

Lumbopelvic Dissociations: Recognition and Recommendations

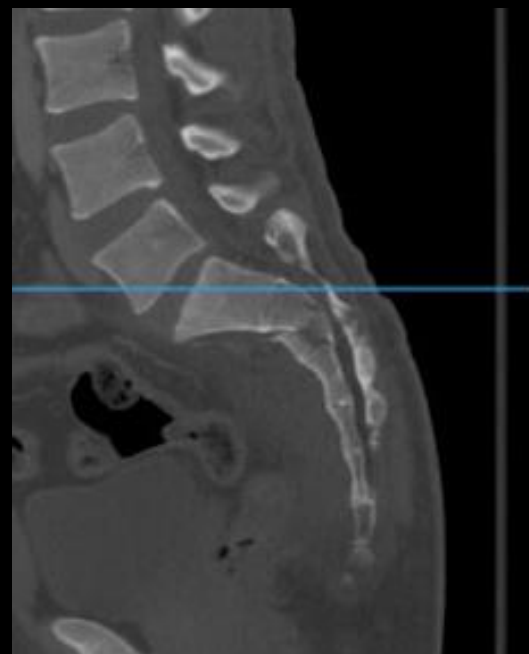
Saturday, October 1,
2022

Ashraf N. El Naga

Assistant Clinical Professor

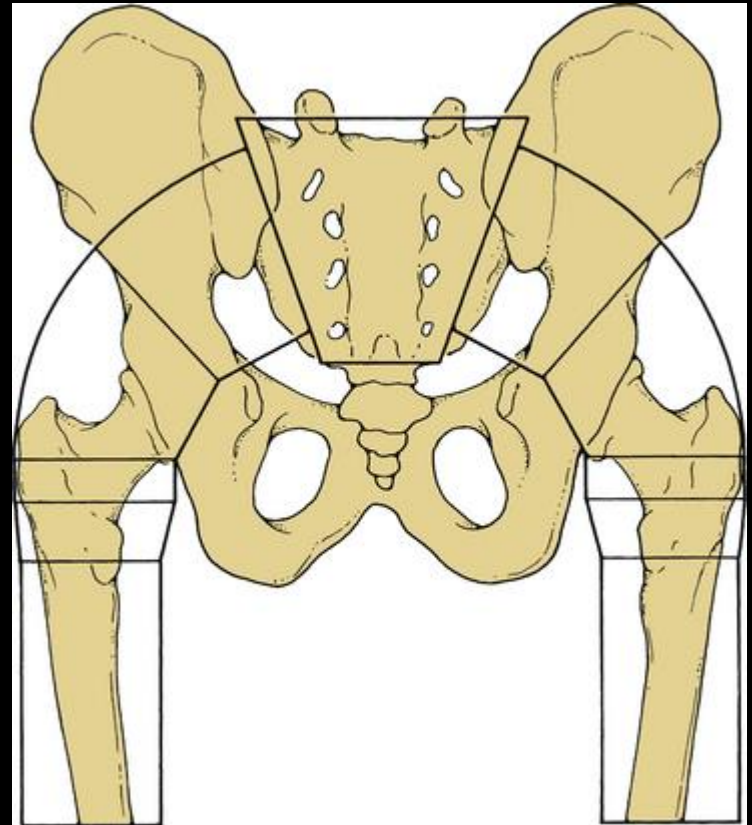
University of California, San Francisco

Co-Director, Orthopaedic Spine Service
Zuckerberg San Francisco General Hospital



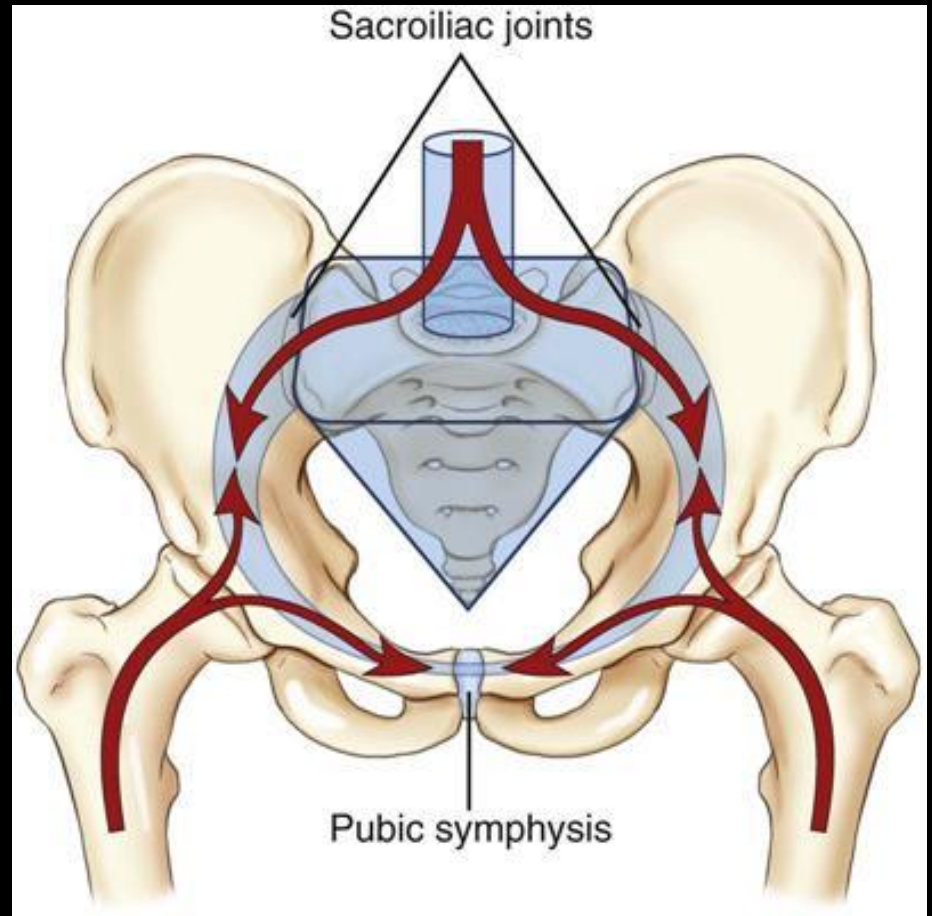
Spinopelvic injury patterns

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

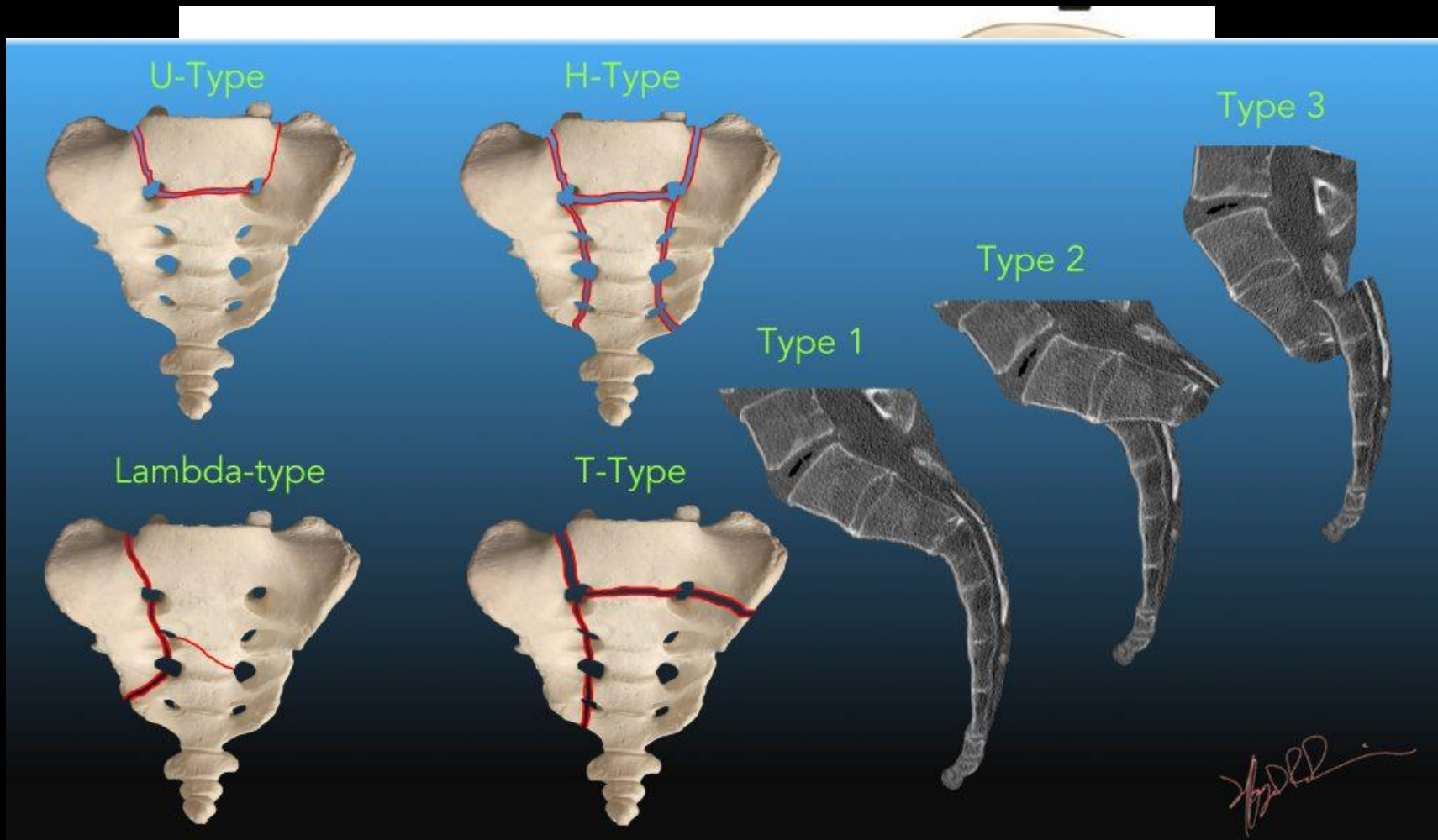


Spinopelvic injury patterns

- 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. 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

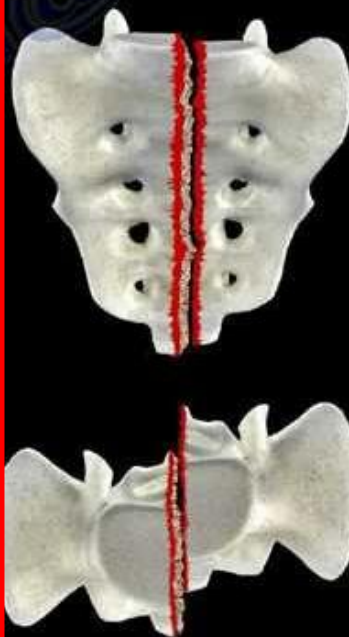
Zone I



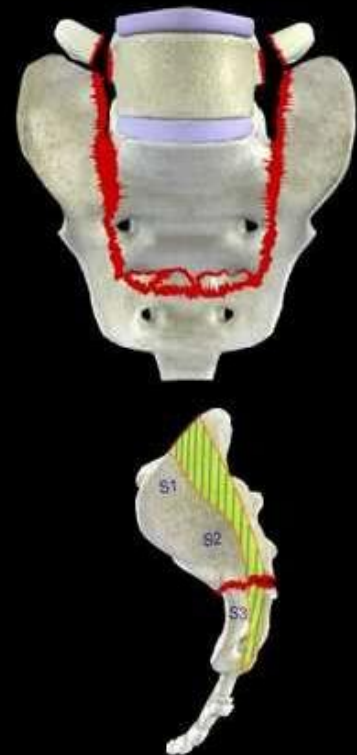
Zone II



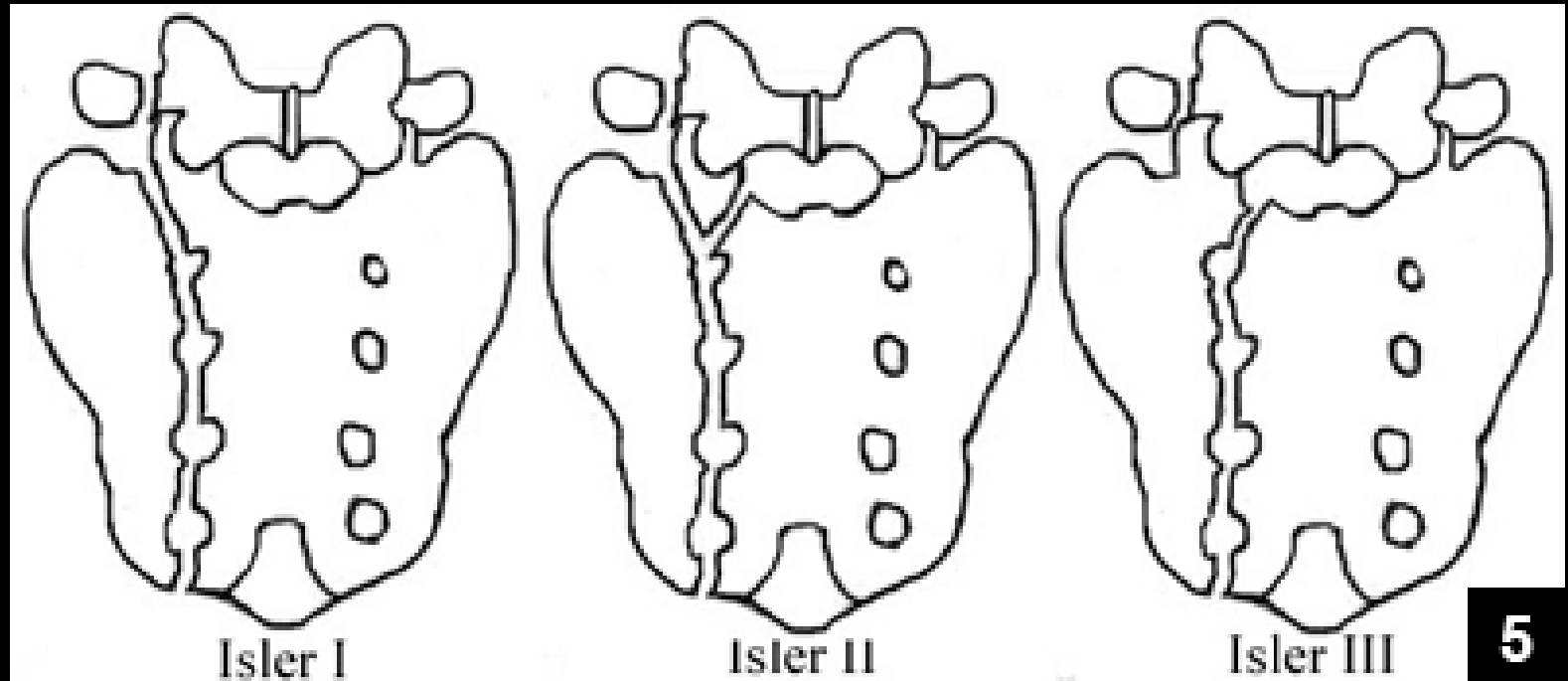
**Zone III
Longitudinal**



**Zone III
Transverse**



Isler Classification



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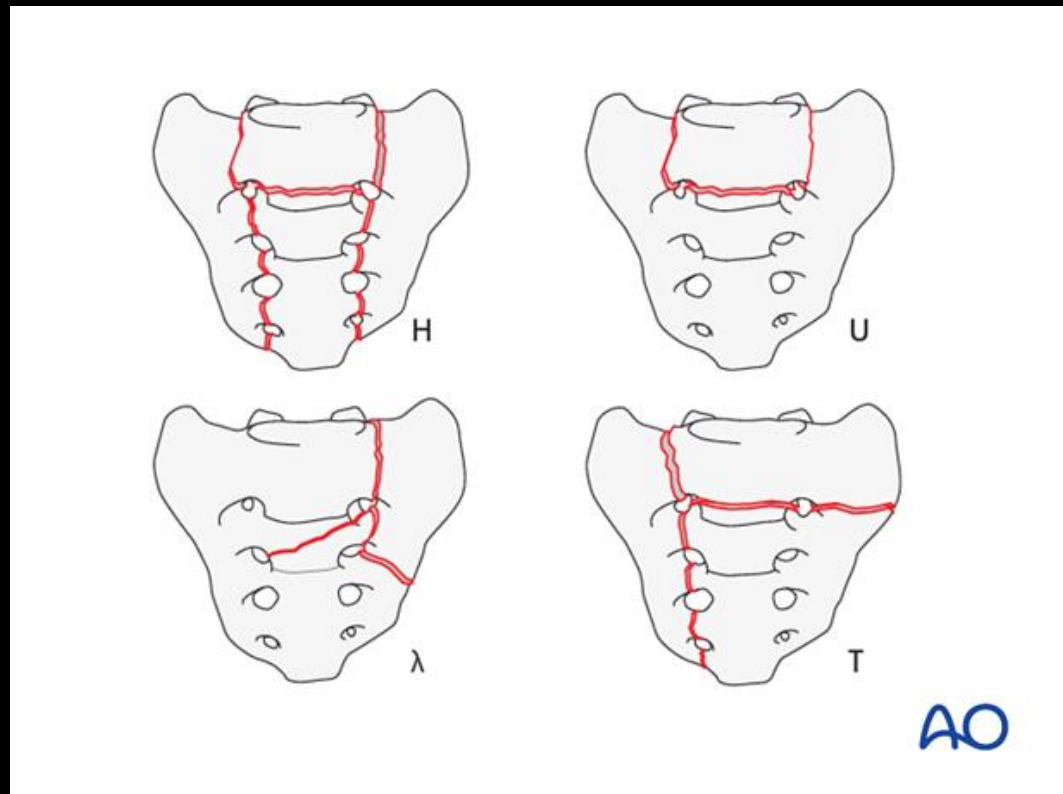
Lumbosacral Lesions Associated with Pelvic Ring Injuries

Balz Isler

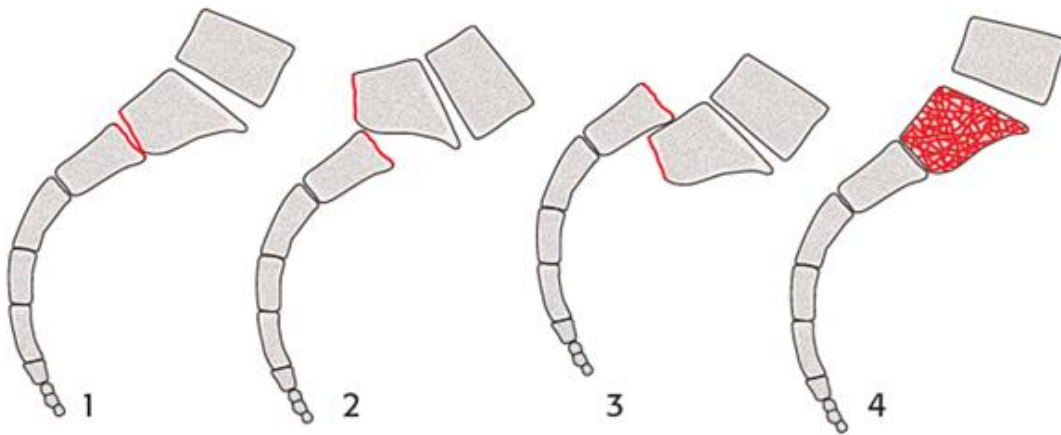
Department of Orthopaedics, University of Berne, Inselspital, Bern, Switzerland

Descriptive Classification

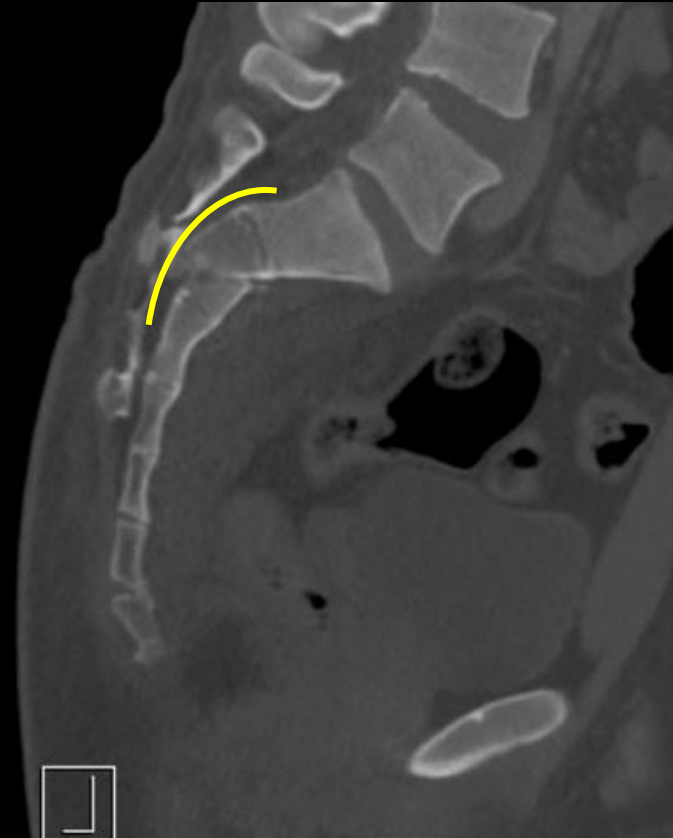
- Transverse Zone III fractures



Roy- Camille Classification



AO



Sacral Kyphosis

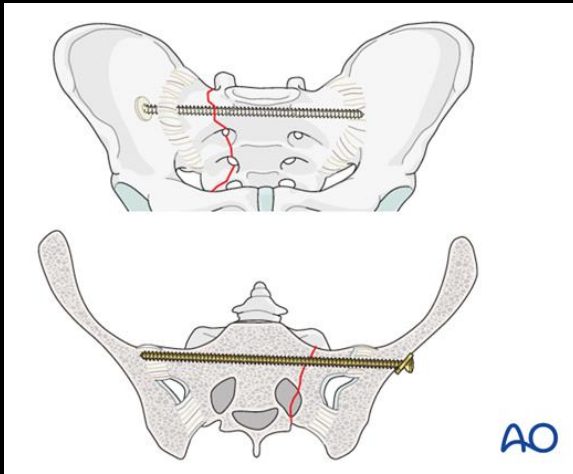


When to call spine?

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

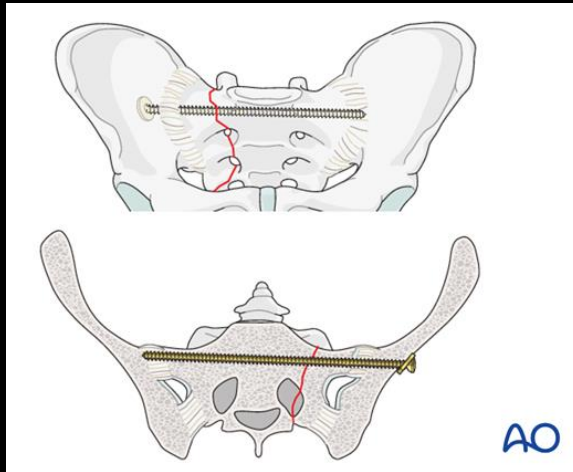
Operative Treatments

Iliosacral screw fixation



Operative Treatments

Iliosacral screw fixation



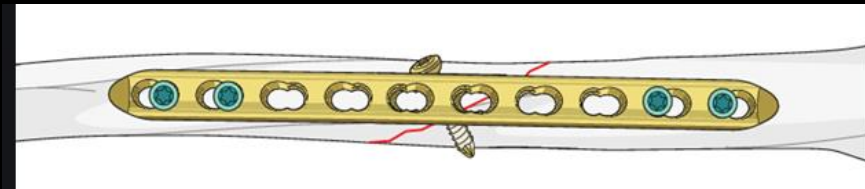
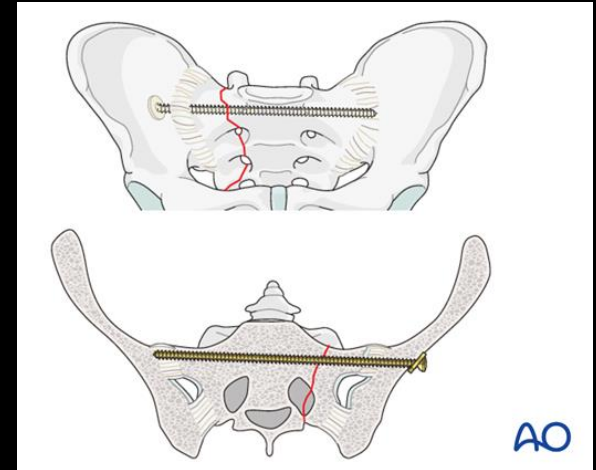
Posterior lumbopelvic fixation



Iliosacral Screw Fixation

■ Pros

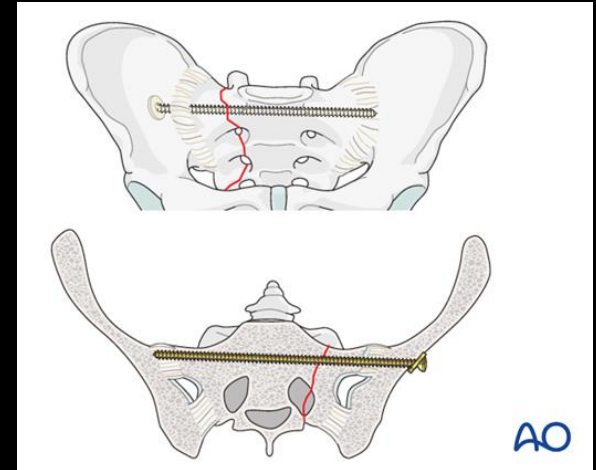
- Safe
- Minimally invasive
- Prone or supine
- Fracture compression



Iliosacral Screw Fixation

■ Pro

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



■ Con

- Poor at resisting shear forces
- Need good fluoro images



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

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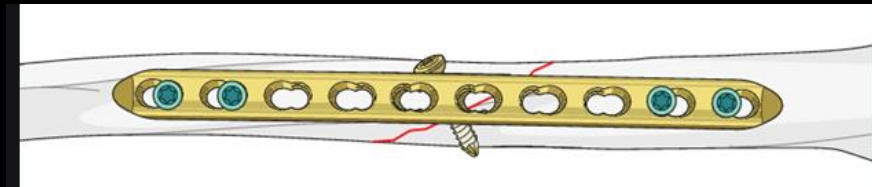
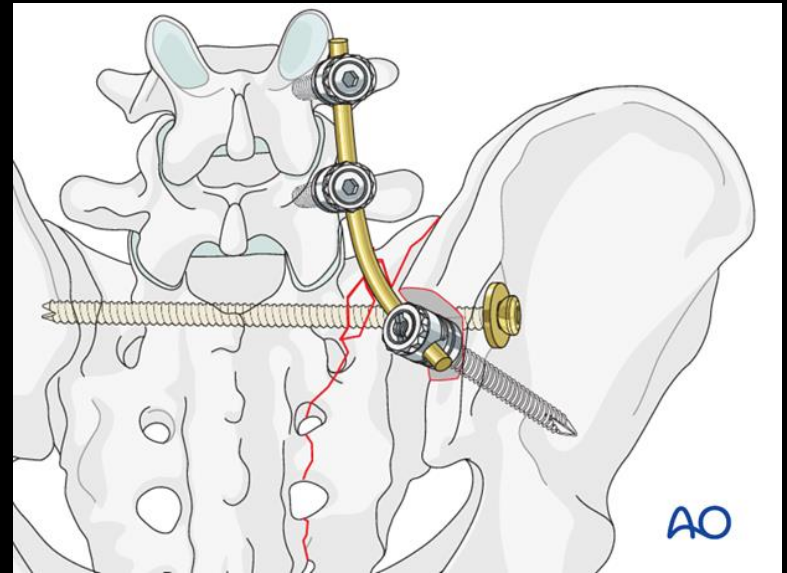
■ Con

- 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

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**

- **Pre-op kyphosis: 43 degrees**
- **Post-op kyphosis: 20 degrees**

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

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■ 13 patients **percutaneous**

- **Pre-op kyphosis: 29 degrees**
- **Post-op kyphosis: 28 degrees**

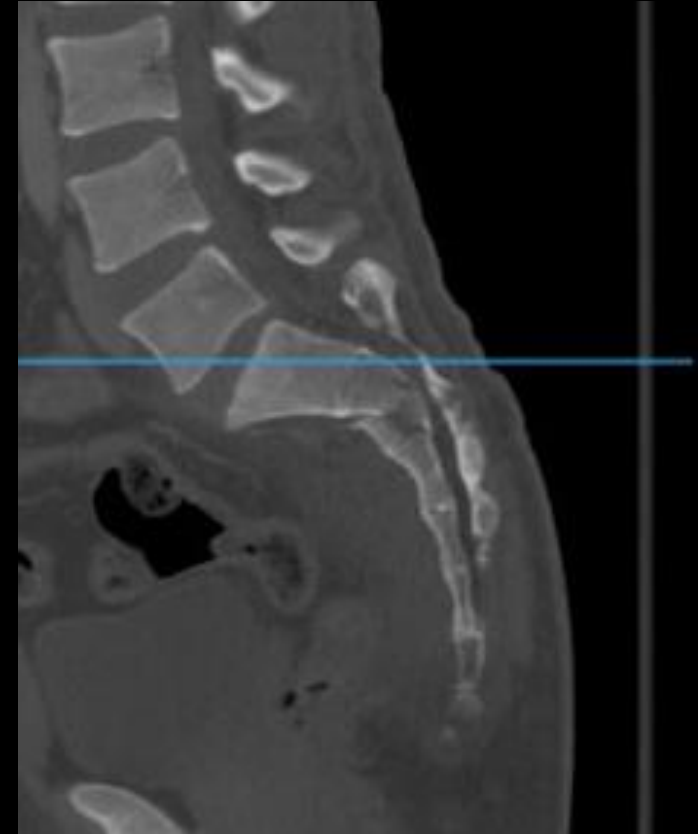
Goals of Treatment

- **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?

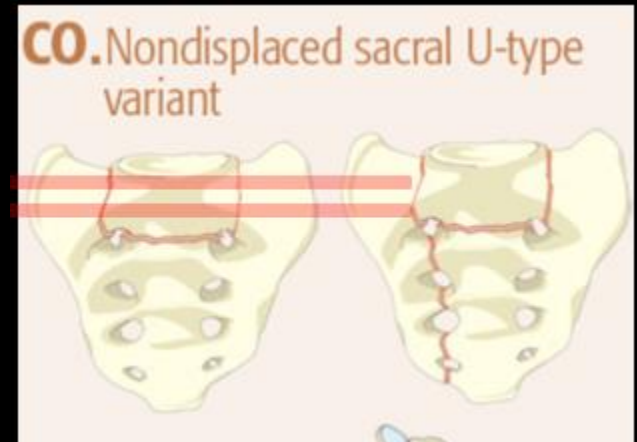
Choosing a fixation strategy?

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



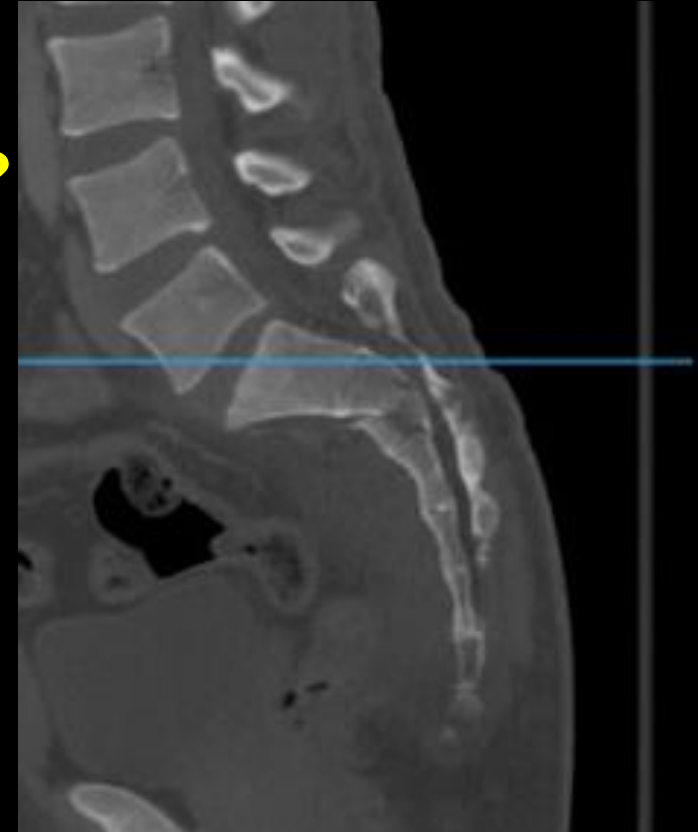
Choosing a fixation strategy?

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

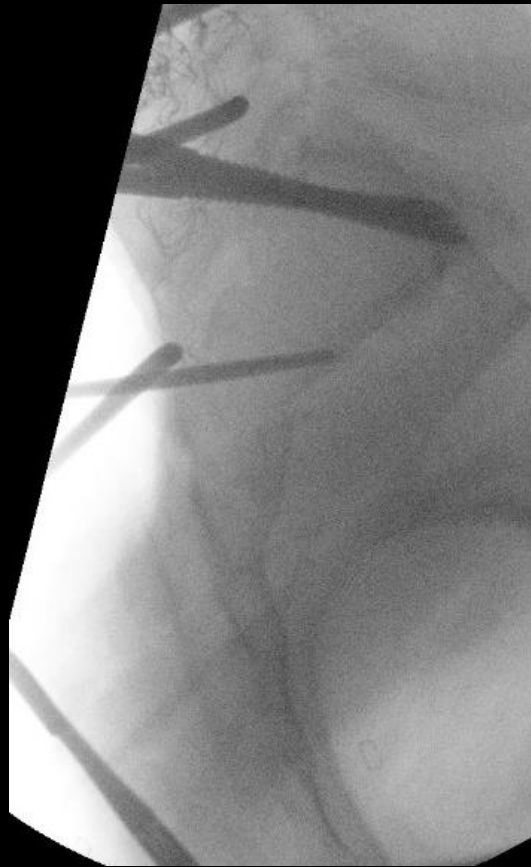


Choosing a fixation strategy?

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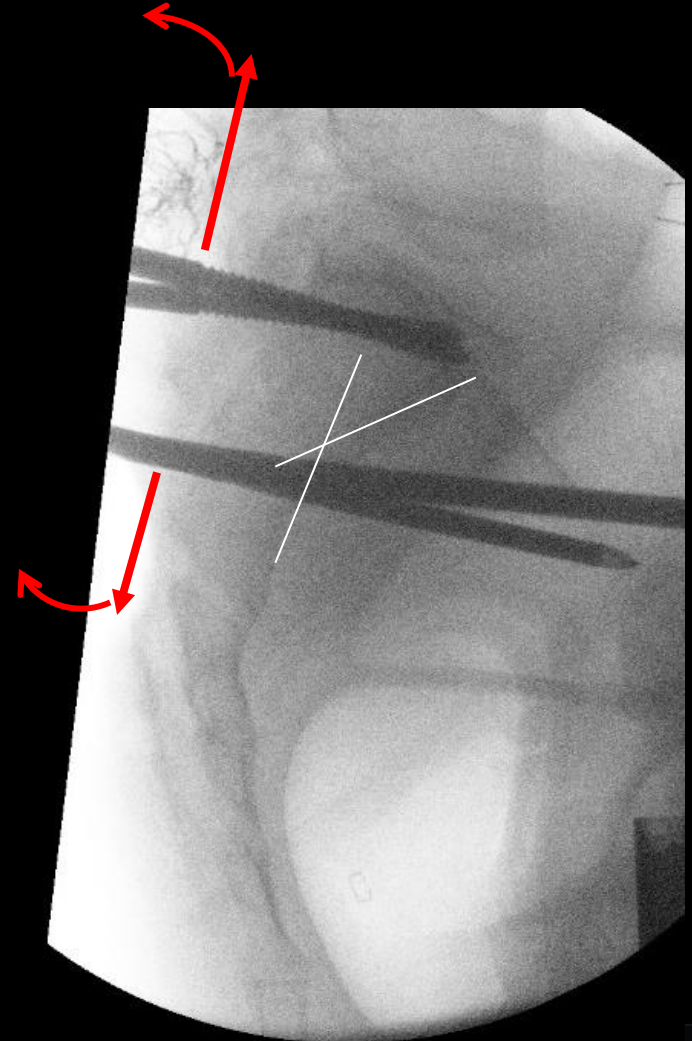
Case # 2



Reduction

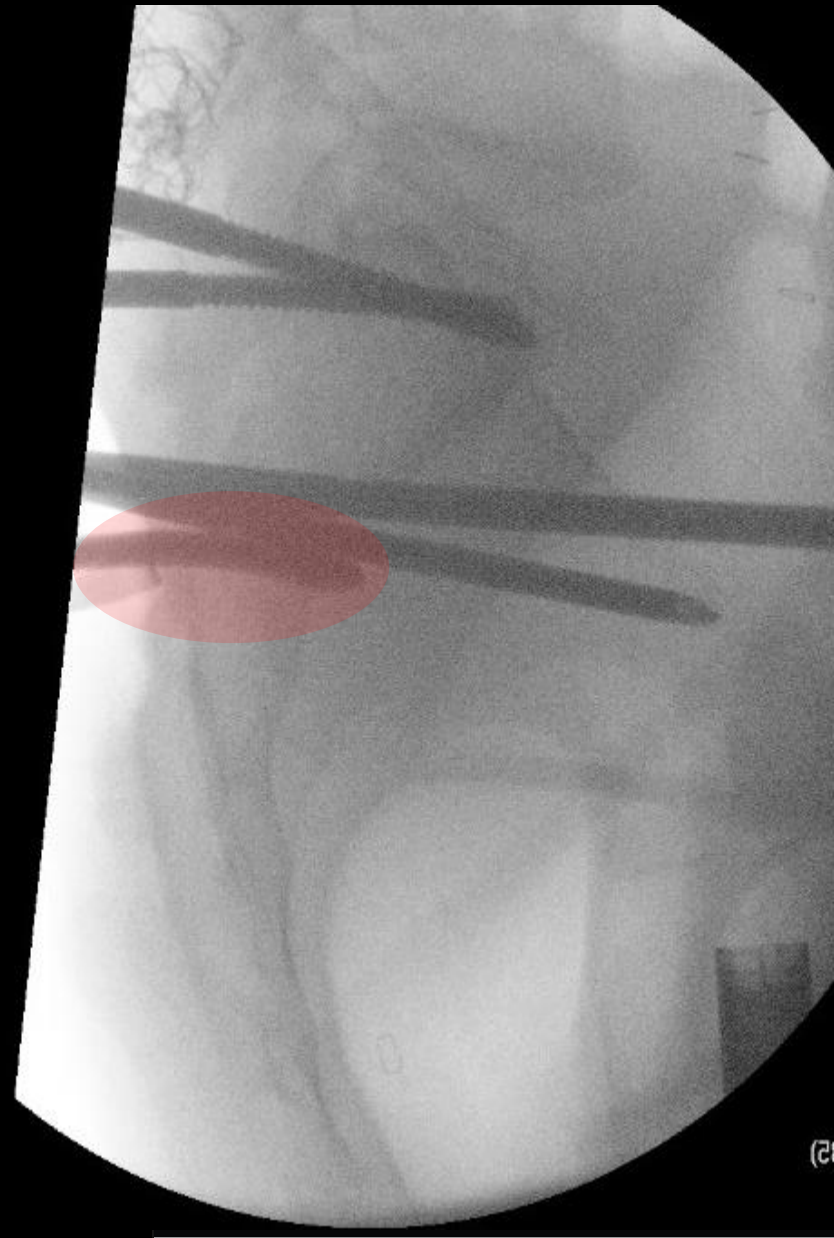
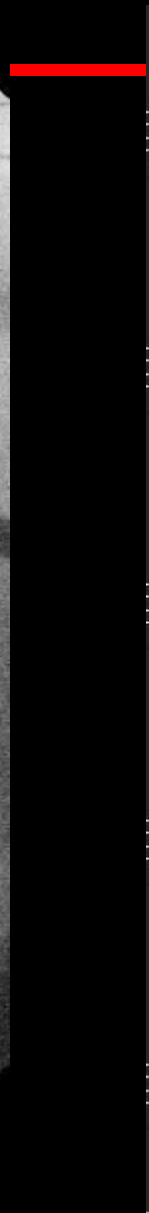


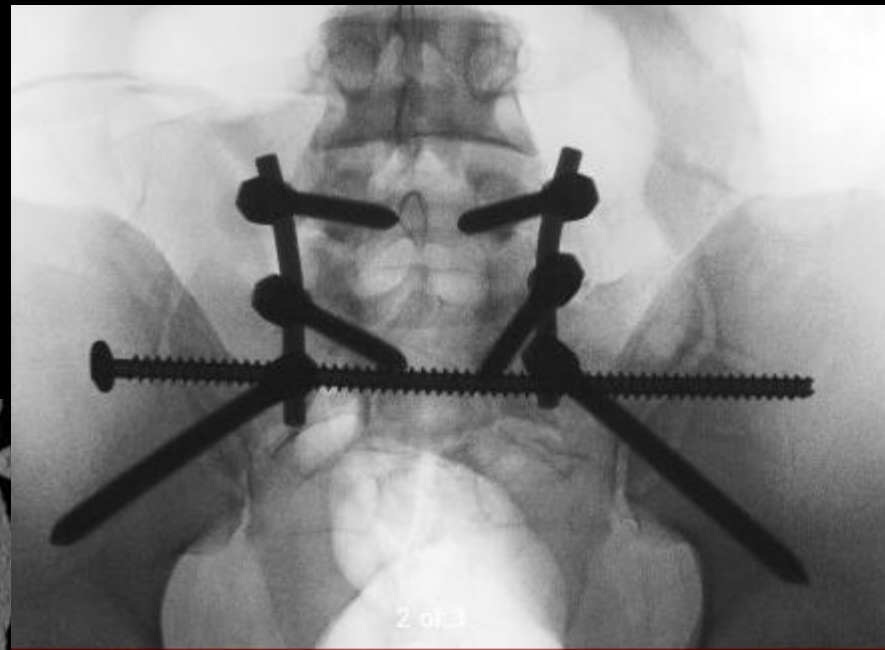
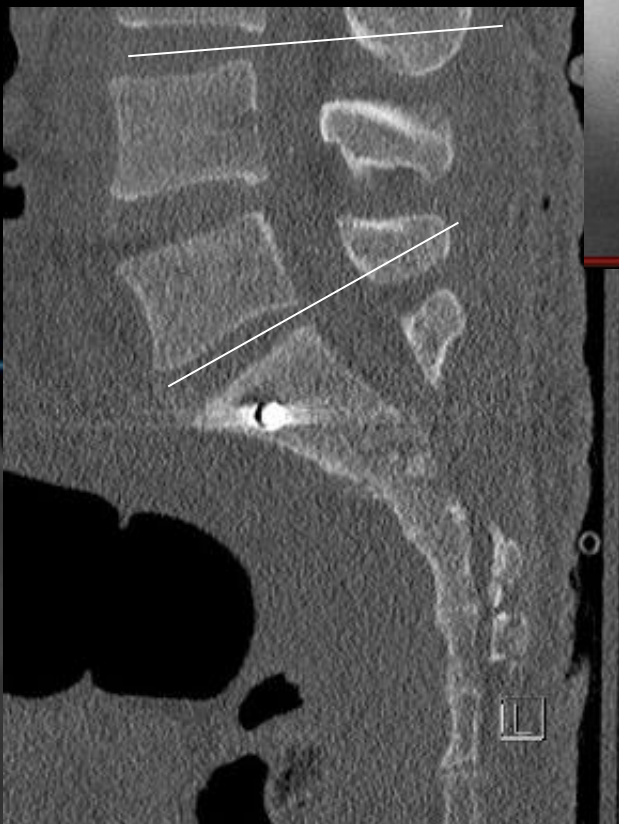
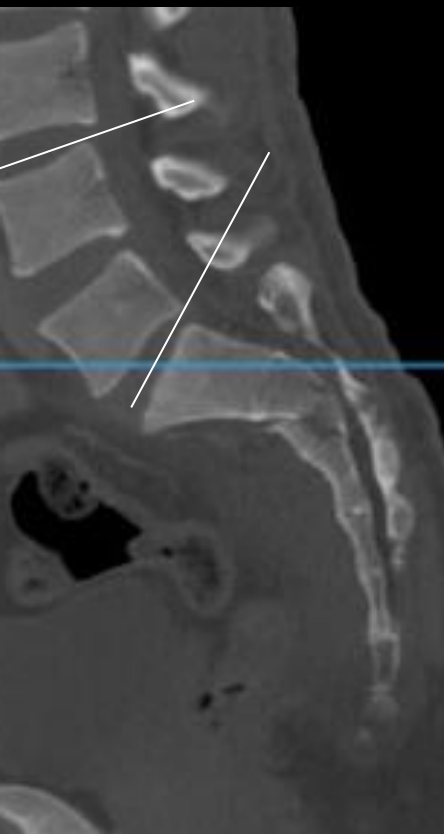
Short
Kyphosis



:20)

Reduction





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?

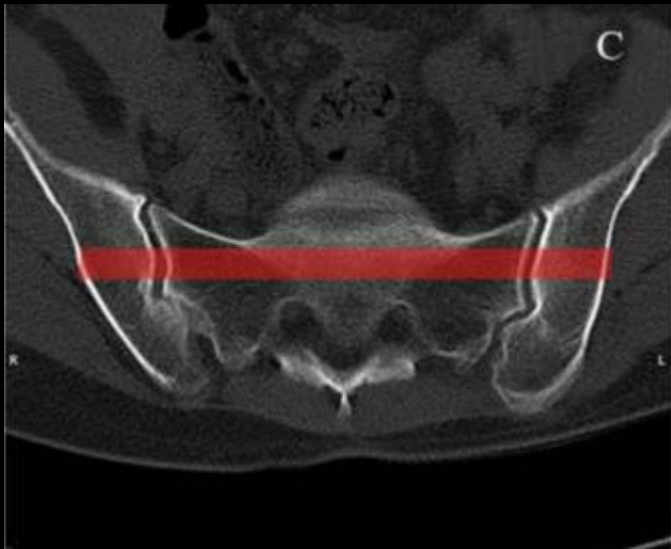


Choosing a fixation strategy?

- Is a neurologic decompression needed?
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- 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

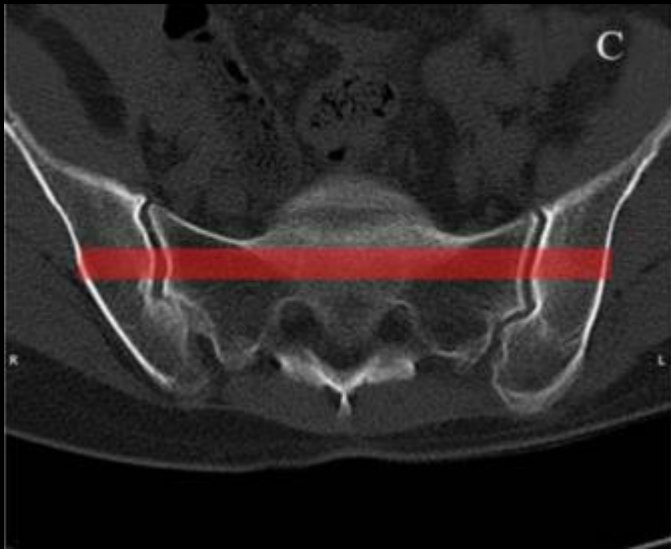
Upper Sacral Segment Variability

Non Dysmorphic

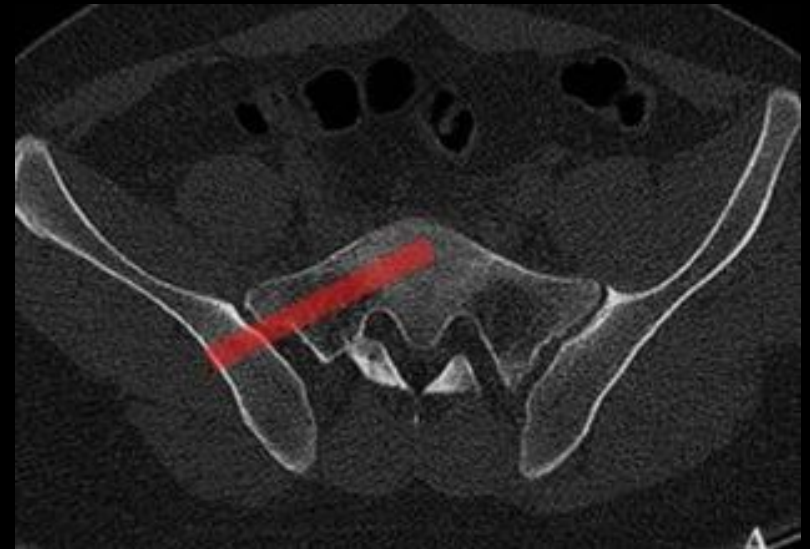


Upper Sacral Segment Variability

Non Dysmorphic

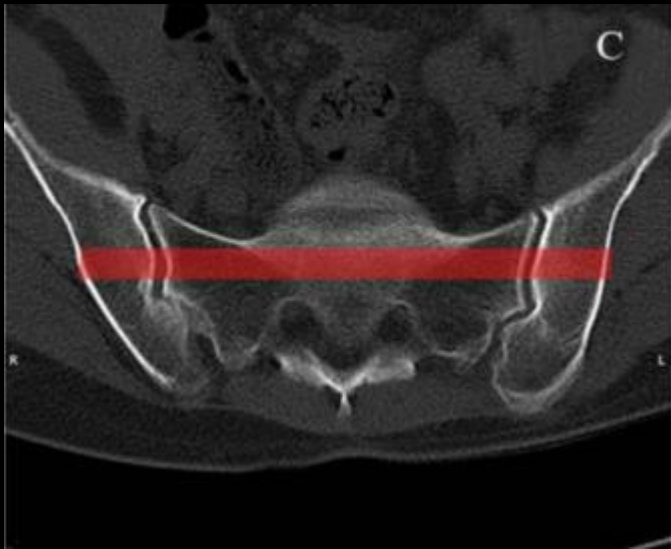


Dysmorphic

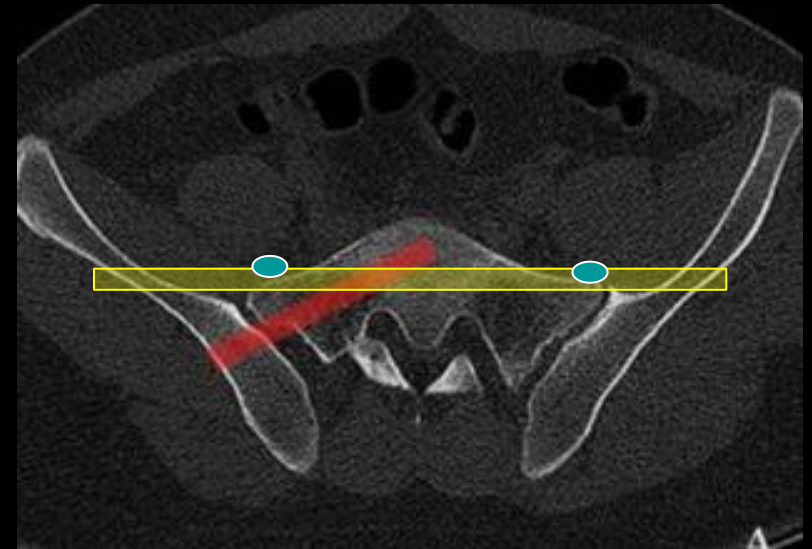


Upper Sacral Segment Variability

Non Dysmorphic



Dysmorphic

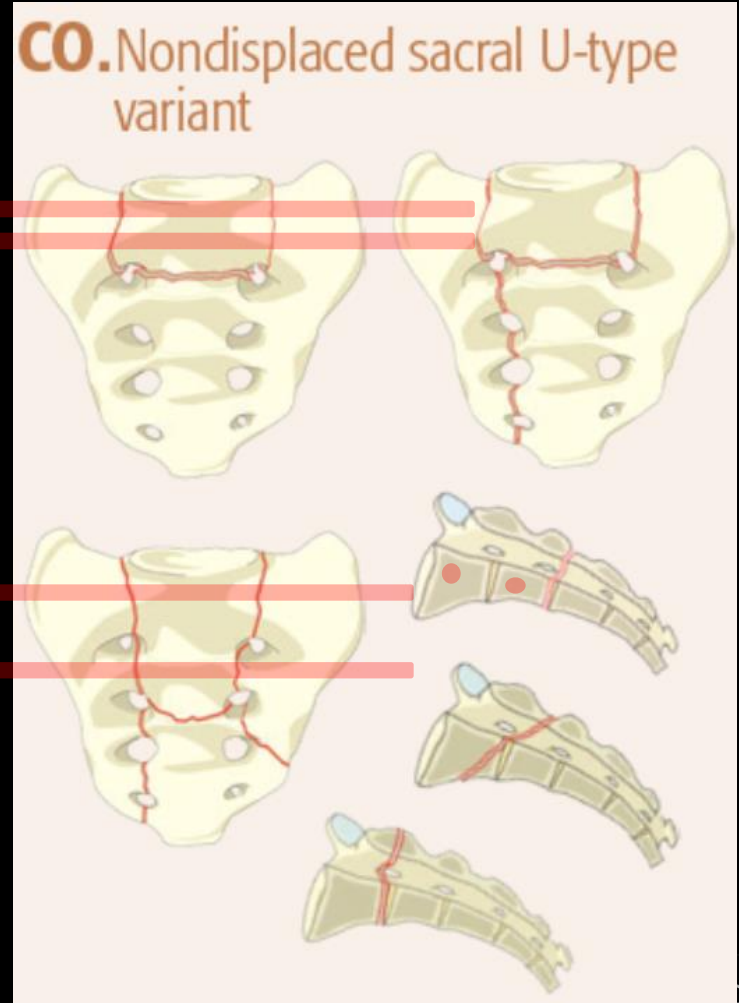


Choosing a fixation strategy?

- 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?

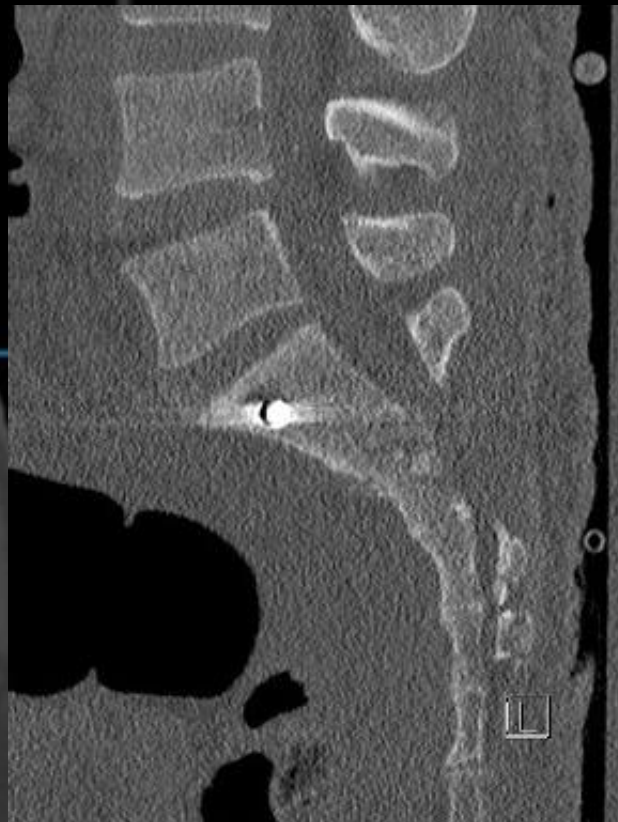
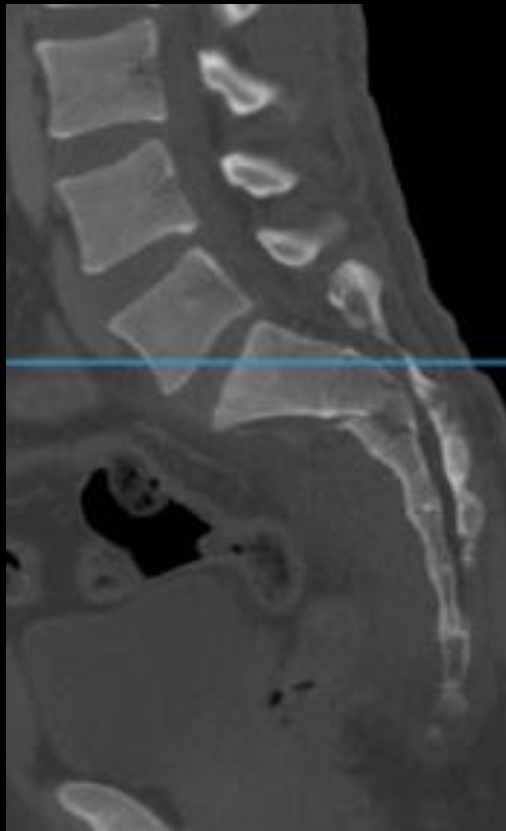
Minimally displaced fractures

- Generally treated with 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