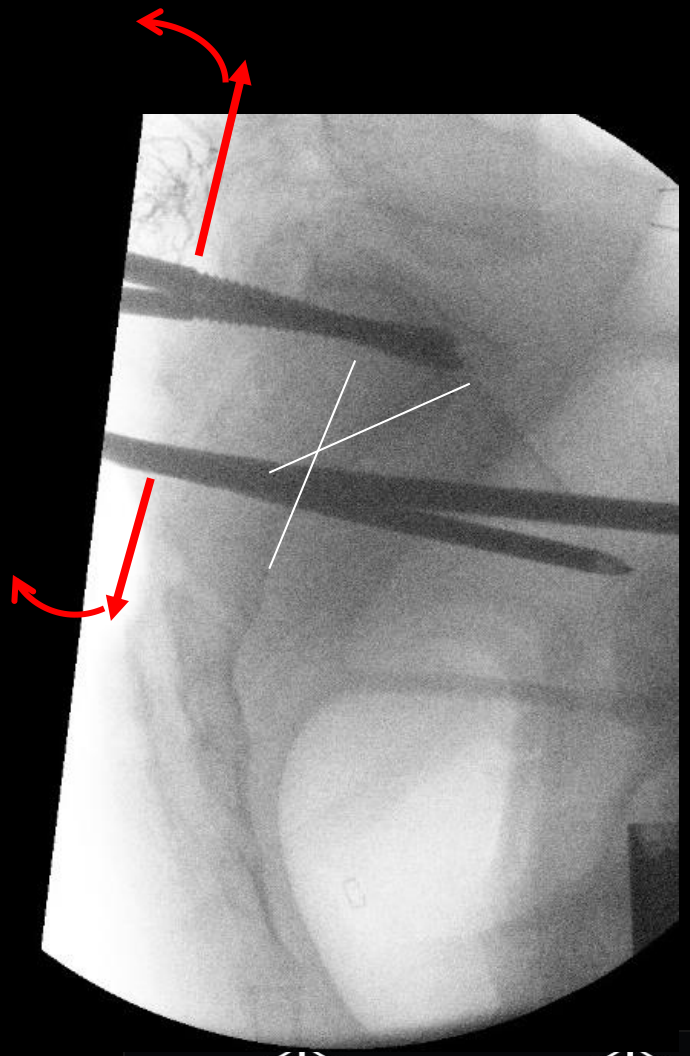
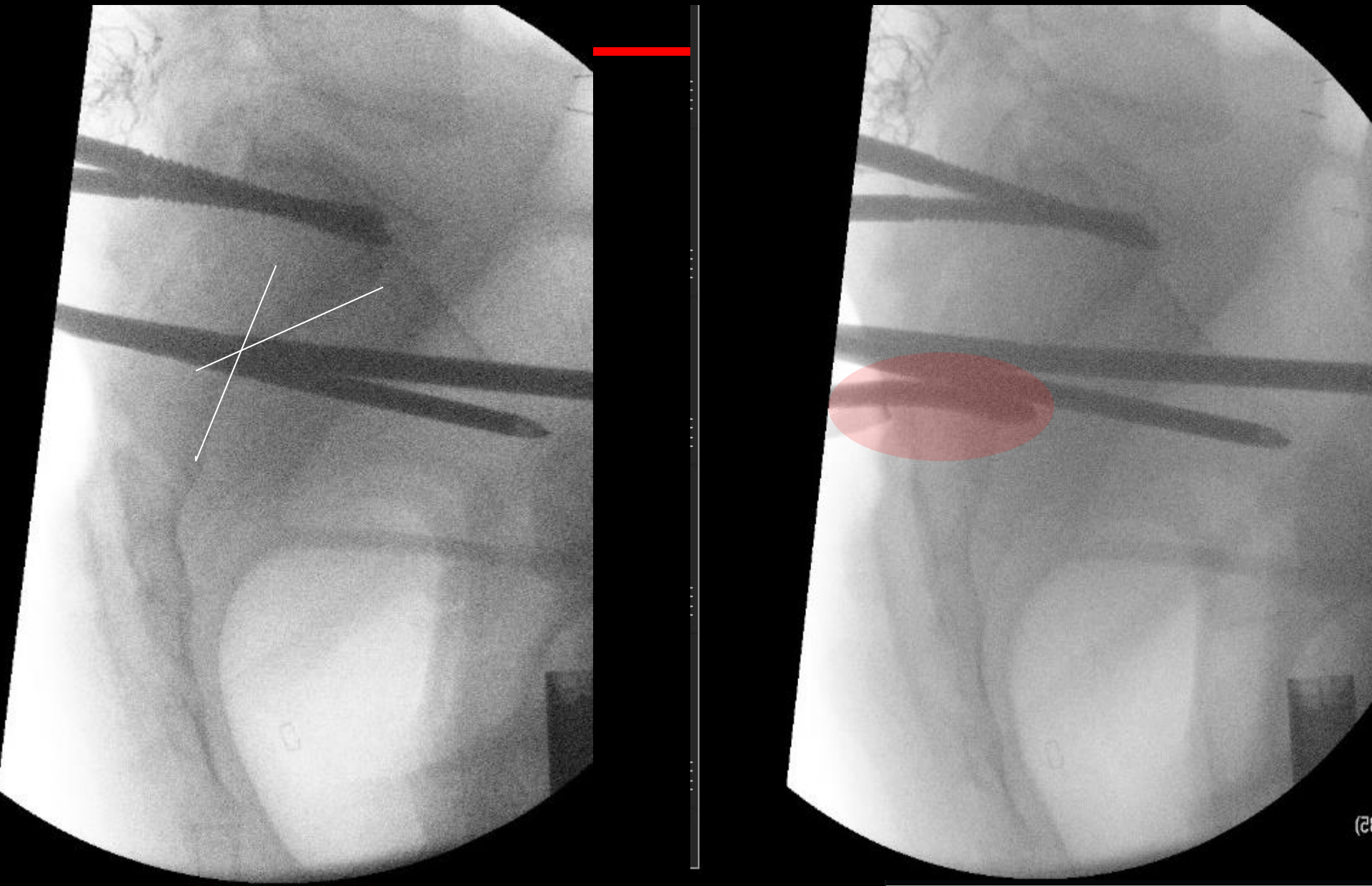
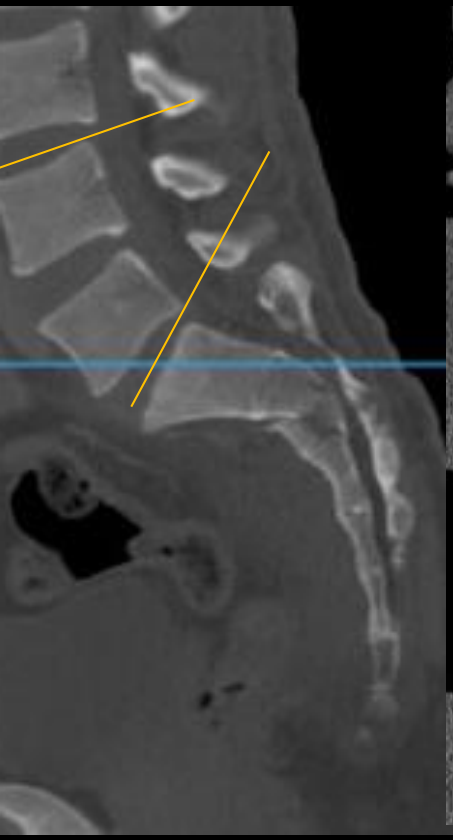
Reduction

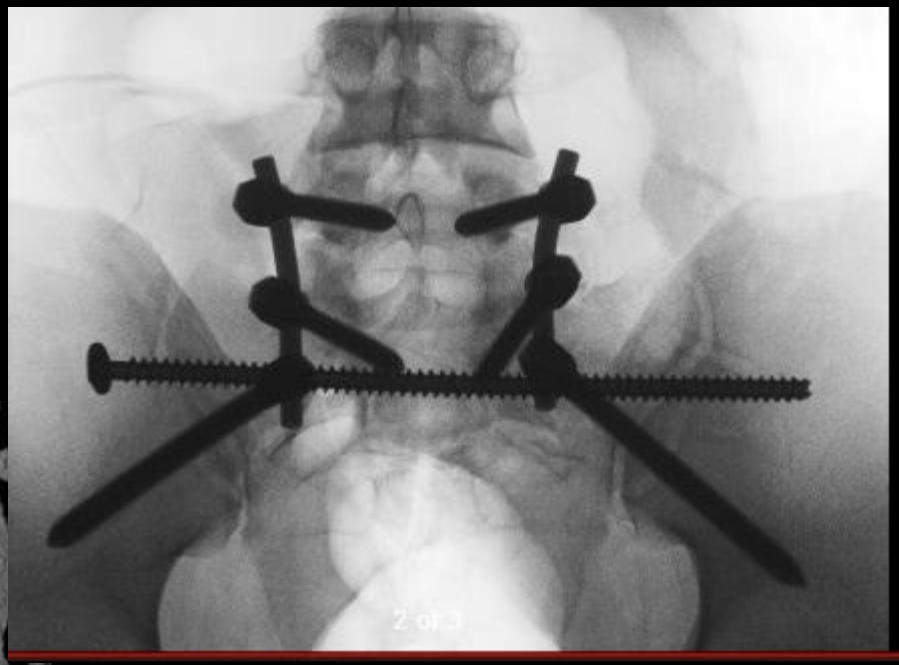


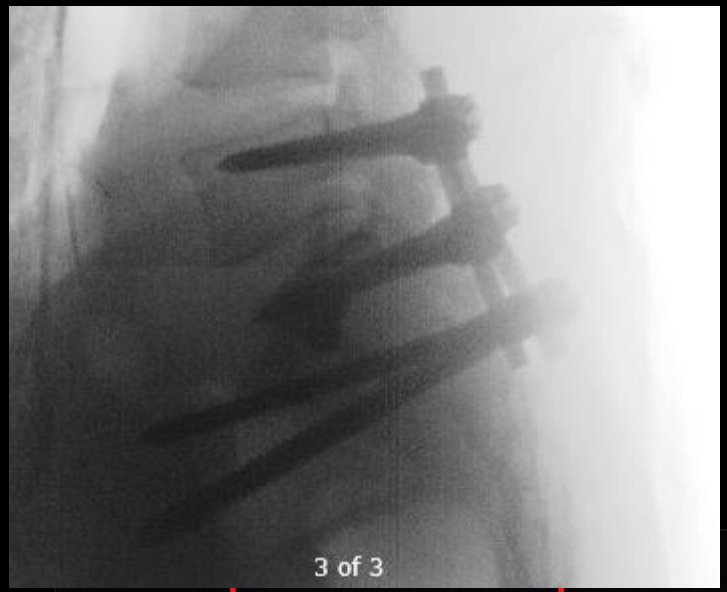
Short
Kyphosis

Reduction









Compensatory Lumbar Lordosis

Choosing a fixation strategy?

- Is a neurologic decompression needed?
  - Ongoing nerve compression?
- How will we reduce the fracture?
  - Closed
  - Percutaneous
  - Open
- Do we need to fuse lumbosacral junction
  - Displaced L5/S1 facet?

Choosing a fixation strategy?

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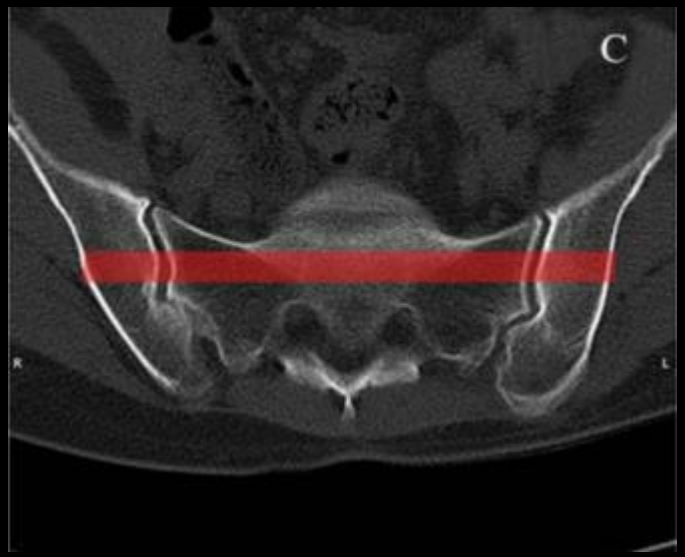
  - Open
- Do we need to fuse lumbosacral junction?
  - Displaced L5/S1 facet?
- How will we instrument?
  - Osseous corridors available (sacral dysmorphism?)
  - Percutaneous or open

Upper Sacral Segment Variability

Non Dysmorphic



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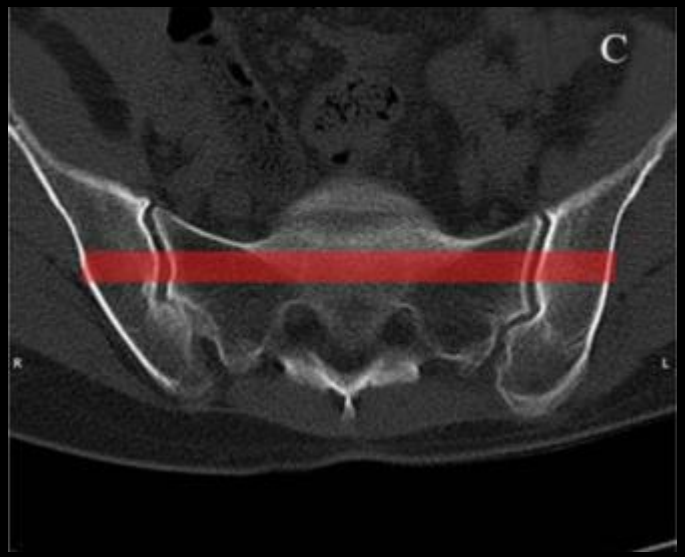
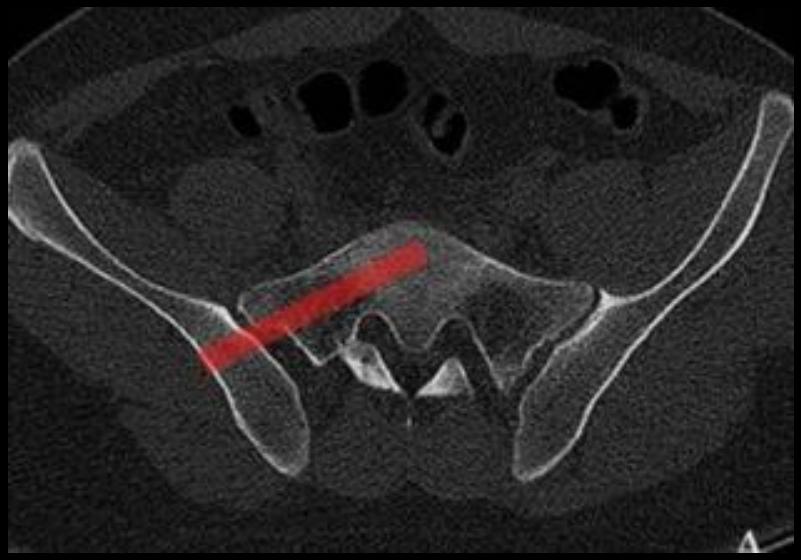


Dysmorphic



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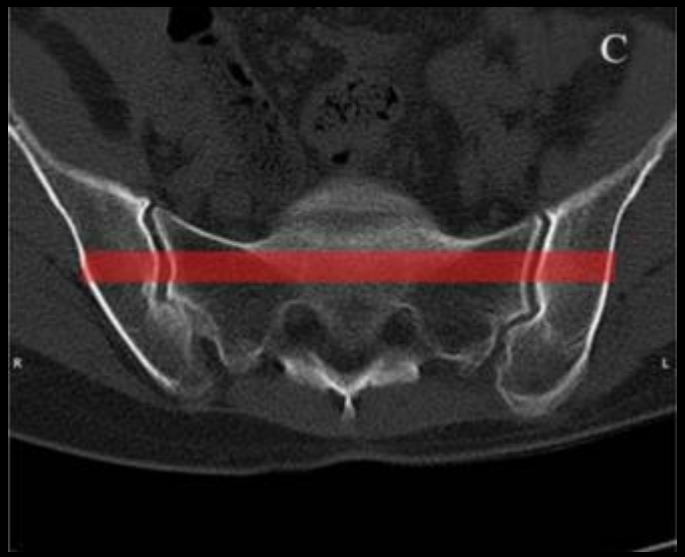
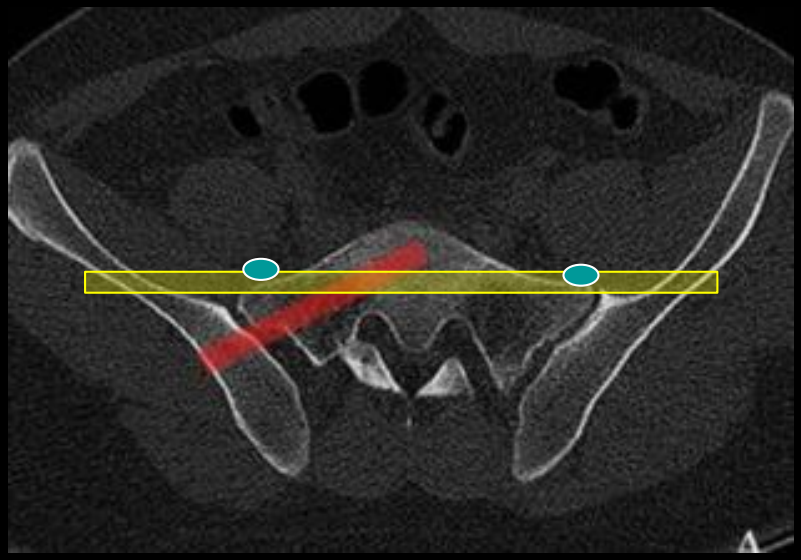


Dysmorphic



Choosing a fixation strategy?

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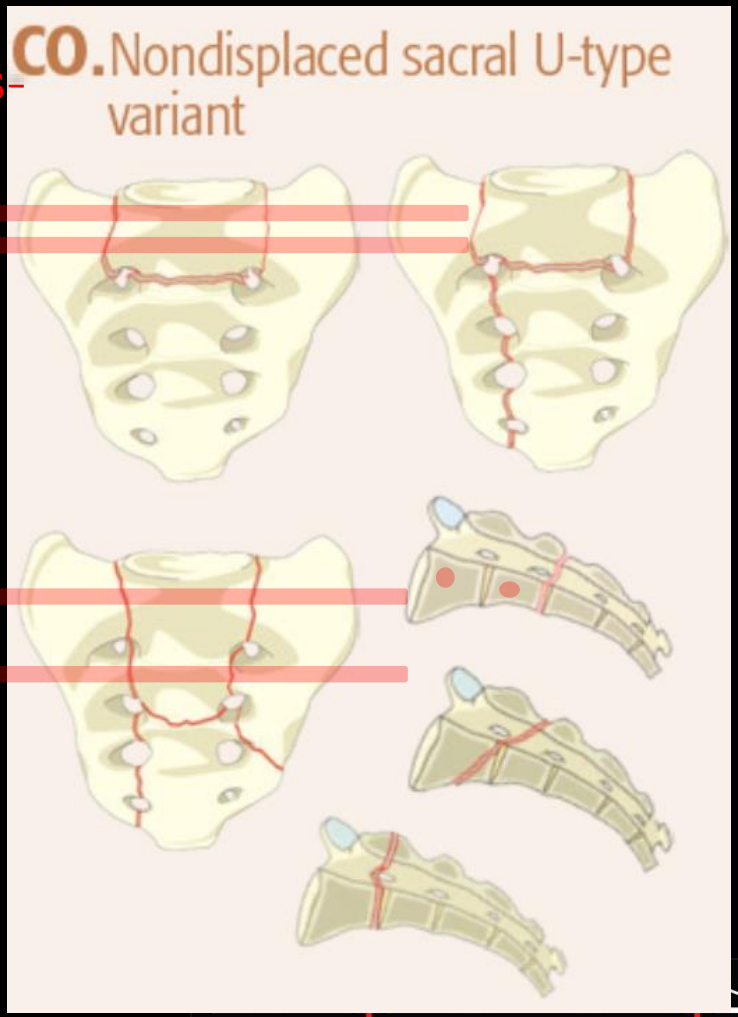
  - Ongoing nerve compression?
- How will we reduce the fracture?
  - Closed
  - Percutaneous
  - Open
- Do we need to fuse lumbosacral junction?
  - Displaced L5/S1 facet?
- How will we instrument?
  - Osseous corridors available (sacral dysmorphism?)
  - Percutaneous or open
- Weight bearing considerations?

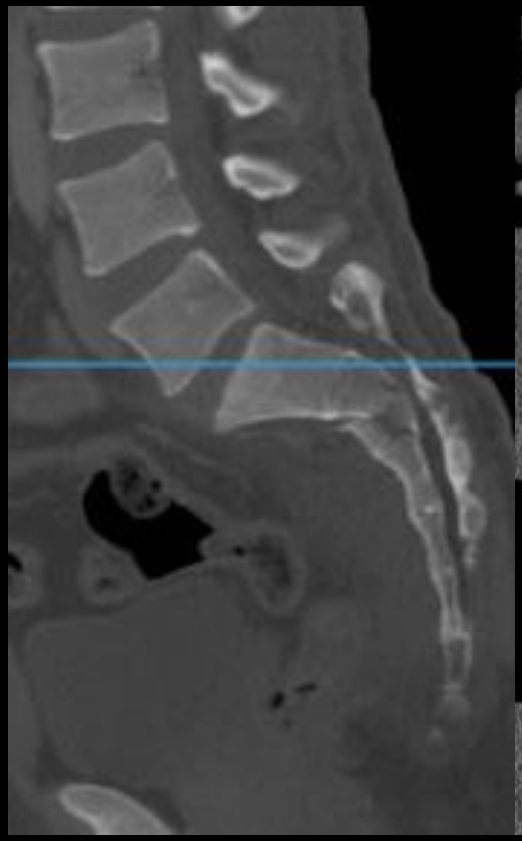
Minimally Displaced Fractures

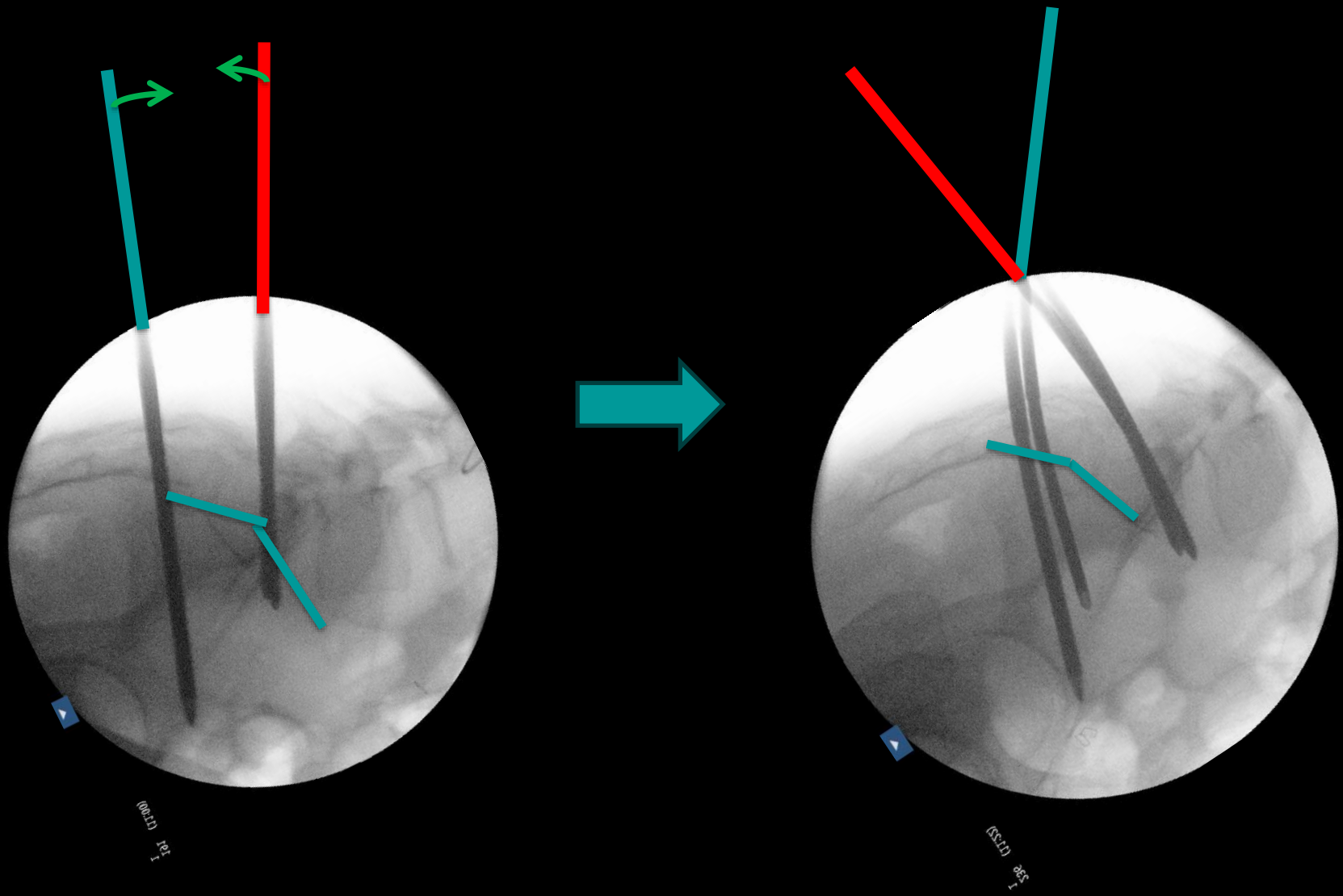
- Generally treated with transiliac trans-sacral screws



Displaced Fractures

- Generally treated with lumbopelvic fixation





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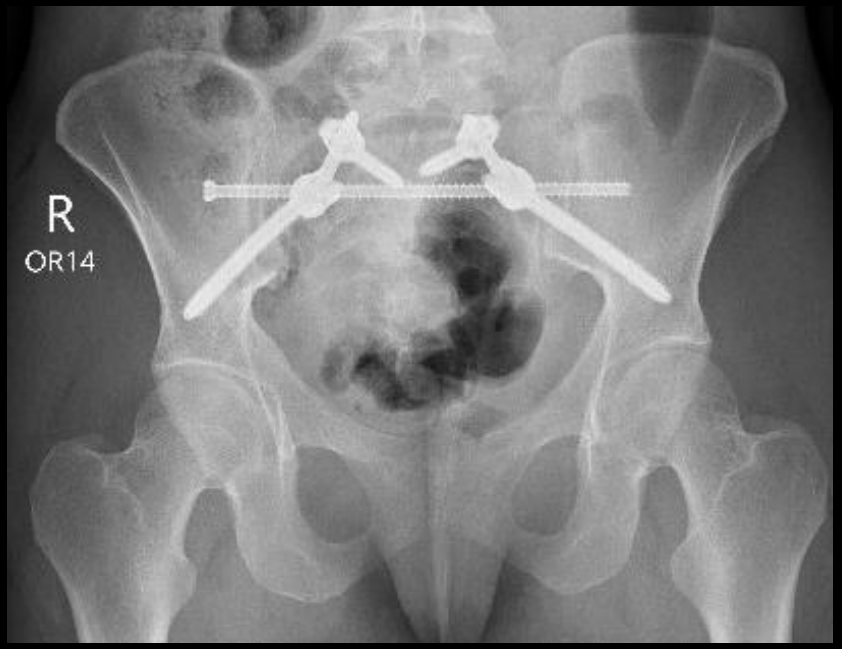
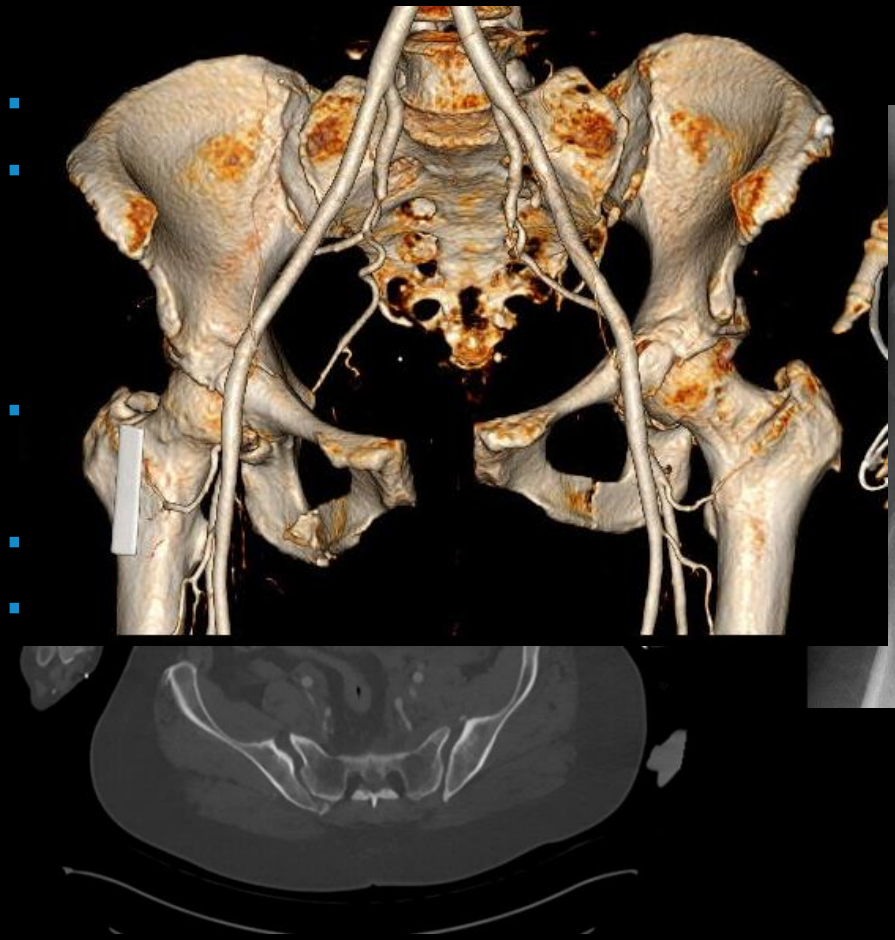


Case Example: Spinopelvic Instrumentation As Supplemental Fixation



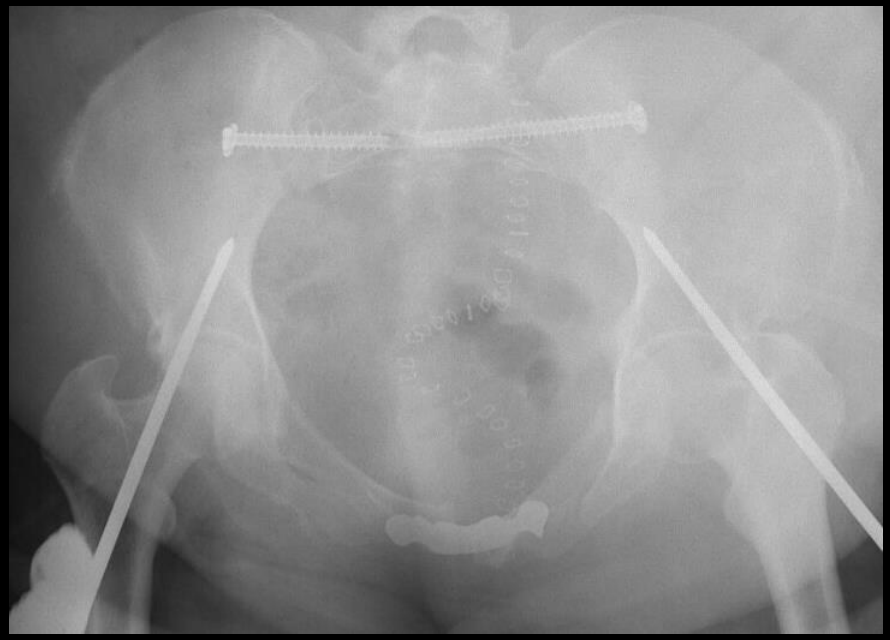
Case example: Spinopelvic Instrumentation As Supplemental Fixation

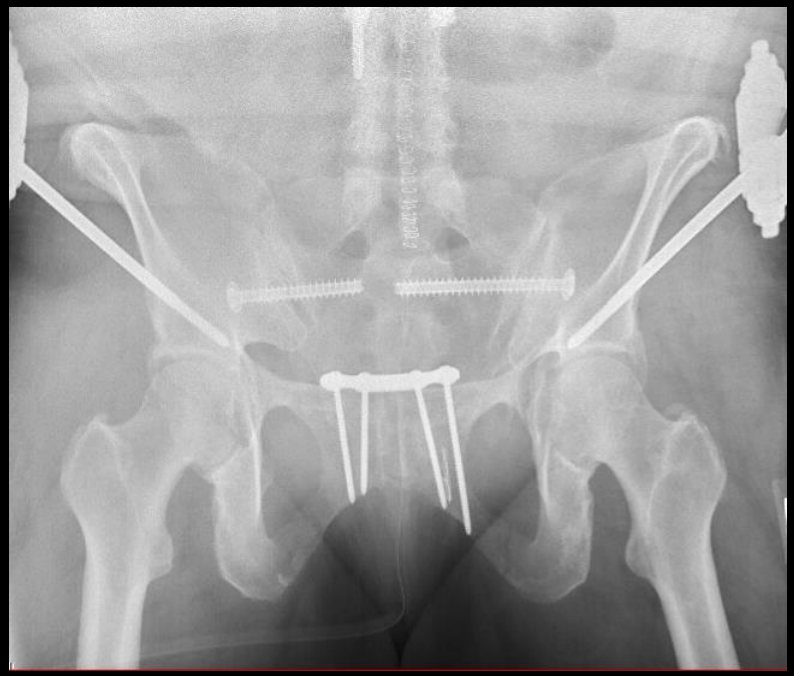
- Initial management
  - Perineal wound washout
  - Ex fix
  - IR embolization
  - Anticipatory colostomy
  - T12 Chance fracture fixation (NSG)

Case Example: Spinopelvic Instrumentation As Supplemental Fixation

Hospital Day 7

To OR for pelvic stabilization





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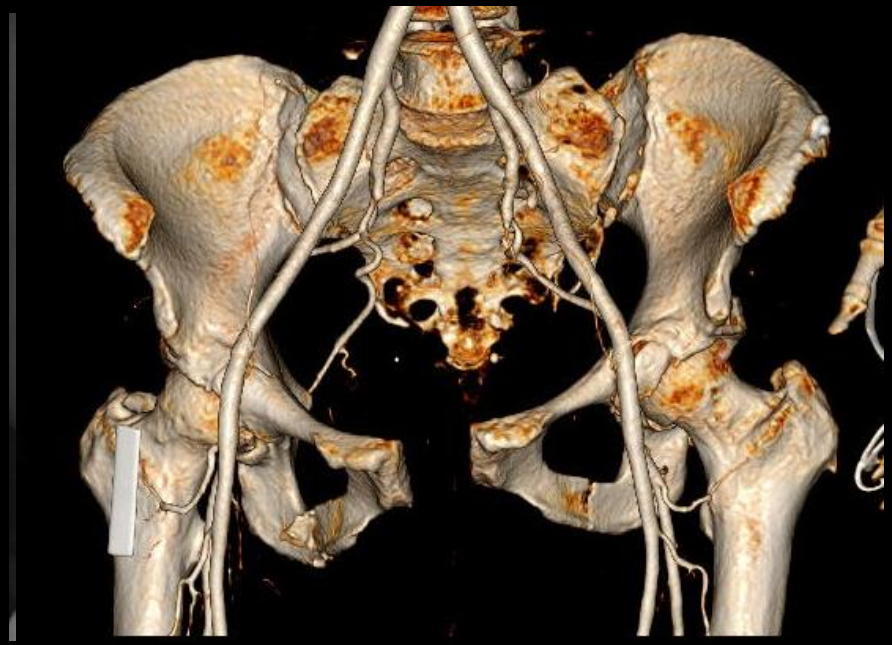
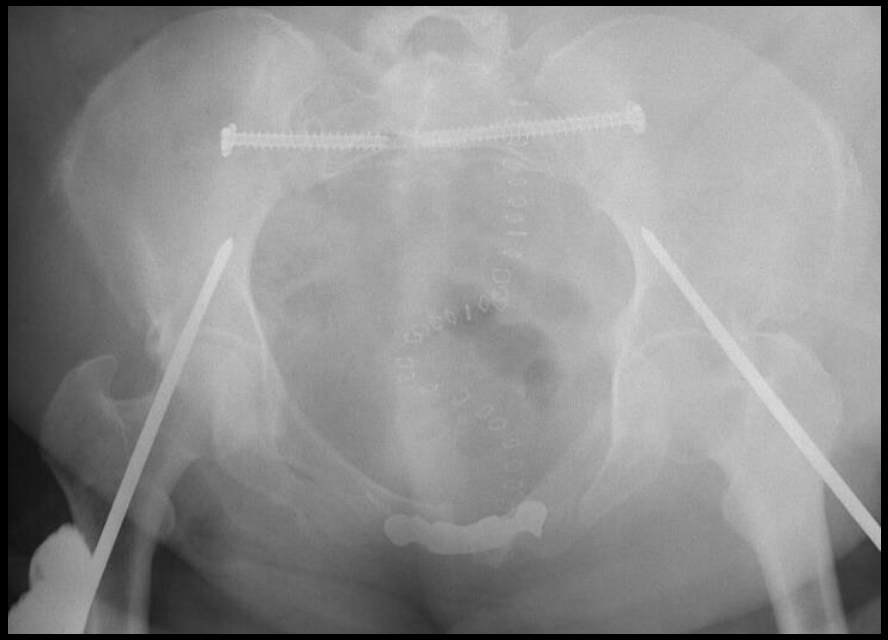


Case Example: Spinopelvic Instrumentation As Supplemental Fixation

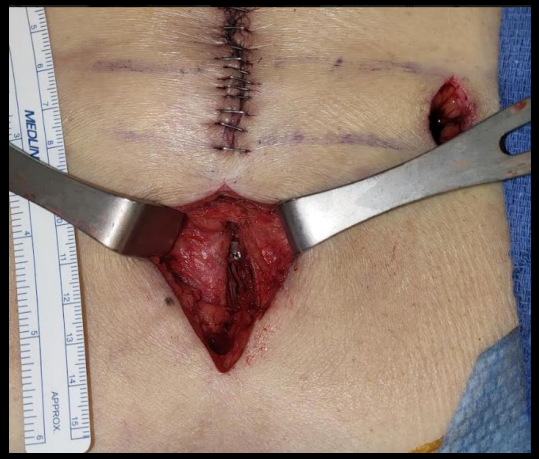
L APC 3 / R APC 2

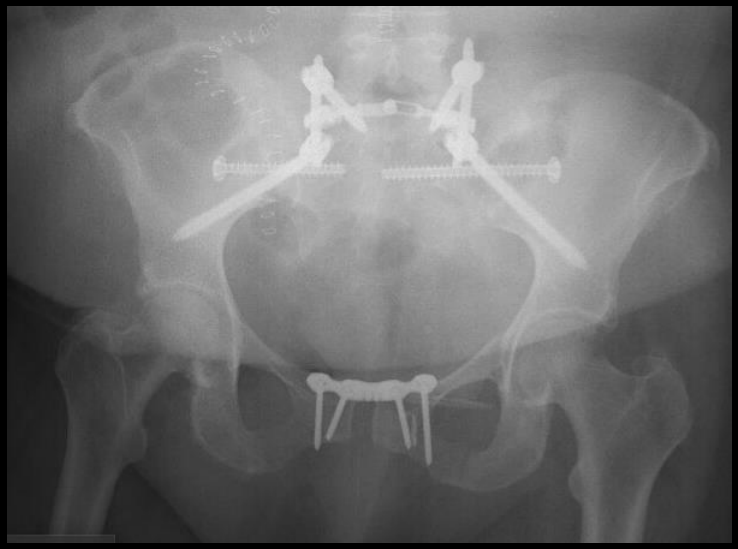
- Anterior external fixator 6 weeks
- Weight bearing?
  - RLE for transfers, NWB LLE



Case Example: Spinopelvic Instrumentation As Supplemental Fixation

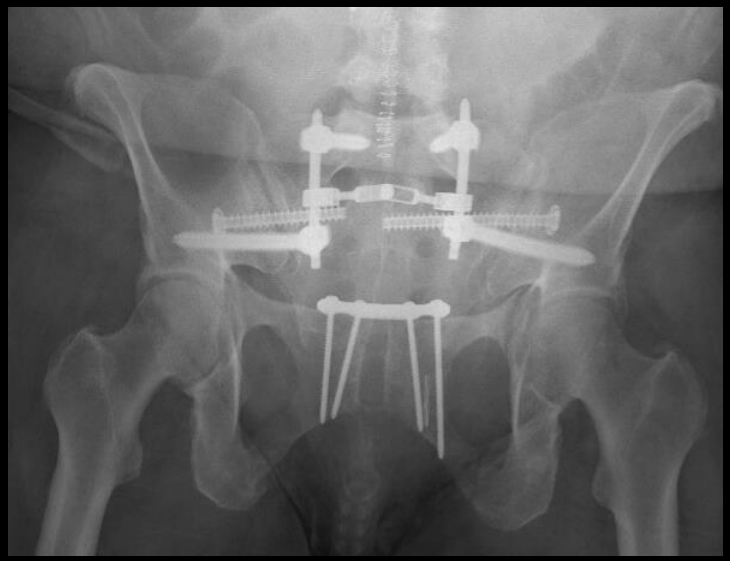
- After discussion with patient, elect for S1 to ilium instrumentation
  - Minimally invasive subfascial cross connector
  - Ex fix removal

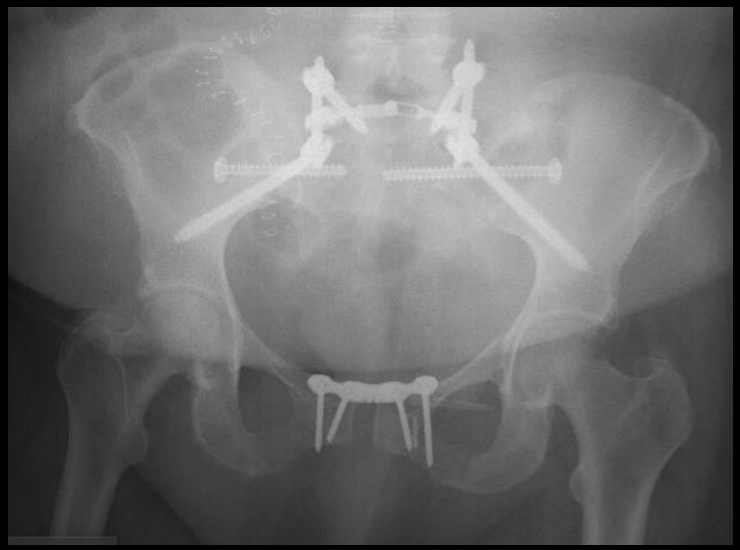




Case Example: Spinopelvic Instrumentation As Supplemental Fixation

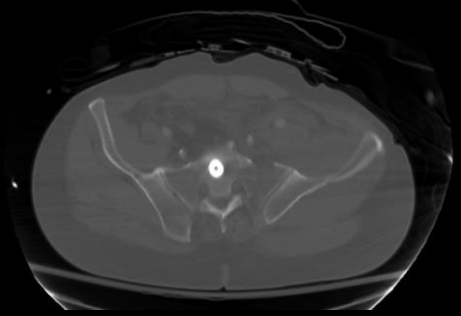
- S1 to ilium instrumentation
- **WBAT BLE:**
  - Some steps with LLE AFO at discharge (1 week)
  - Ambulating independently with walker at 3 week appt
  - Independently at 6 week





Spinopelvic Fixation For Posterior Pelvic Ring Injuries

- Absolute Indications
  - Unstable lumbosacral junction
  - Pelvic morphology precludes sufficient traditional fixation
    - Dysmorphism/transitional anatomy, preexisting hardware
  - Inadequate proximal fixation due to fracture morphology with iliosacral screws alone
- Relative indications
  - Displaced vertical shear component
  - Supplemental fixation to allow for immediate WBAT
  - Narrow corridors
- No indications
  - Stable ring fracture
  - S/p traditional pelvis ORIF and can WBAT or can tolerate a period of protected weight bearing



Summary

- Wide spectrum of injuries
- Development of a comprehensive classification scheme
- Goals of fracture reduction and decompression of any compressed nerves
- Prioritize early mobilization and weight bearing!!!

Thank You

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