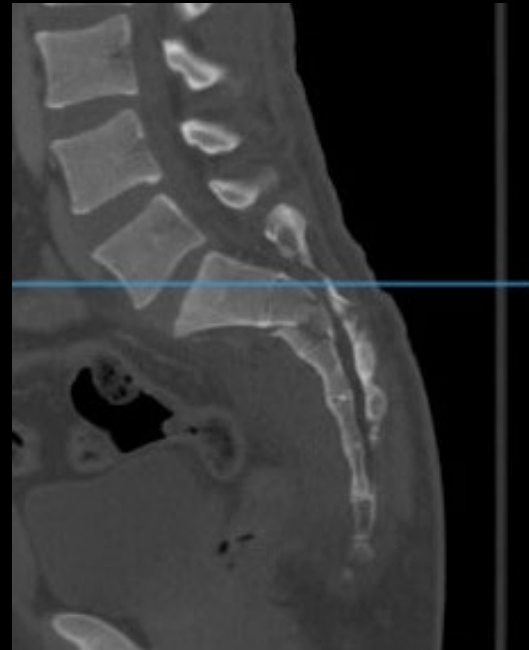


Lumbosacral Injuries: Recognition, Recommendations, and Treatment Options

Thursday, April 4, 2024

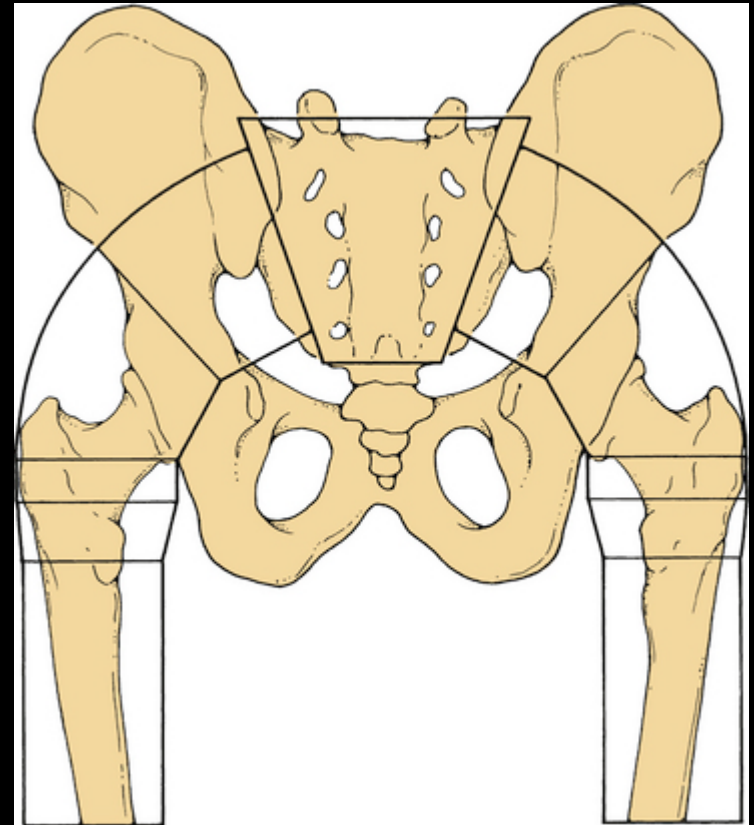
Ashraf N. El Naga
Assistant Clinical Professor
University of California, San Francisco

Director, Orthopaedic Spine Service
Zuckerberg San Francisco General Hospital



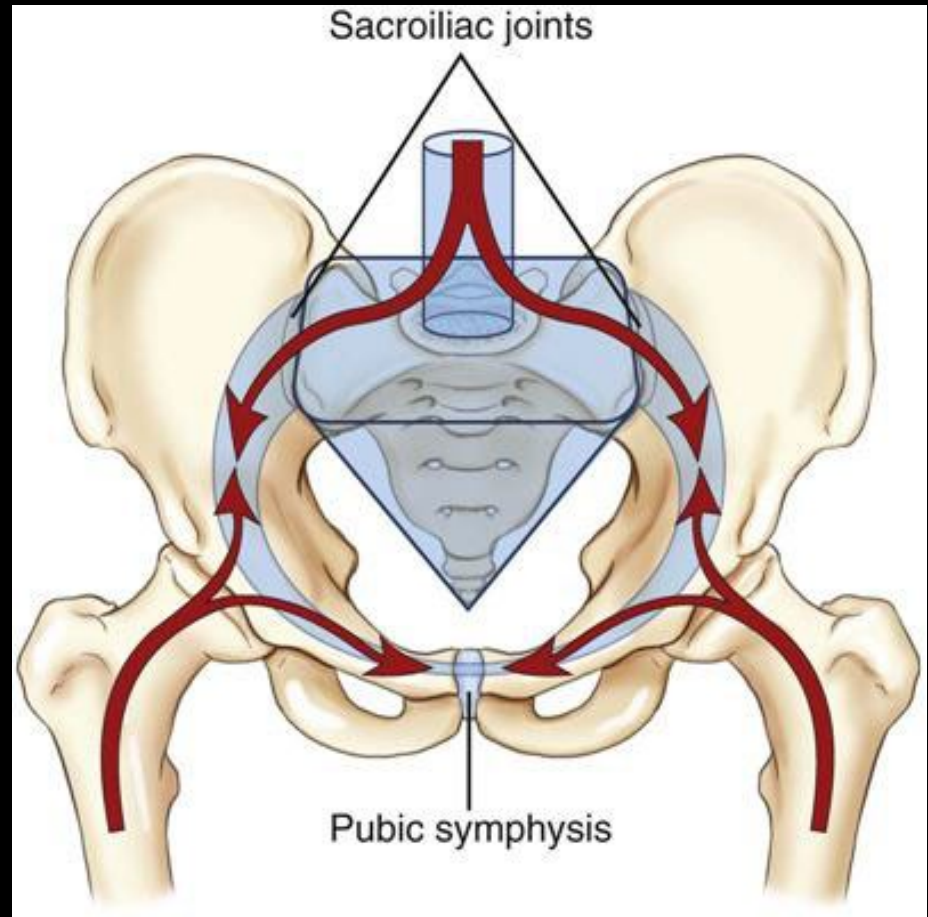
Spinopelvic Injury Patterns

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

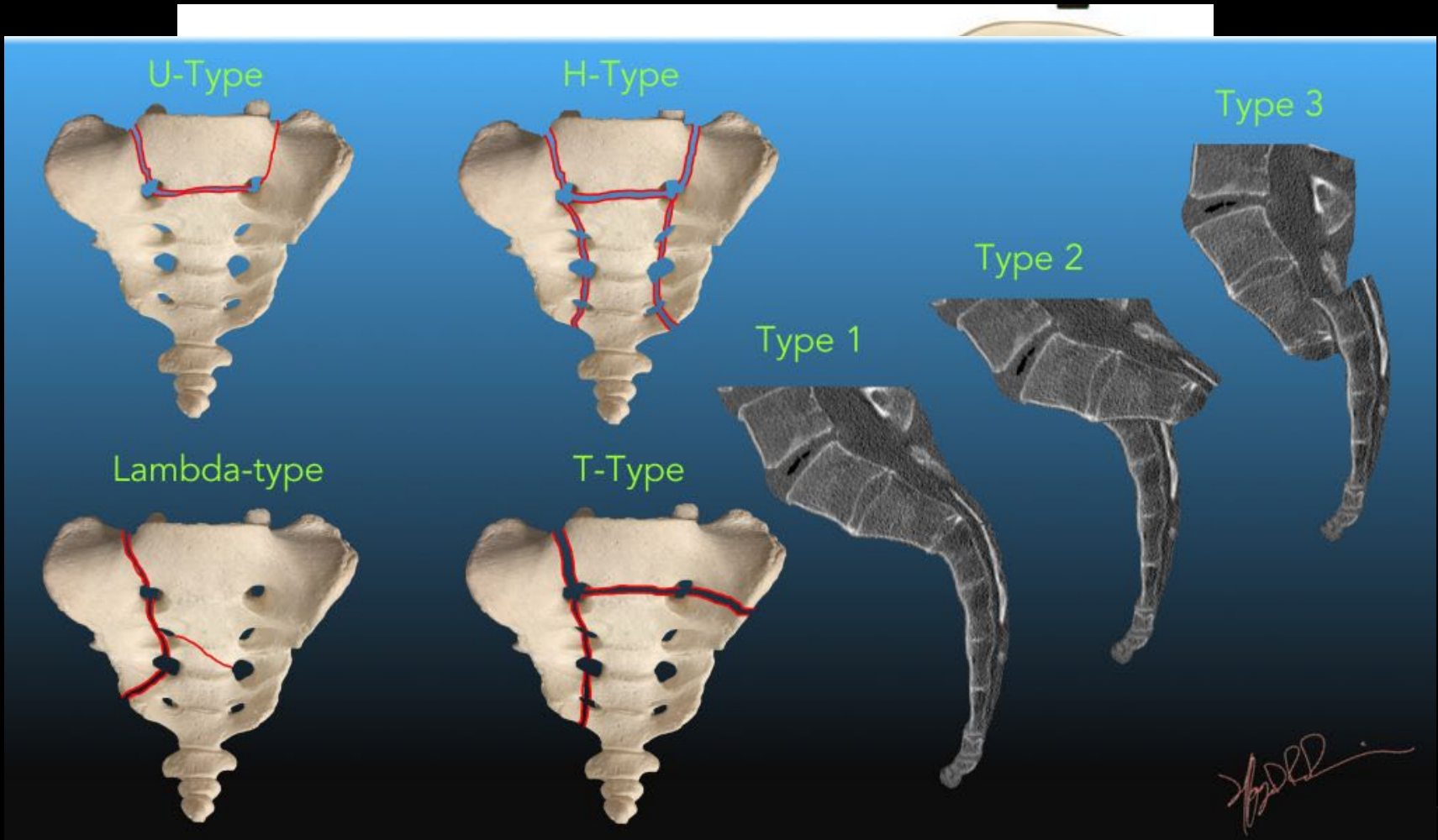


Spinopelvic Injury Patterns

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



Spinopelvic Injury Patterns



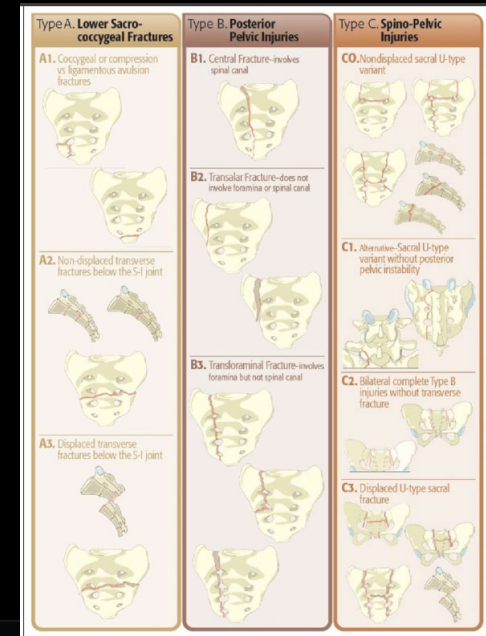
Objectives

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

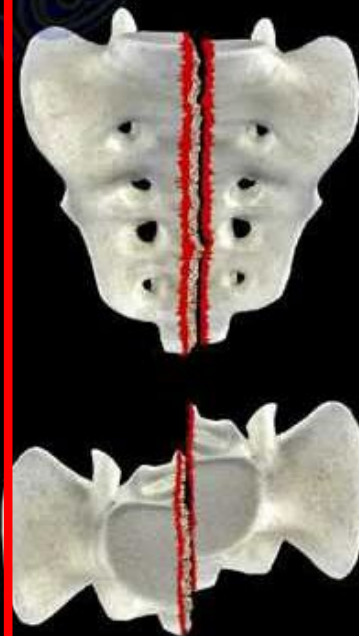
Zone I



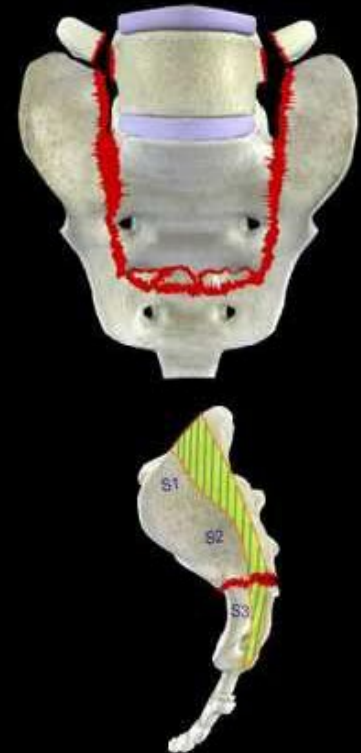
Zone II



Zone III
Longitudinal

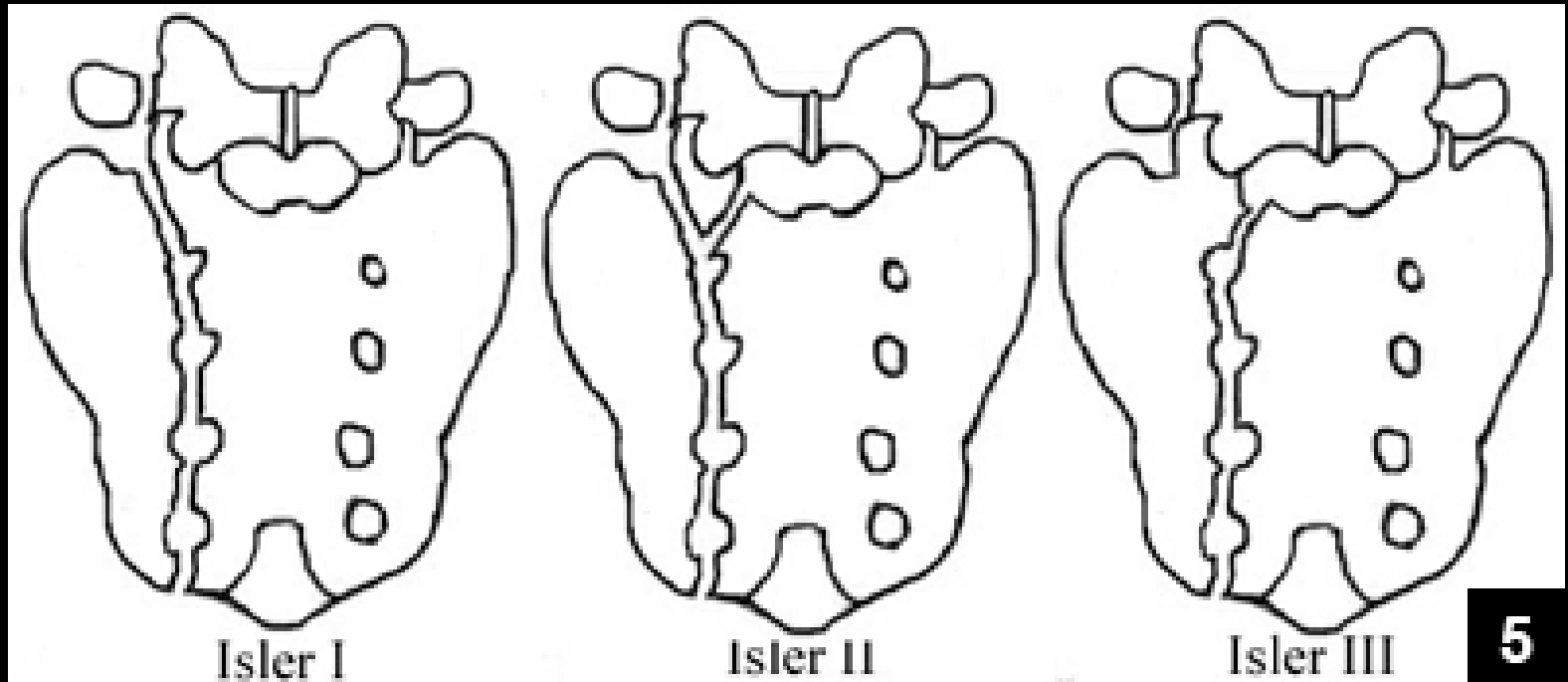


Zone III
Transverse



Outcome: Neurologic injury

Isler Classification



Outcome: Lumbosacral stability

Journal of Orthopaedic Trauma
Vol. 4, No. 1, pp. 1-6
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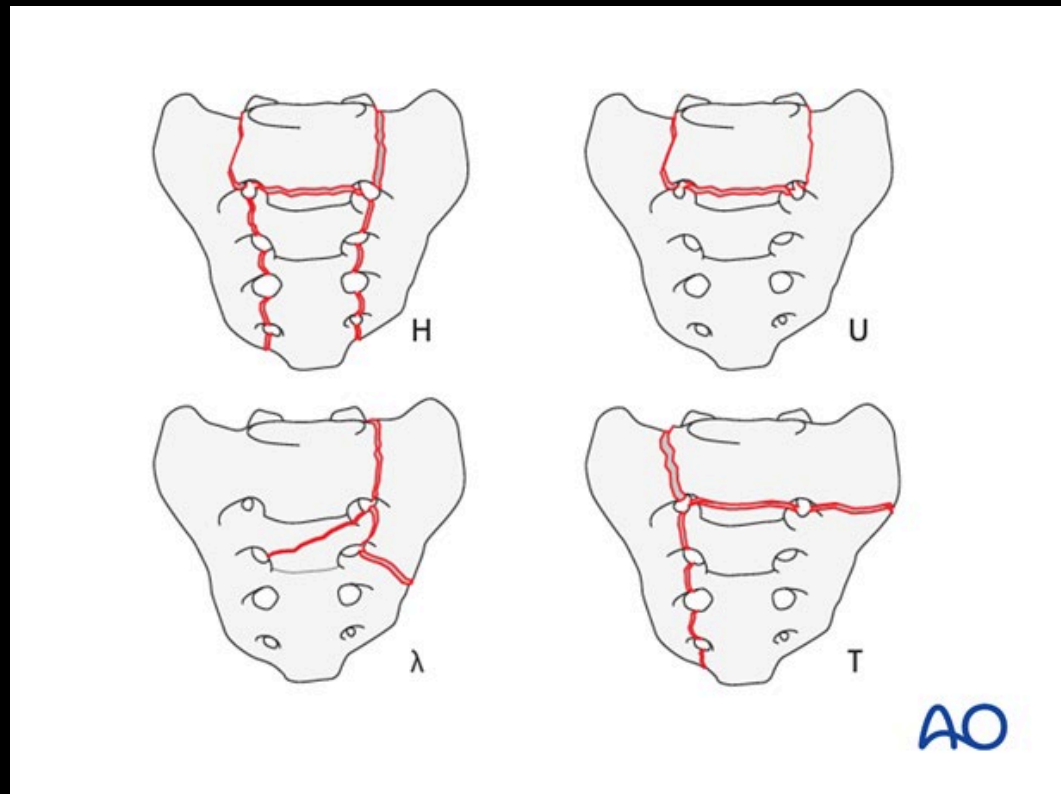
Lumbosacral Lesions Associated with Pelvic Ring Injuries

Balz Isler

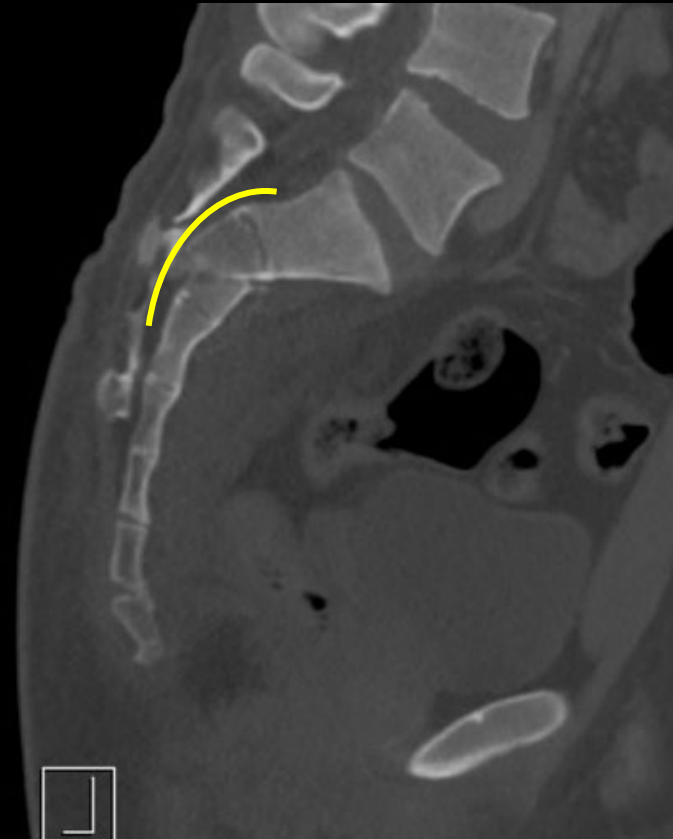
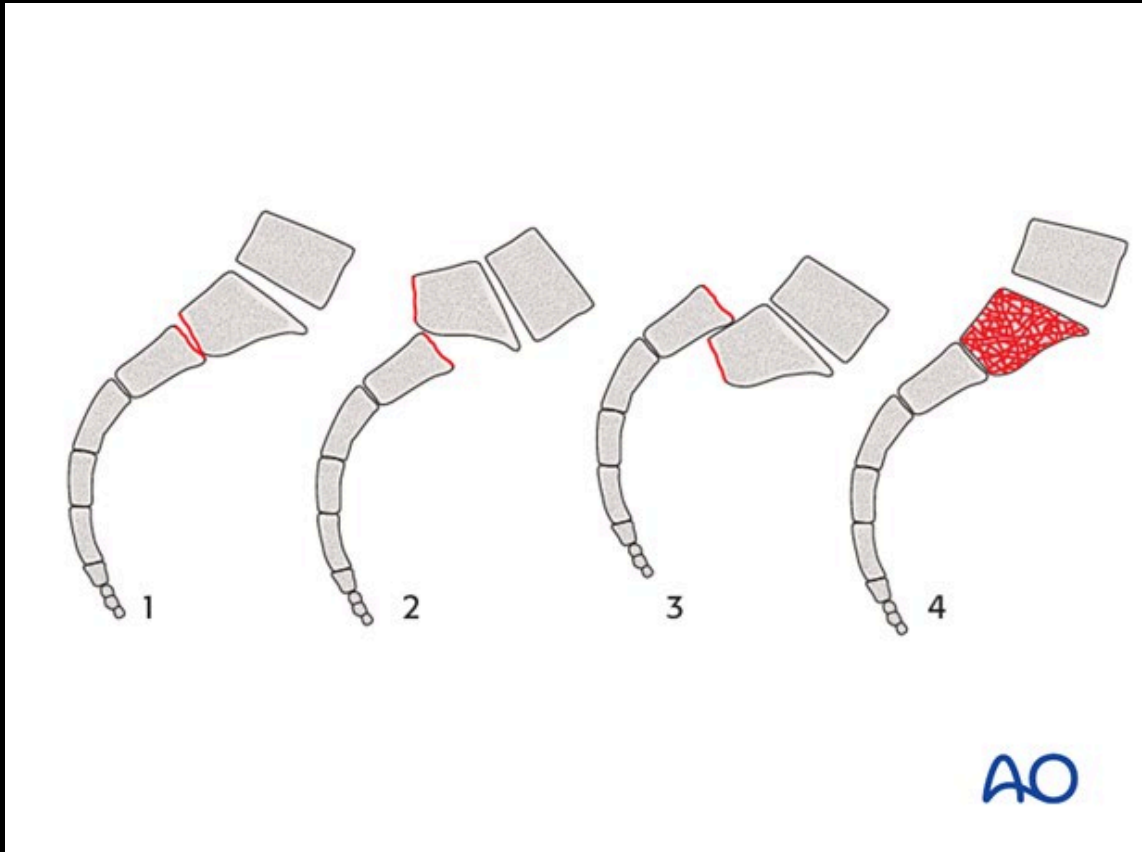
Department of Orthopaedics, University of Berne, Inselspital, Bern, Switzerland

Descriptive Classification

- Transverse Zone III fractures



Roy- Camille Classification



Sacral Kyphosis

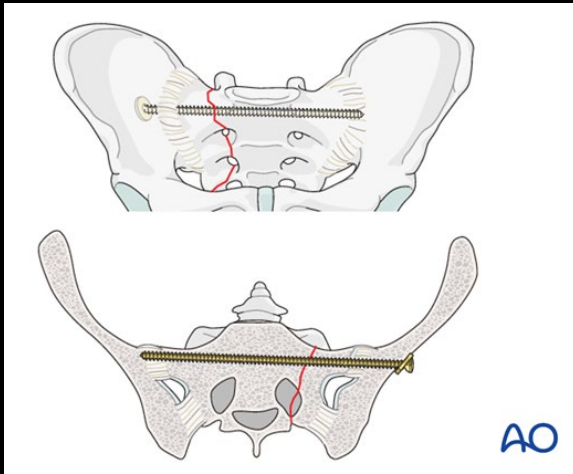


When to call spine?

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

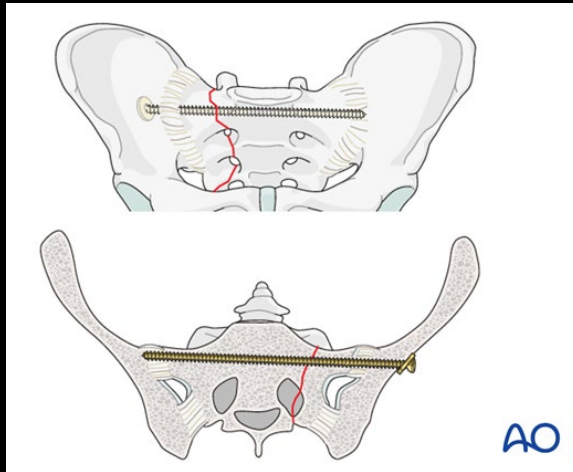
Operative Treatments

Iliosacral screw fixation



Operative Treatments

Iliosacral screw fixation



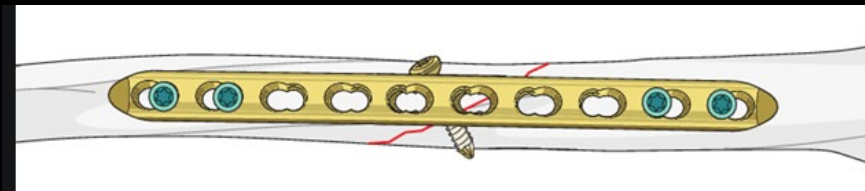
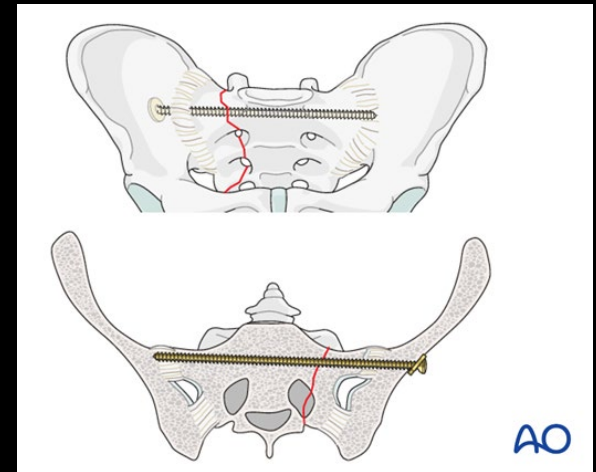
Posterior lumbopelvic fixation



Iliosacral Screw Fixation

■ Pros

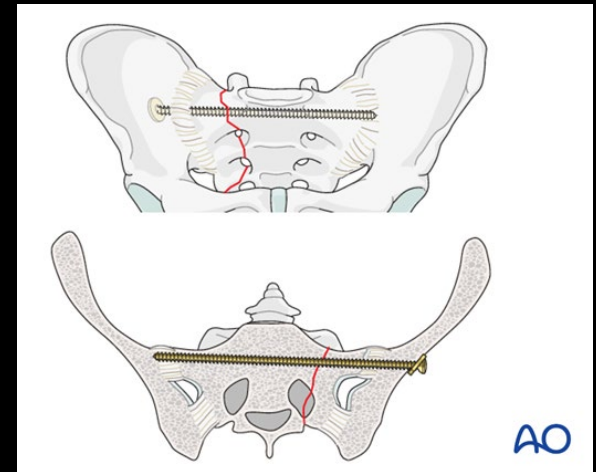
- Safe
- Minimally invasive
- Prone or supine
- Fracture compression



Iliosacral Screw Fixation

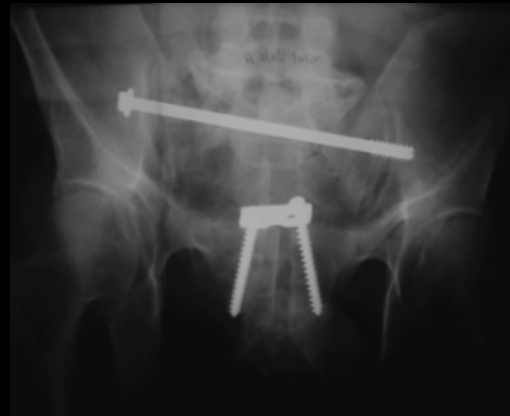
■ Pro

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



■ Con

- Poor at resisting shear forces
- Need good fluoro images



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

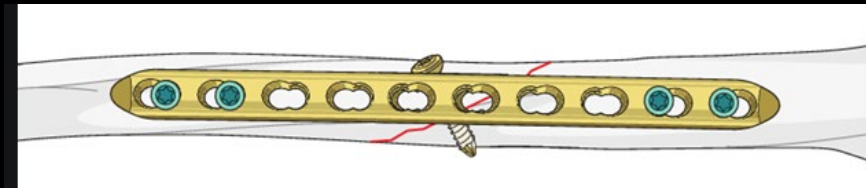
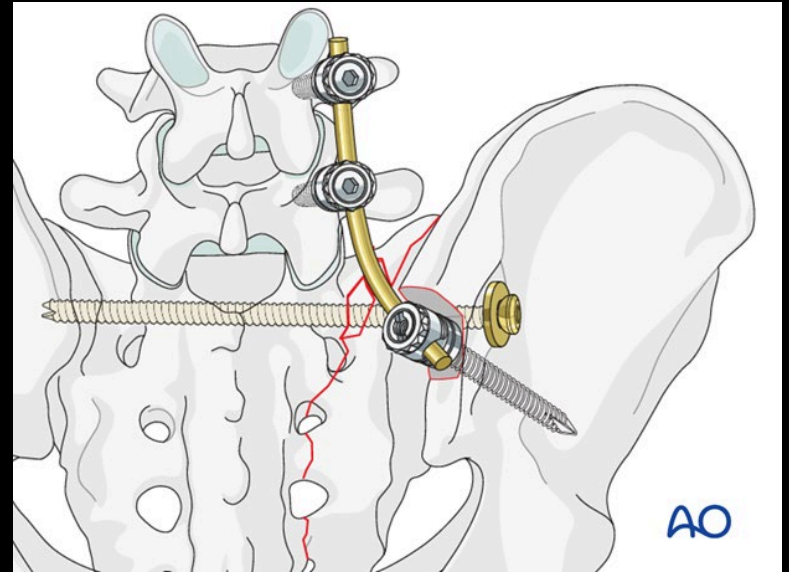
■ Con

- 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



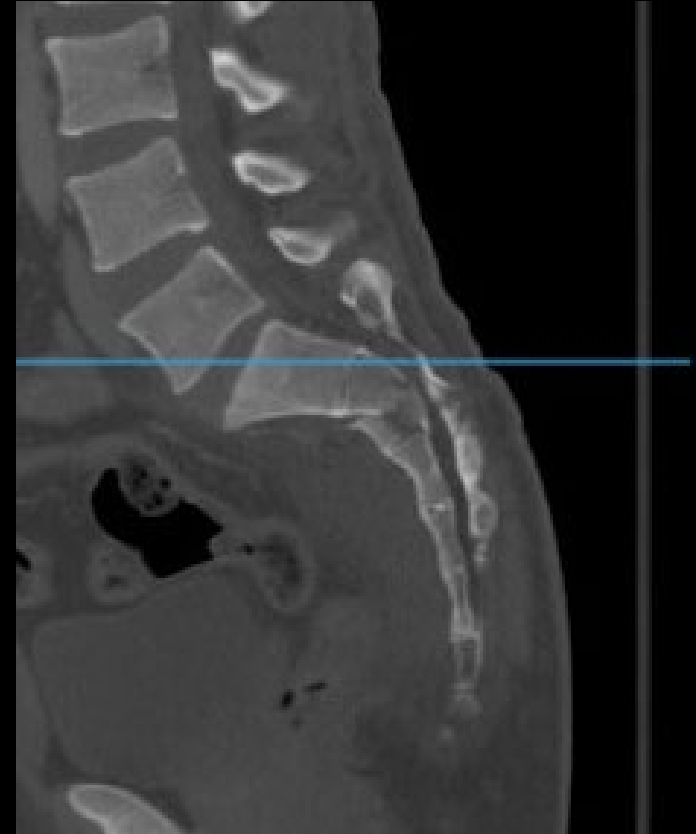
Goals of Treatment

- **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?

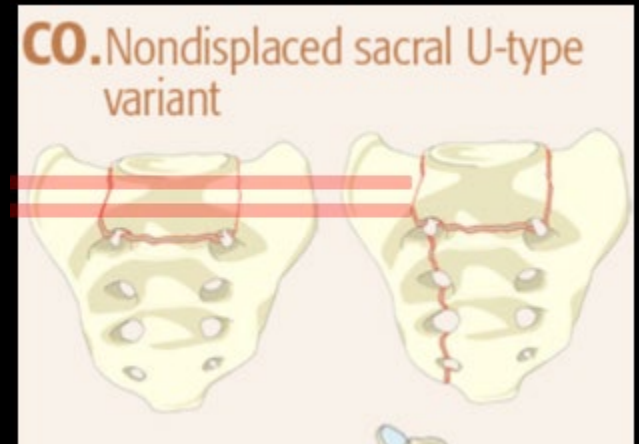
Choosing a Fixation Strategy?

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



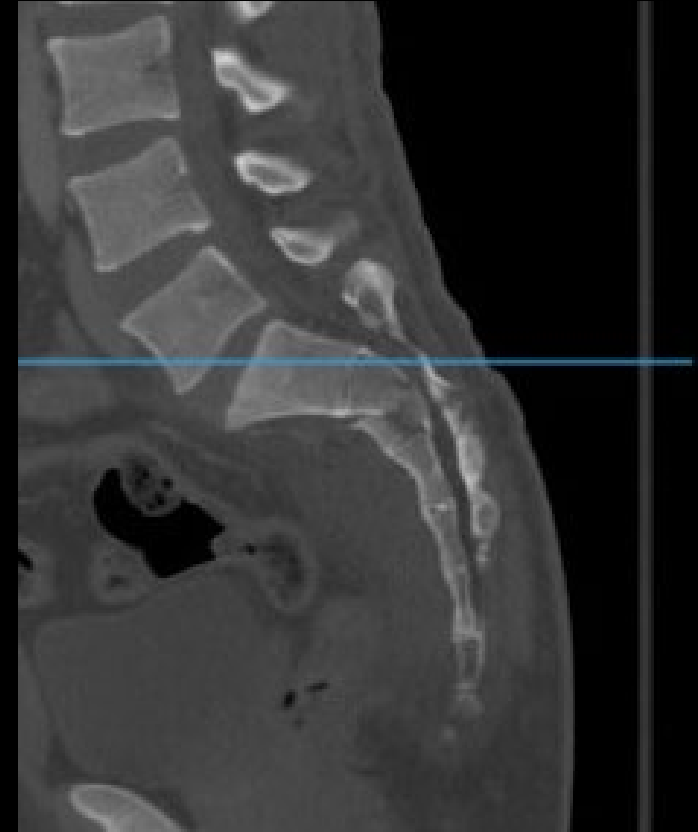
Choosing a Fixation Strategy?

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

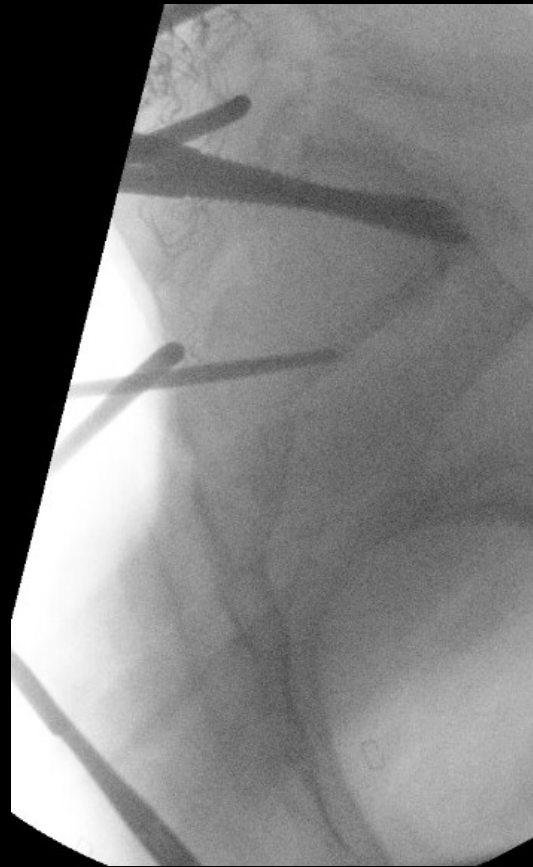


Choosing a Fixation Strategy?

- Is a neurologic decompression needed?
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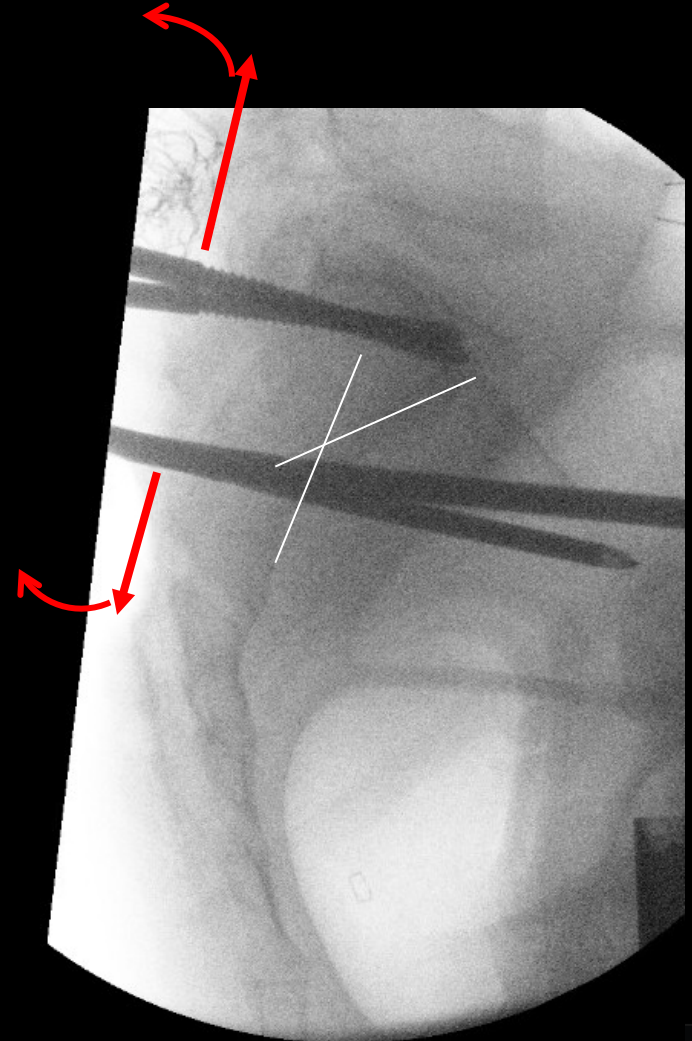
Case # 1: H type with Sacral Kyphosis



Reduction

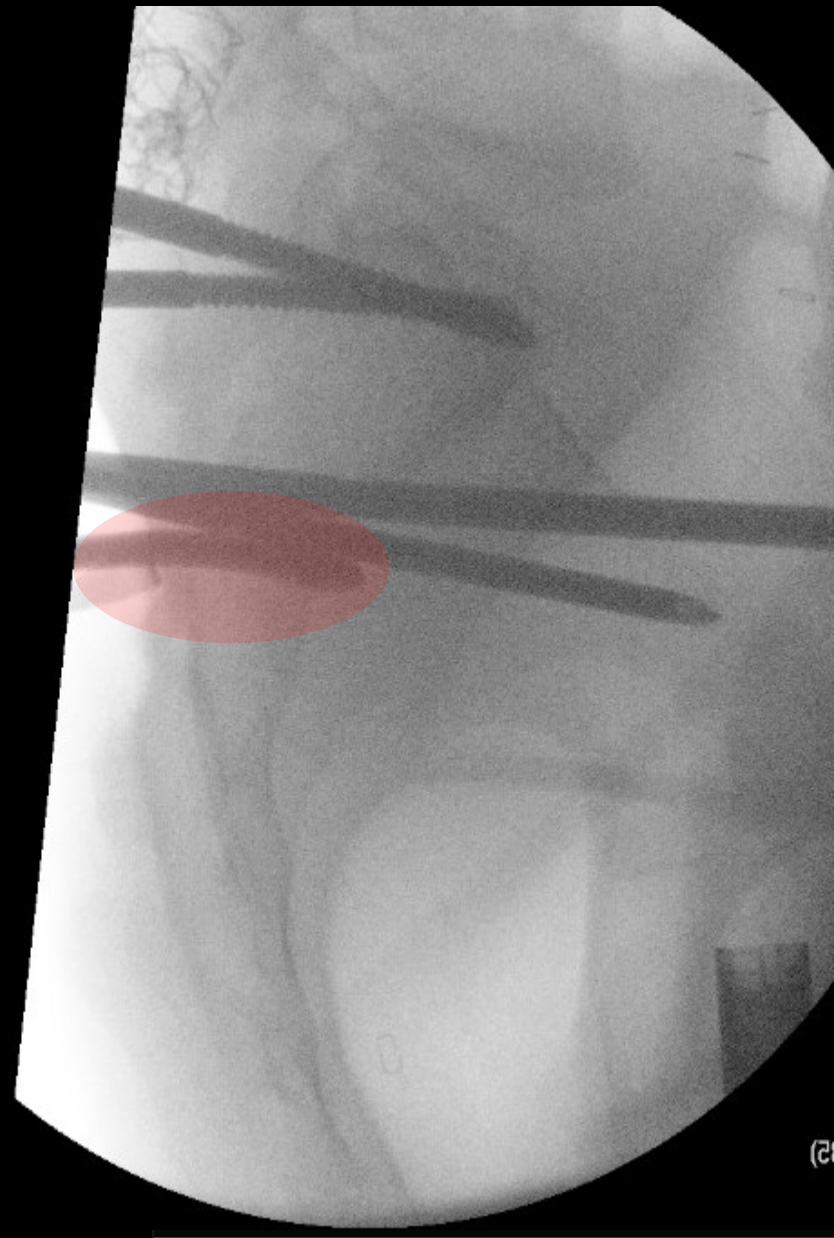
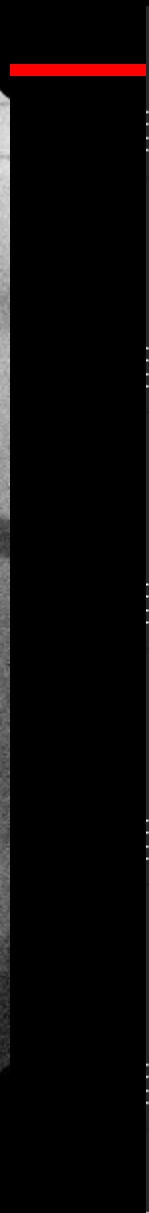


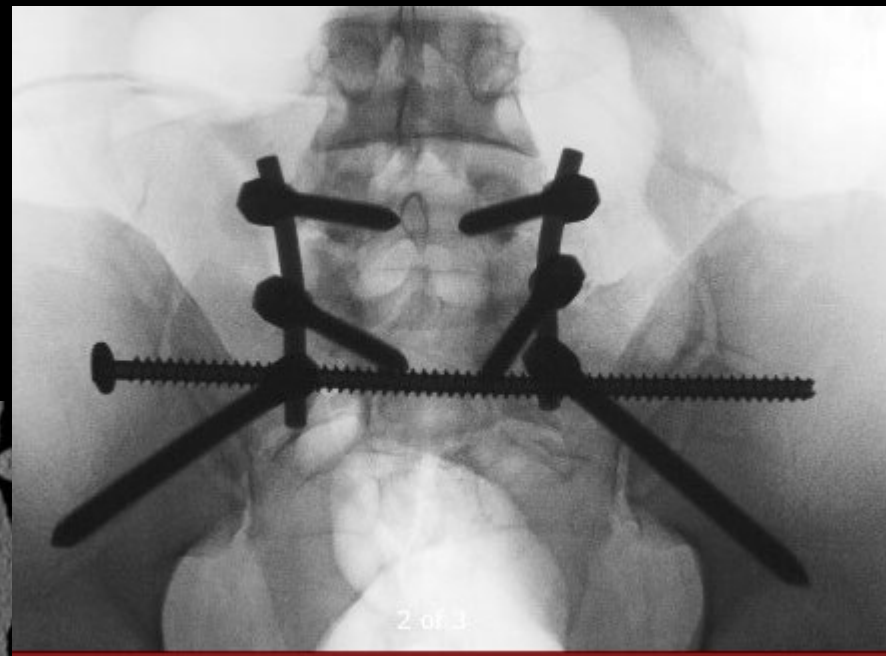
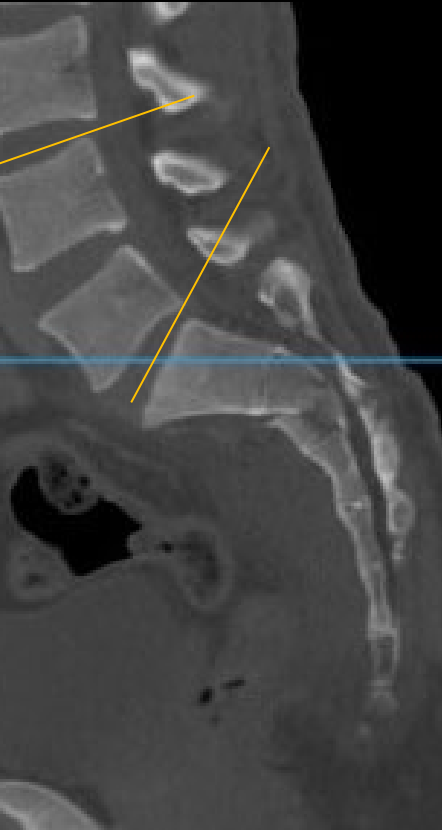
Short
Kyphosis



:20)

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?

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

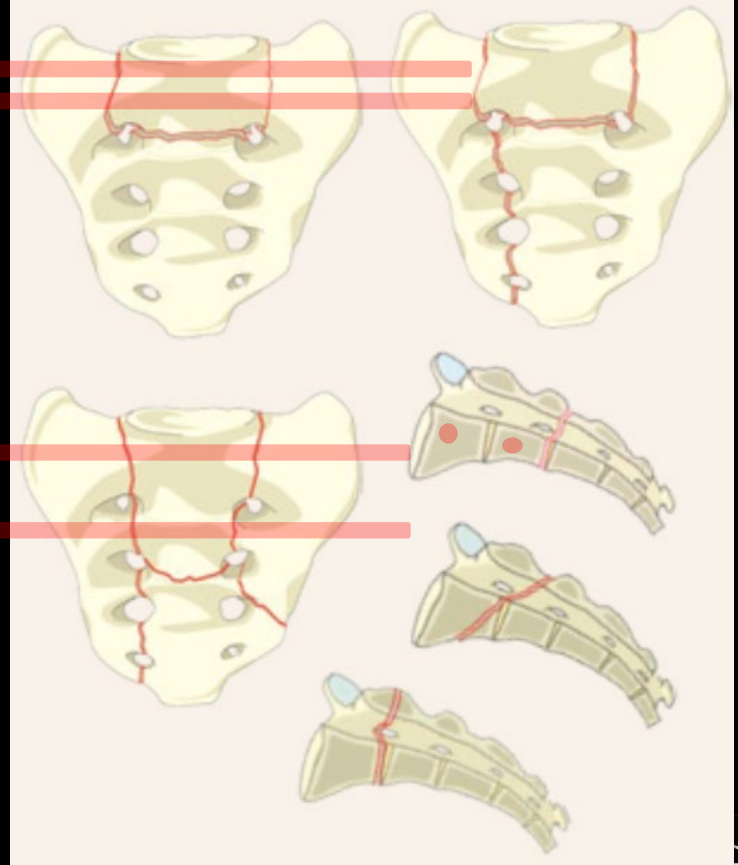
Choosing a fixation strategy?

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

Minimally Displaced Fractures

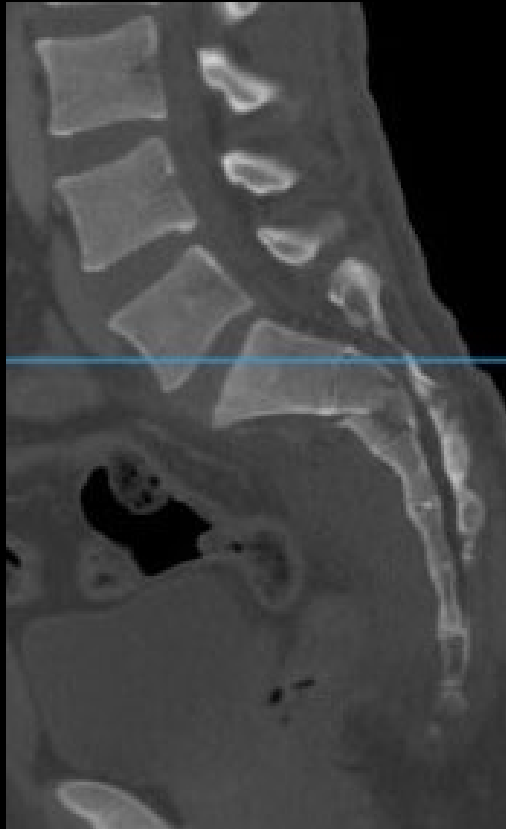
- Generally treated with transiliac trans-sacral screws

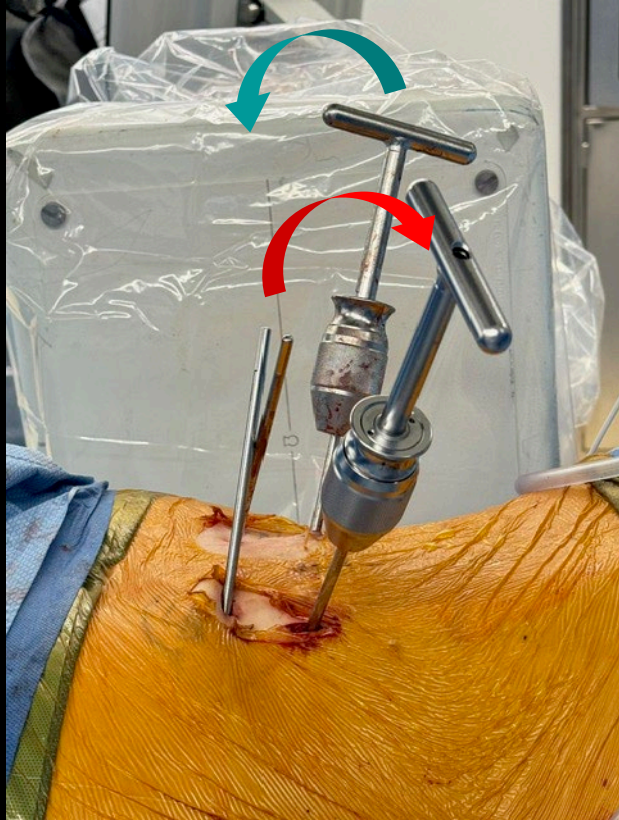
CO. Nondisplaced sacral U-type variant

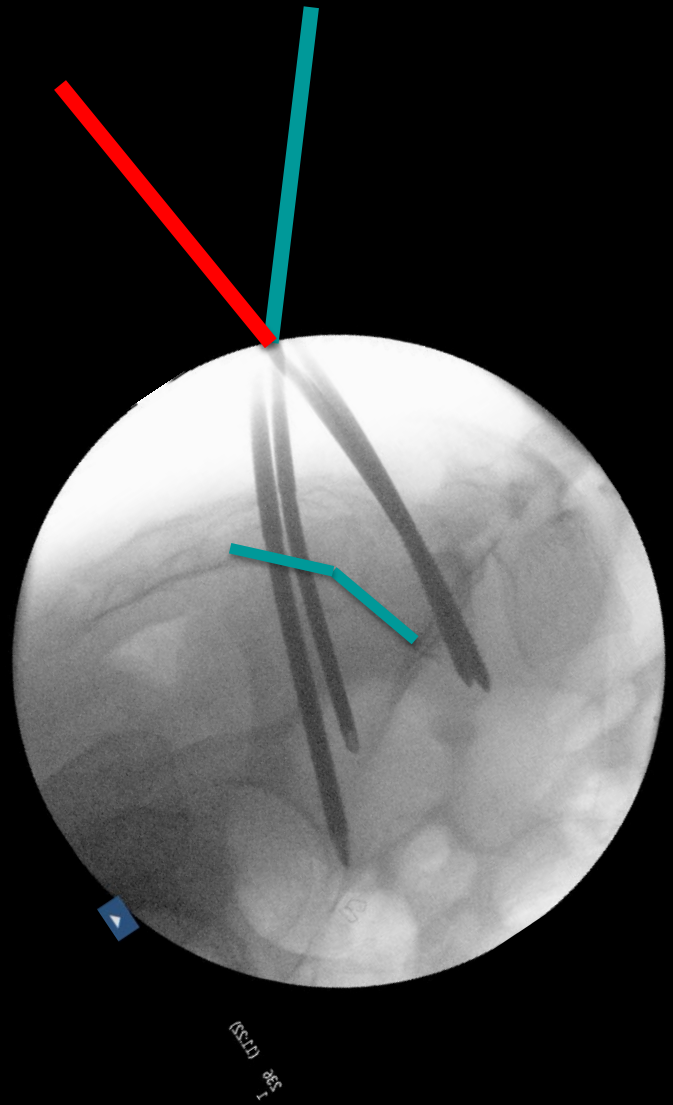
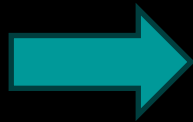
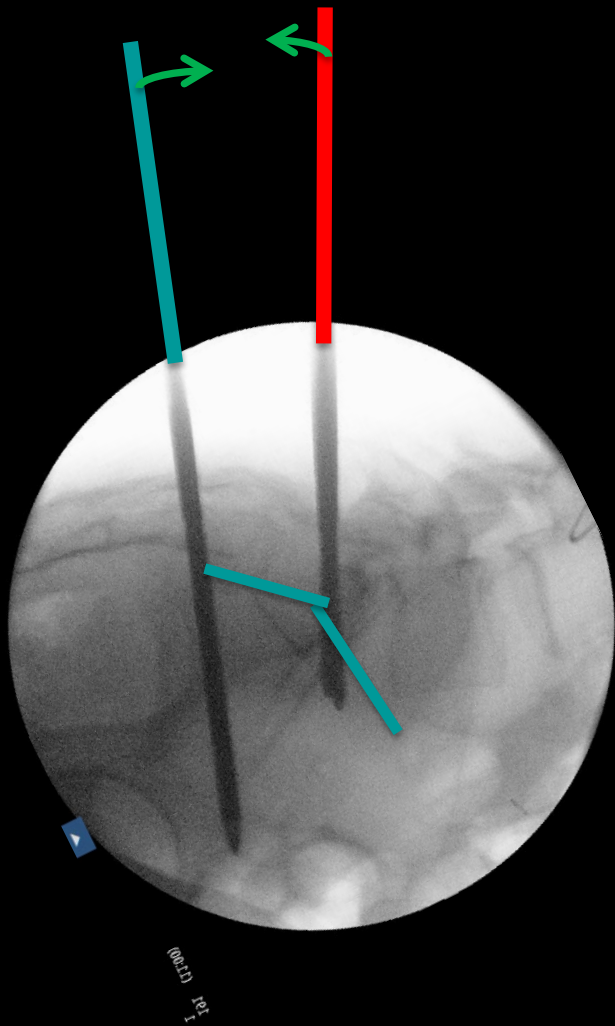


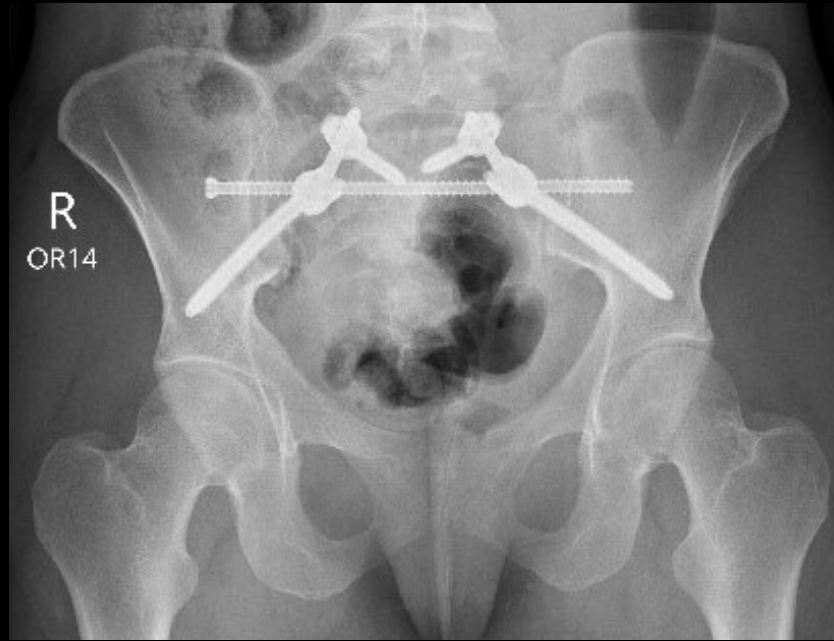
Displaced Fractures

- Generally treated with lumbopelvic fixation

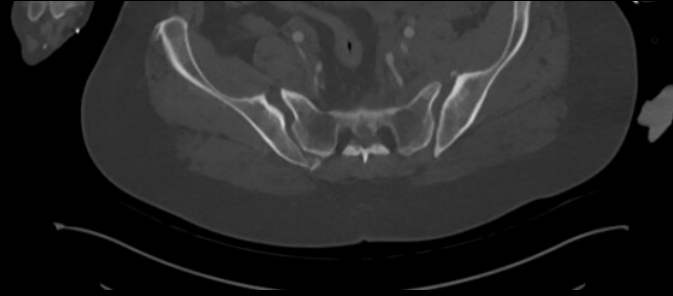
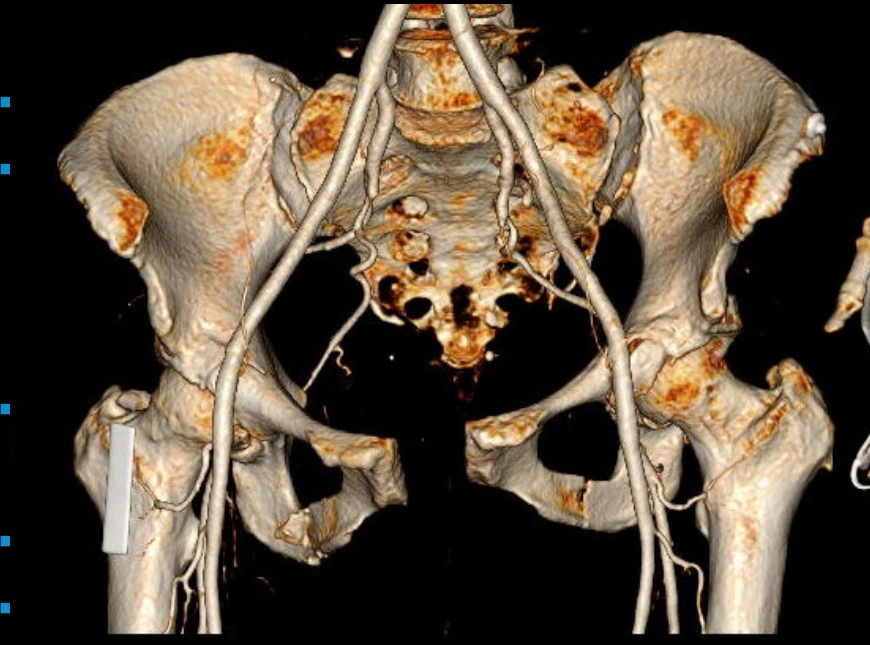








Case Example: Spinopelvic Instrumentation As Supplemental Fixation



Case example: Spinopelvic Instrumentation As Supplemental Fixation

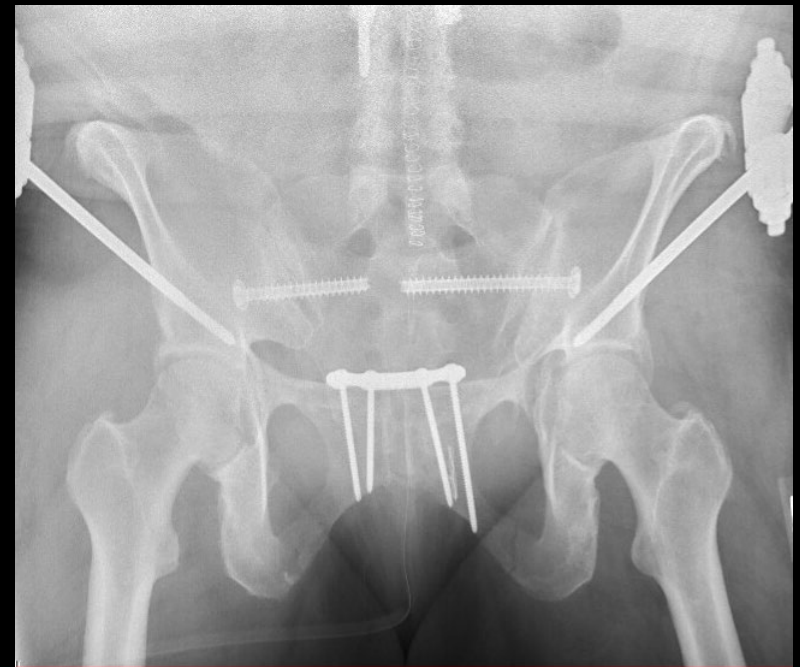
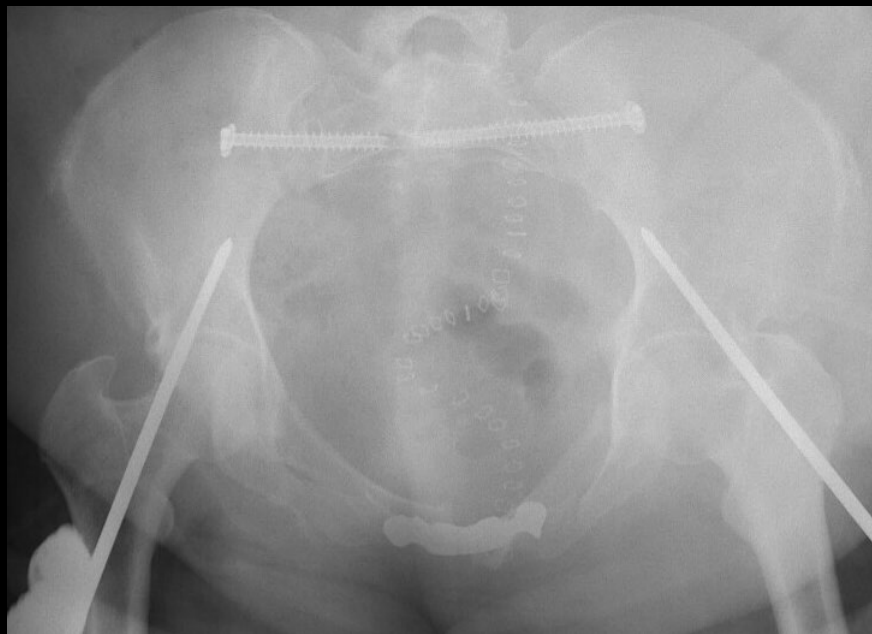
- Initial management
 - Perineal wound washout
 - Ex fix
 - IR embolization
 - Anticipatory colostomy
 - T12 Chance fracture fixation (NSG)



Case Example: Spinopelvic Instrumentation As Supplemental Fixation

Hospital Day 7

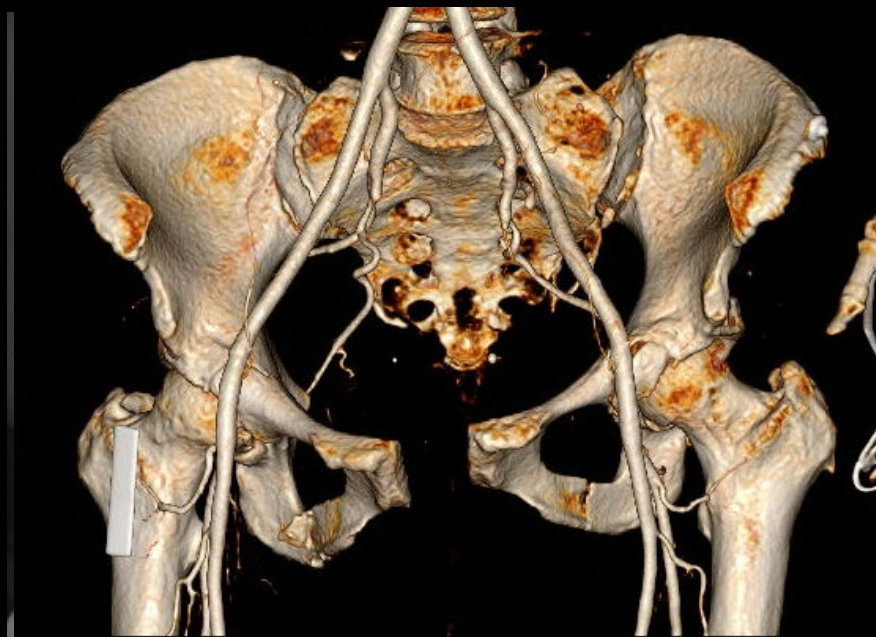
To OR for pelvic stabilization



Case Example: Spinopelvic Instrumentation As Supplemental Fixation

Hospital Day 7

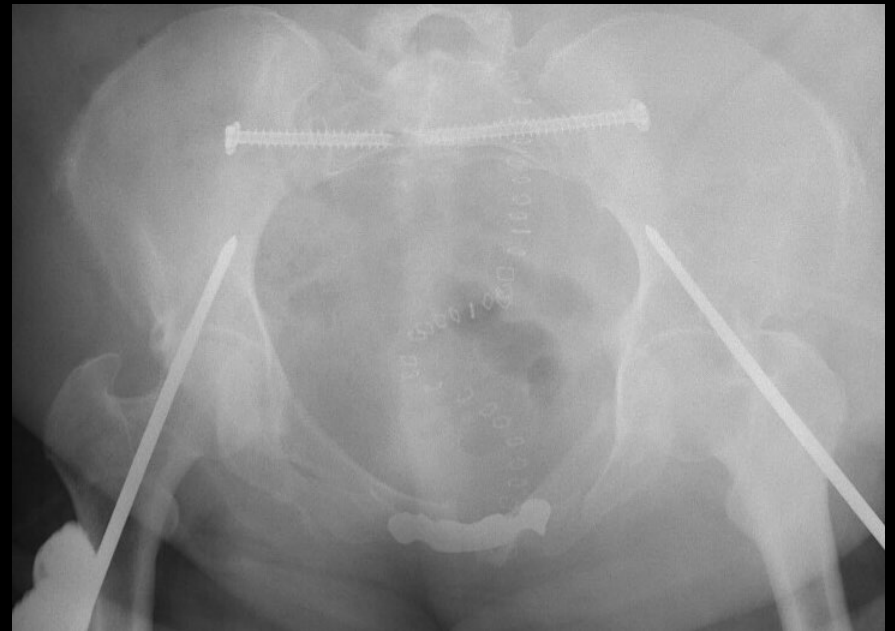
To OR for pelvic stabilization



Case Example: Spinopelvic Instrumentation As Supplemental Fixation

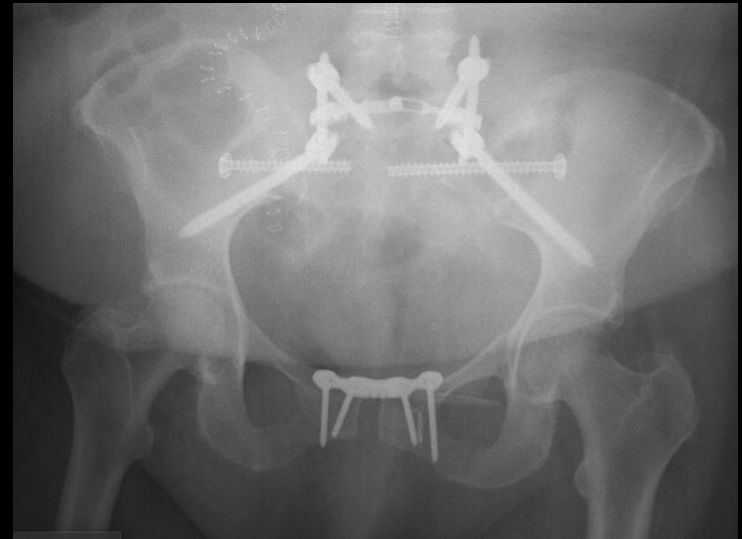
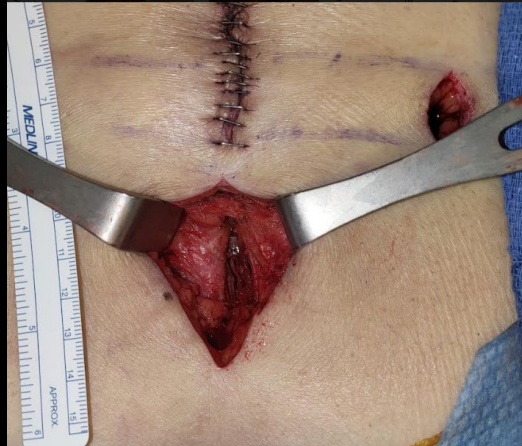
L APC 3 / R APC 2

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



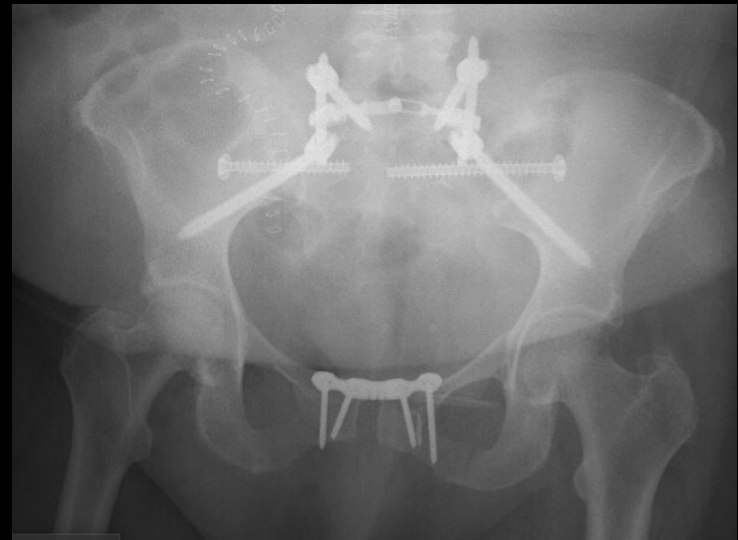
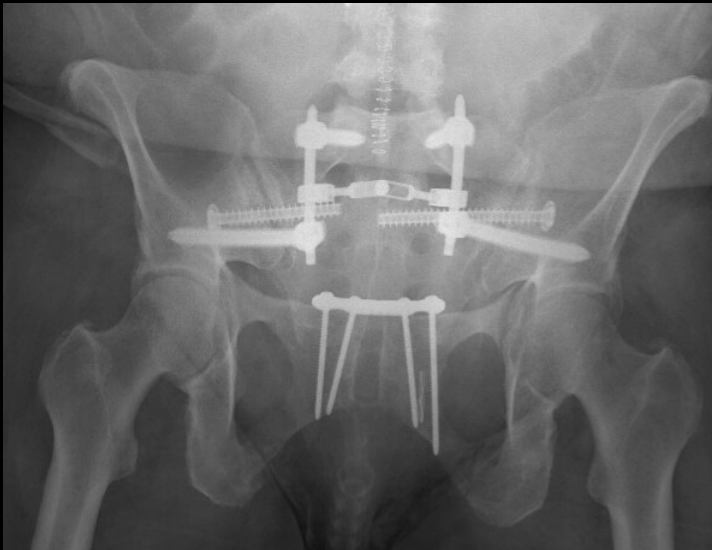
Case Example: Spinopelvic Instrumentation As Supplemental Fixation

- 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

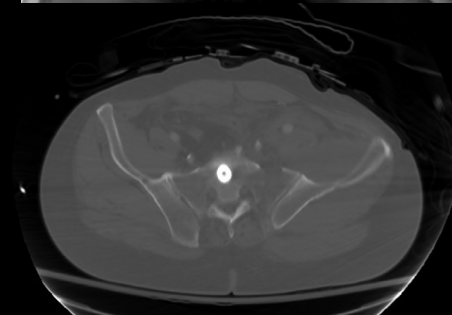
- Unstable lumbosacral junction
- Pelvic morphology precludes sufficient traditional fixation
 - Dysmorphism/transitional anatomy, preexisting hardware
- Inadequate proximal fixation due to fracture morphology with iliosacral screws alone

■ 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 limited weight bearing



Thank You



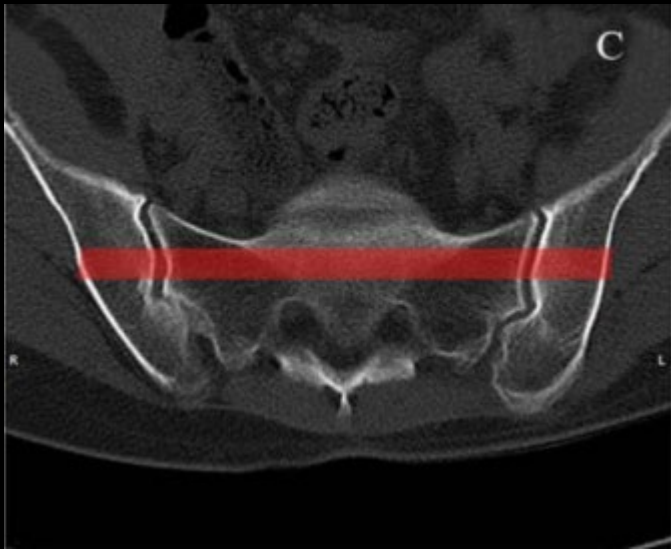
Ashraf.ELNaga@ucsf.edu

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!!!

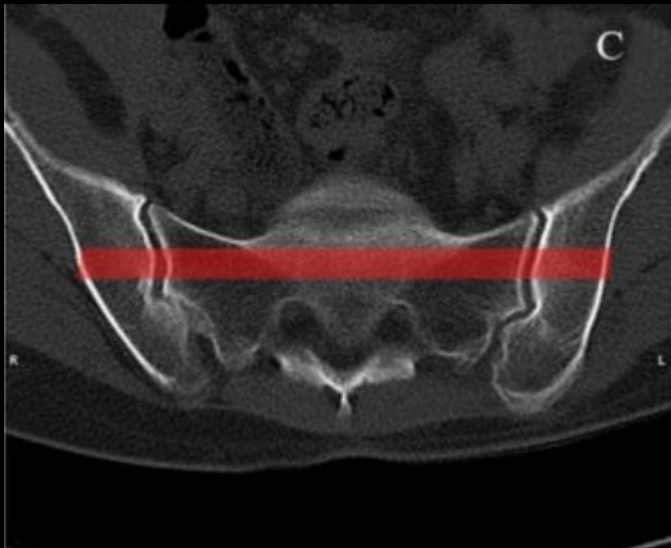
Upper Sacral Segment Variability

Non Dysmorphic

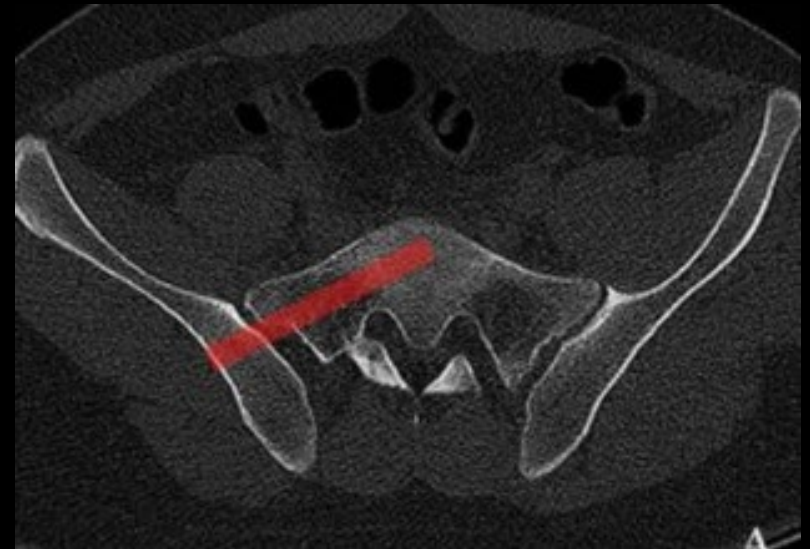


Upper Sacral Segment Variability

Non Dysmorphic

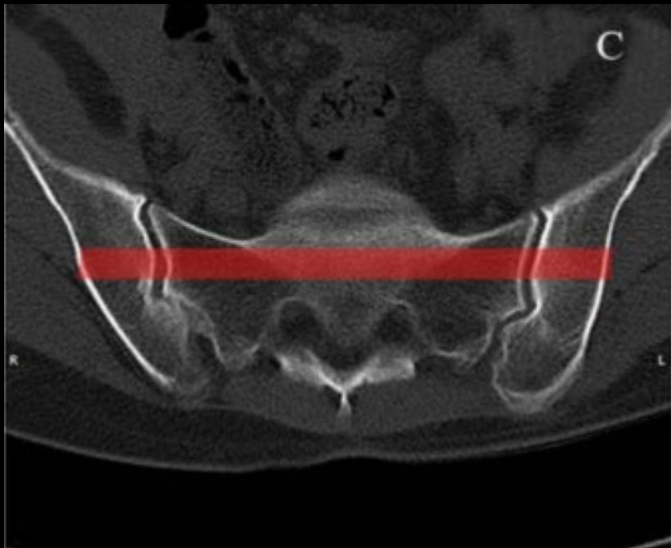


Dysmorphic



Upper Sacral Segment Variability

Non Dysmorphic



Dysmorphic

