

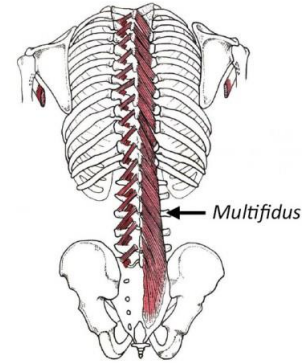
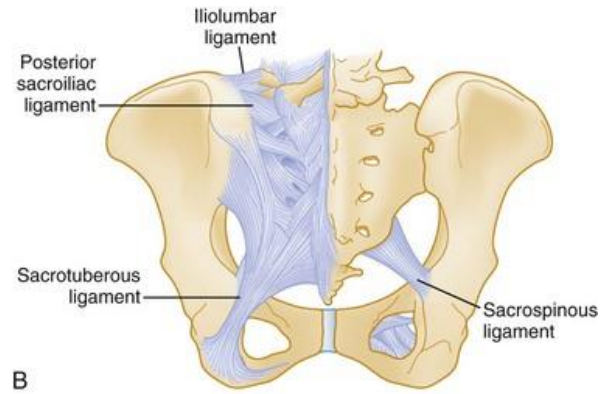
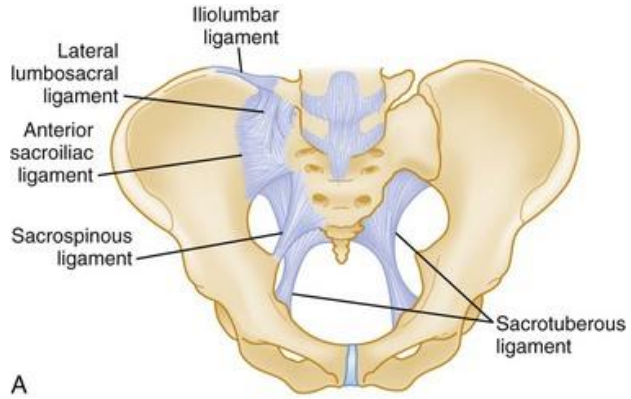
Sacrum Fractures

Dr Esat Kiter
Denizli, Turkey

- Anatomy & biomechanics
- What is different & challenges
- Classifications
- Imaging & treatment
- Surgical techniques

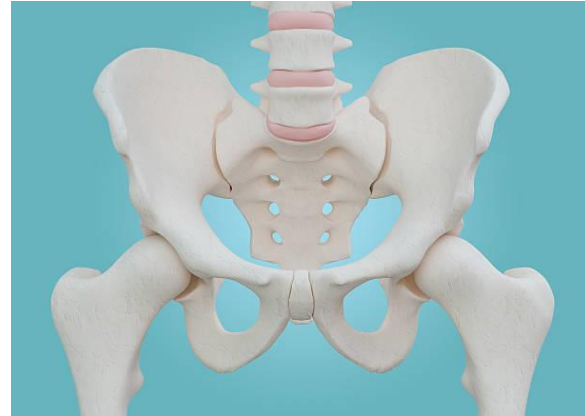
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- Mechanical nucleus of the axial skeleton
- Strong ligamentous structures
- Weak soft tissue envelope



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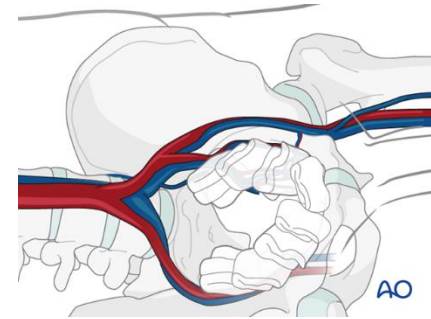
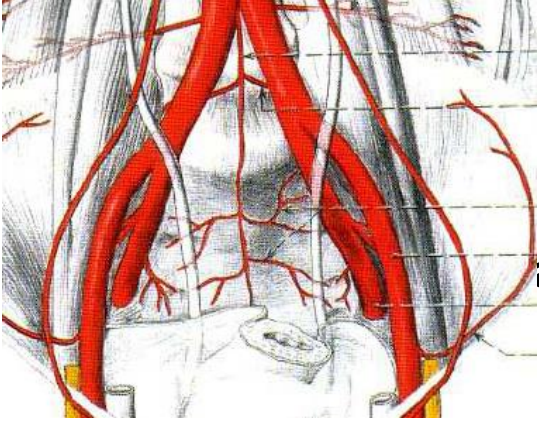
- Responsible from whole body load transfer
- Transmission of load distributed by first two sacral segment through iliac wings to the acetabulum



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- Only %5 of sacral fractures are isolated injuries
- Associated injuries are often more serious
 - Diagnosis and treatment may delay
- Bleeding is one of the challenging issue
 - Anterior-perisacral plexus, median sacral a., superior gluteal a.
 - Intrapelvic bleeding disturbs hemodynamic condition (in case of normal vissera)
 - Often needs urgent provisional fixation

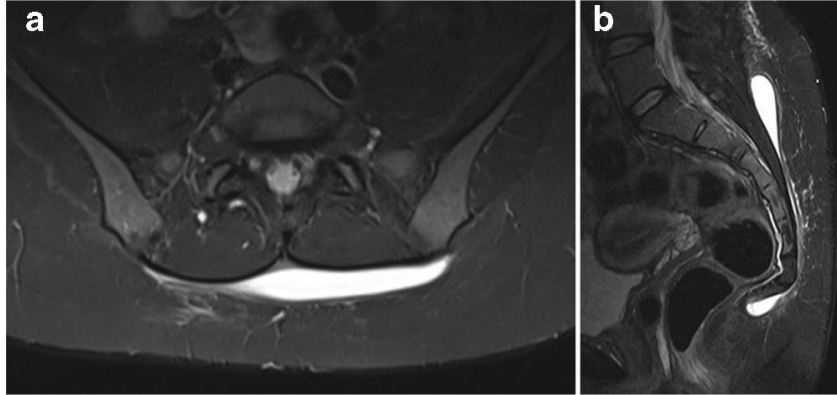
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Selective embolization
Pelvic compressive packing

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- Open fractures/Rectal- perineal injuries
 - cystomy /colostomy
- Skin deglowing (Morel Lavallée)



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•Associated fractures

-%80-90 Pelvic ring fractures

Os pubis > os ischium > os coxa

-Other spinal fractures

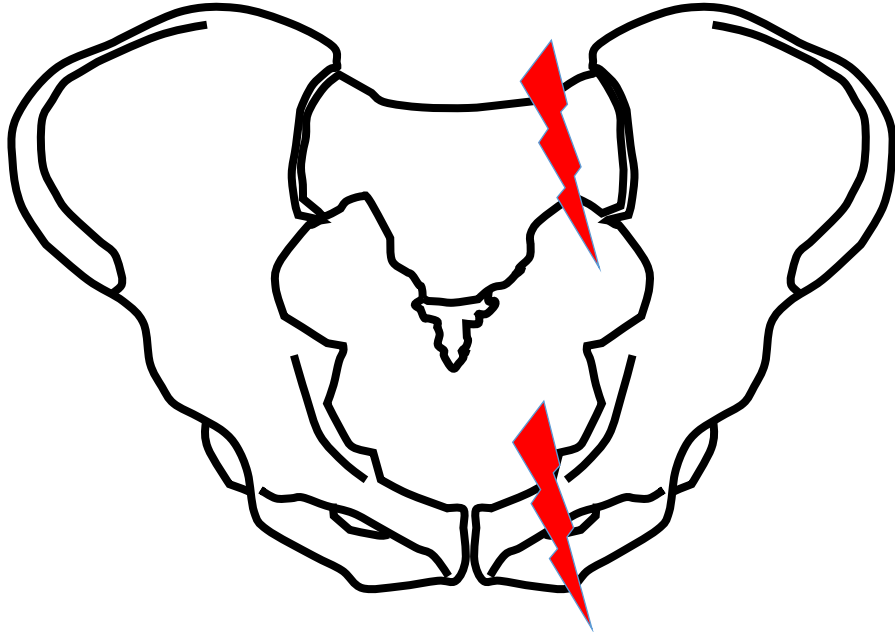
With transvers sacral fractures %62

Thoracolumbar junction

-Lumbosacral junction

→Lumbosacral subluxation

→Lumbopelvic dissociation



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Classification (s)

- According to energy of trauma
 - High energy (young patients)
 - Low energy (insufficiency fractures)
- Association of pelvic ring injuries
 - Young-Burgess
 - Tile classifications
 - AO classifications
- According to morphology of fracture (U-T-H)

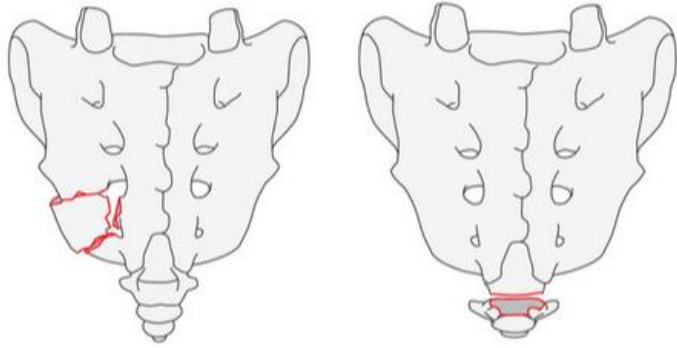
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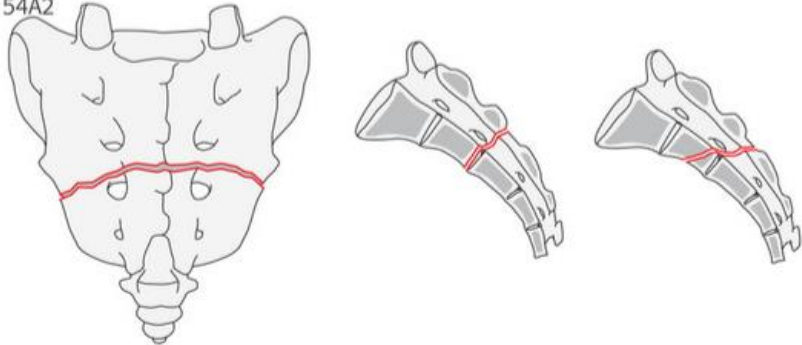
AO Type A

54: Sacrum

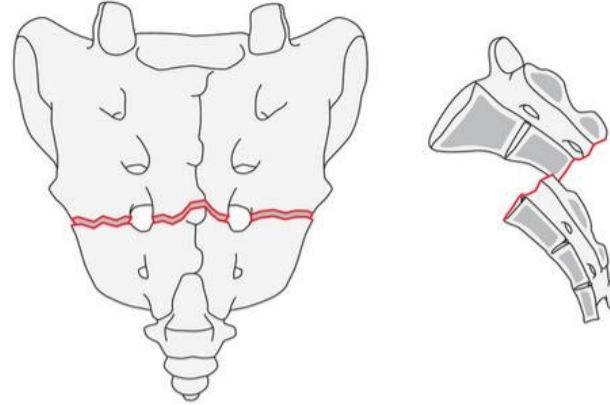
Group: Spine, sacrum, fractures of the lower sacral segments not associated with sacroiliac joint, **coccygeal or sacral compression injuries** 54A1



Group: Spine, sacrum, fractures of the lower sacral segments not associated with sacroiliac joint, **transverse fractures, nondisplaced** 54A2



Group: Spine, sacrum, fractures of the lower sacral segments not associated with sacroiliac joint, **transverse fractures, displaced** 54A3



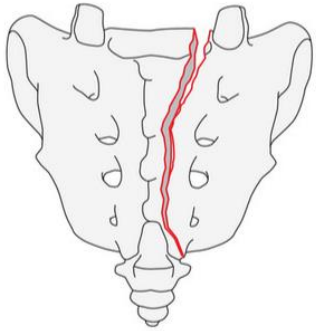
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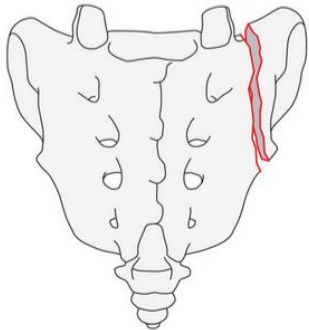
AO Type B

load bearing area is not intact !

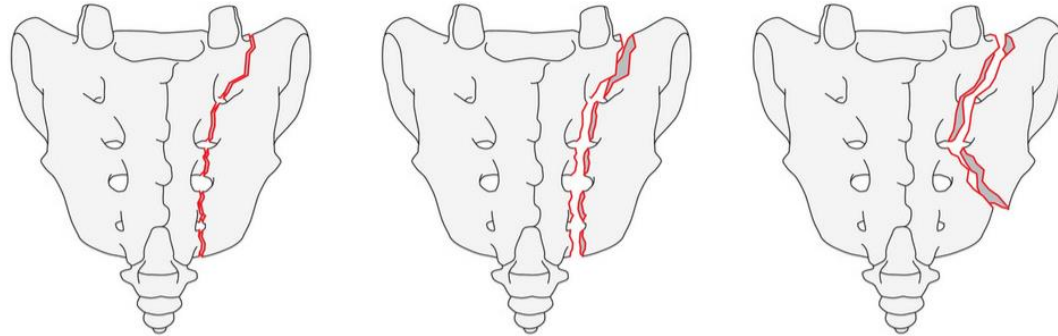
Group: Spine, sacrum, fractures involving the upper sacral segments associated with sacroiliac joint, **isolated vertical central fractures medial to the foramina involving the spinal canal (Denis III)** 54B1



Group: Spine, sacrum, fractures involving the upper sacral segments associated with sacroiliac joint, **transalar fractures lateral to the foramina or spinal canal (Denis I)** 54B2



Group: Spine, sacrum, fractures involving the upper sacral segments associated with sacroiliac joint, **transforaminal fractures involving the foramina but not the spinal canal (Denis II)** 54B3



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Neurologic injury

- **NX:** Cannot be examined.
- **N0:** No neurological deficits.
- **N1:** Transient neurological injury.
- **N2:** Nerve root injury.
- **N3:** Cauda Equina Syndrome/Incomplete spinal cord injury.
- **N4:** Complete spinal cord injury.

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Clinical Modifiers

- **M1:** Soft tissue injury.
- **M2:** Metabolic bone disease.
- **M3:** High energy injury that might be associated with an Anterior Pelvic Ring Injury, acetabular fracture or vascular injury.
- **M4:** Sacroiliac joint injury

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Challenges

- Multidisciplinary approach is required
- Treatment should be determined according to associated injuries
 - Associated pelvic ring injuries
 - Temporary fixation of pelvic ring to decrease blood loss
 - Osseous Instability -> rigid fixation
 - No instability /No neurologic findings-> conservative
 - Associated lumbosacral facet injuries
 - Temporary fixation of pelvic ring to decrease blood loss
 - Rigid fixation
 - Associated lumbosacral dislocation
 - Immediate rigid fixation

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Challenges

- Associated neurologic injury
 - Surgical treatment of neurologic injury is controversial. Indications of decompression is not clear
 - With fragments encroachment in the sacral canal
 - Plexus injury

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- Sacral fractures represent unique injuries with a variety of fracture patterns
- Their treatment possesses many challenges and requires input from a multidisciplinary team for an optimum outcome
- Classification of the sacral fractures is complicated due to pelvic injury pattern
- If the load transferred area is intact fixation may not necessary

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Thank you