

Fractures of the Pelvis and Acetabulum in the Elderly

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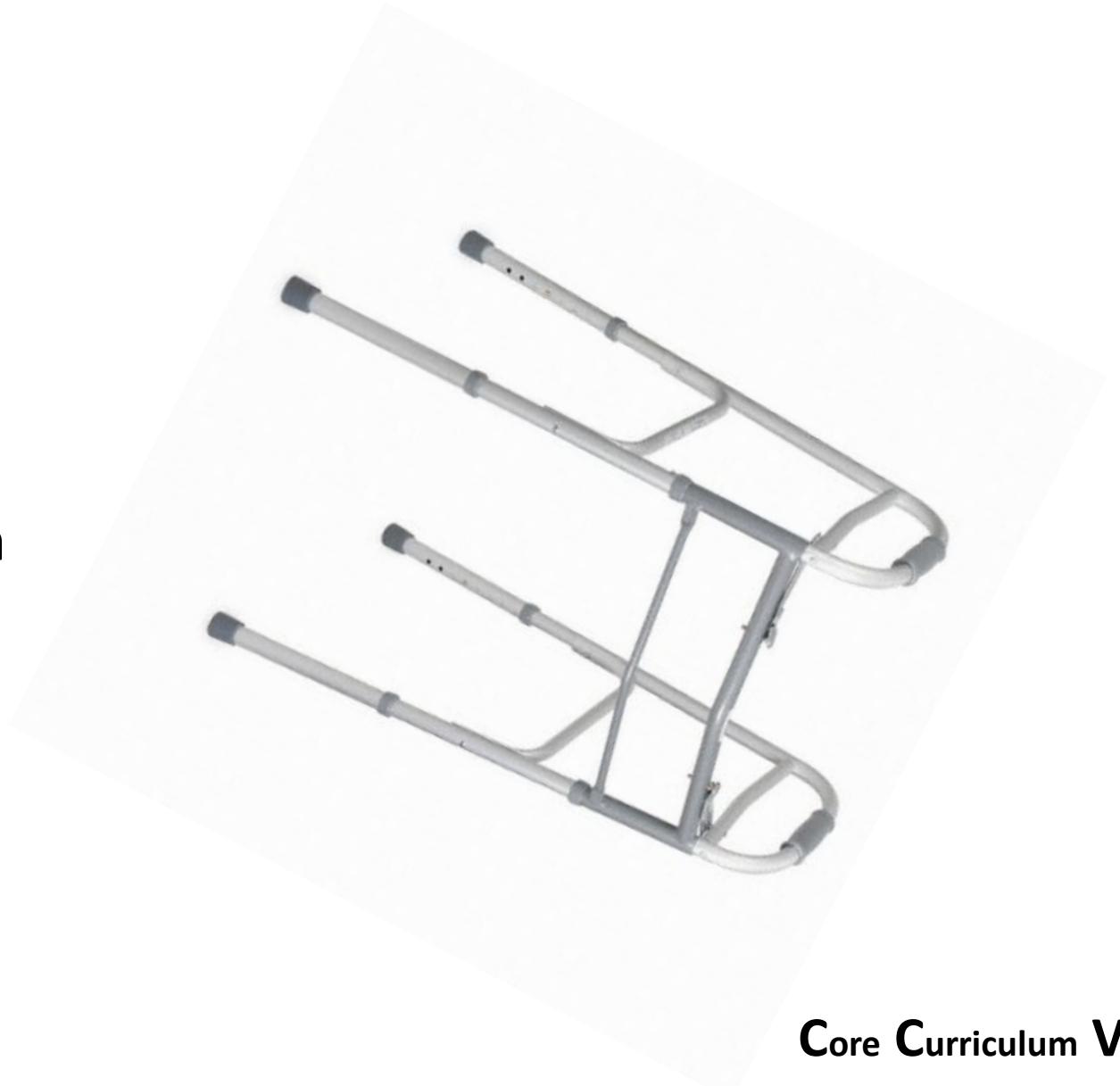
Coastal Orthopaedic Trauma

Objectives

- **Describe classification systems for pelvic and acetabular fractures**
- **Discuss differences in pelvic ring disruptions/acetabular fractures between adult and geriatric patients**
- **Discuss treatment options and recommendations in geriatric pelvis and acetabular fractures**

Introduction

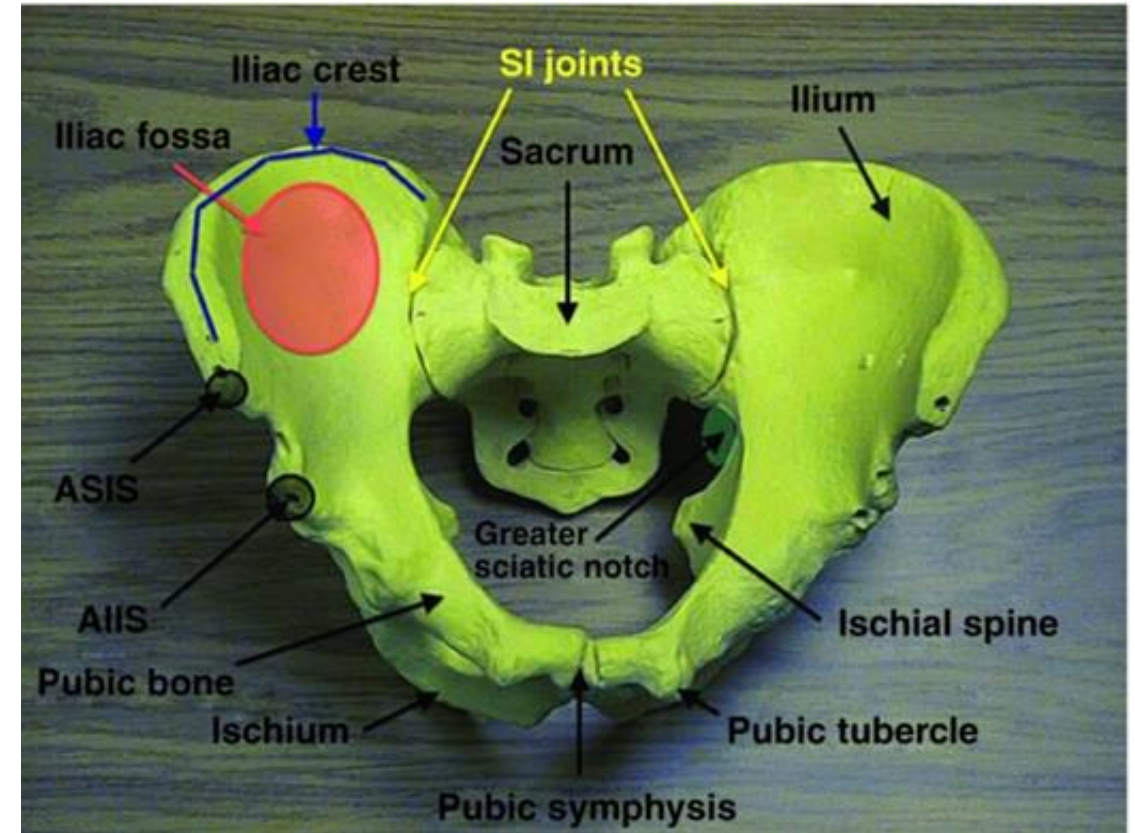
- Geriatric pelvic/acetabular fractures have shown a steady increase over the past few decades
- Low energy pelvic/acetabular fractures are much more common in the geriatric population due to osteoporosis and falls
- Although not entirely known, mortality rate for these injuries may be 20% or more



Anatomy - Bony

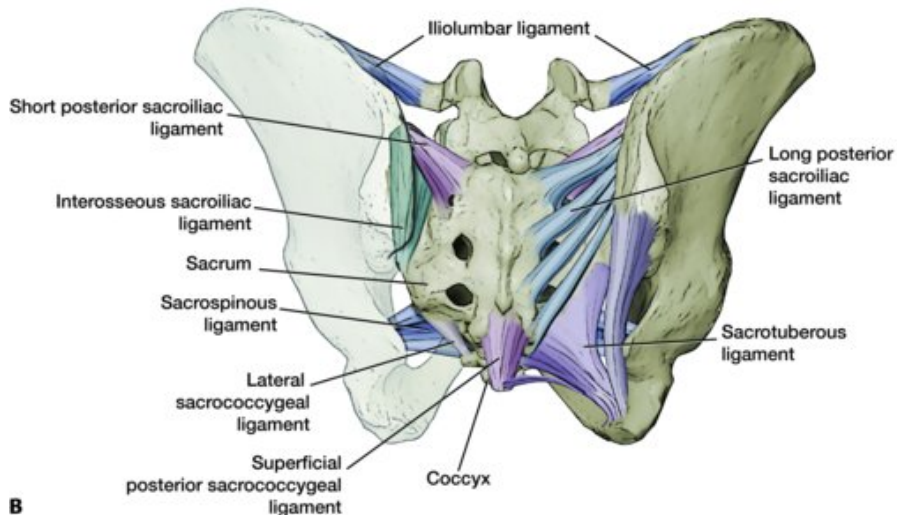
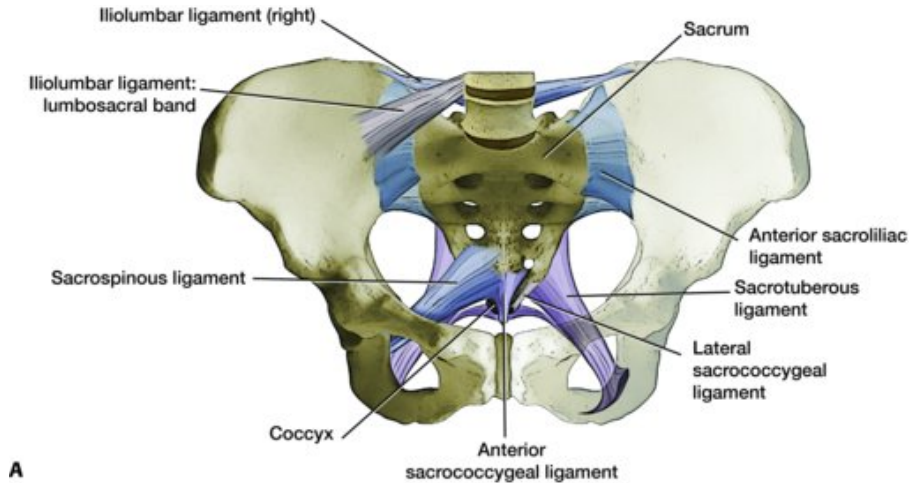


- Two innominate bones
 - Pubis
 - Ilium
 - Ischium
- Sacrum
- Articulates superiorly with L5 vertebral body and inferiorly with the femoral head



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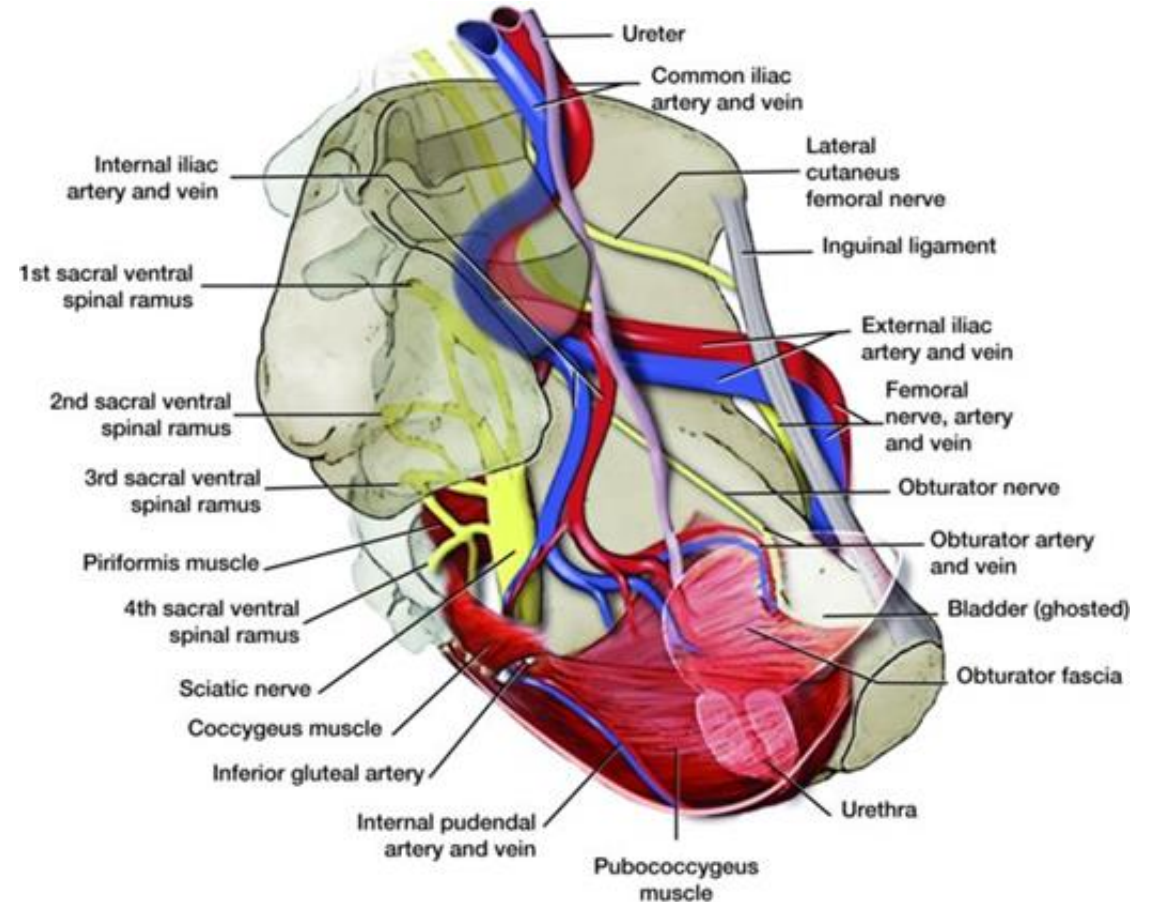
Anatomy - Ligamentous



- Sacrospinous ligament
 - anterior sacrum/coccyx to ischial spine
 - Divides sciatic notches (greater & lesser)
 - Rotational stability
- Sacrotuberous ligament
 - Posterior sacrum/coccyx to ischial tuberosity
 - Inferior border of lesser sciatic notch
 - Vertical stability
- Anterior SI ligaments
 - Prevent external rotation of hemipelvis

Anatomy – N/V & Foramen

- Greater sciatic foramen
 - Sciatic n., sup & inf gluteal vessels and n., pudendal vessels and n., n. to quadratus femoris, post fem cutaneous n., piriformis
- Lesser sciatic foramen
 - Tendon and n to obturator internus, pudendal vessels and n.
- Obturator foramen
 - Obturator artery, vein, and n.



Agarwal A. Chapter 51. Rockwood and Greens Fractures in Adults. Philadelphia: Lippincott Williams & Wilkins, 9e, 2019

Anatomy – Misc.

- The posterior ring transmits much of the forces involved in weightbearing, therefore,
- Posterior ring integrity most important in determination of stability and weight bearing status
- Inlet/outlet radiographs and CT scan for evaluation, rarely MRI

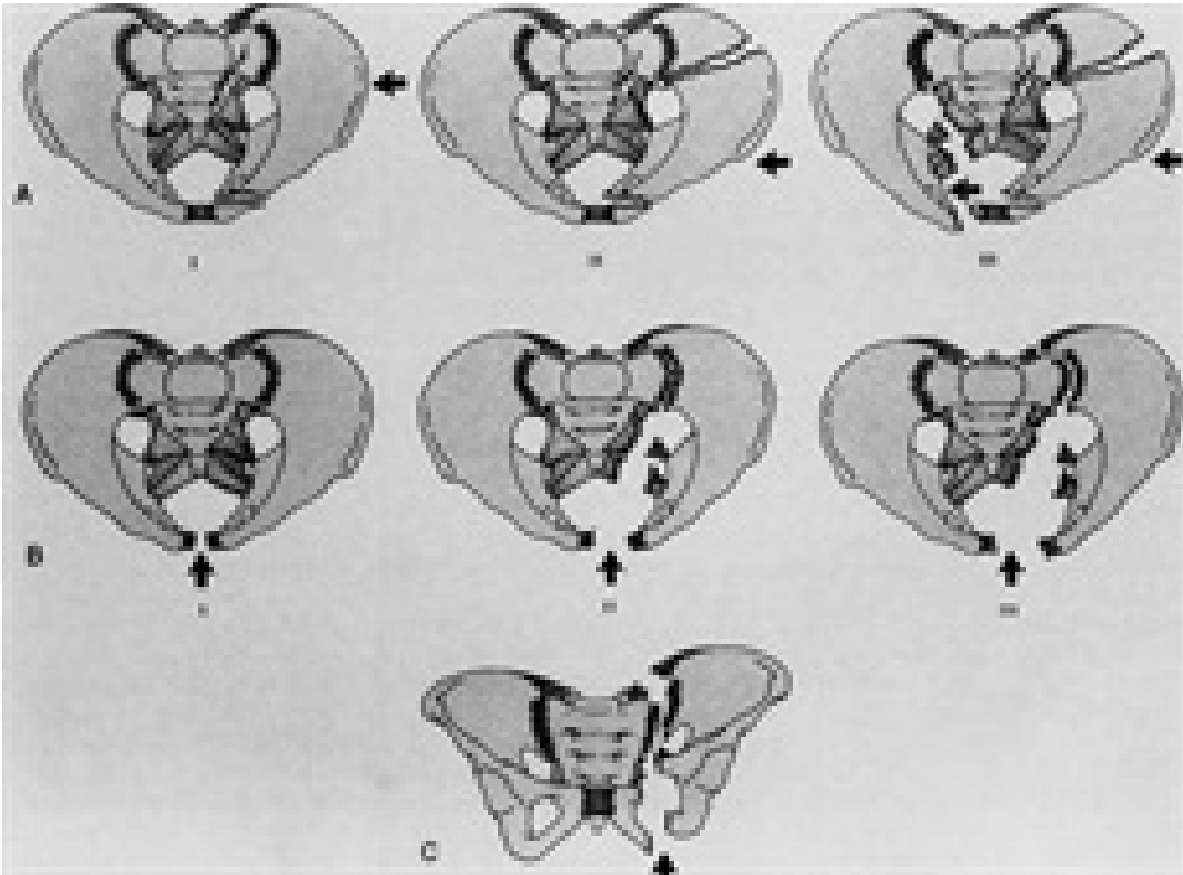


History & PE

- Injury mechanism
- Pre-injury f'n, ambulatory status
- Pre-existing hip/back pain
- Current living status (help determine discharge goals)
- Hemodynamic status
- Medical comorbidities (including anticoagulant use)
- Complete LE NV exam
- Examine pelvis for open wounds, blood at urogenital meatus/rectum
- Leg length
- SI joint TTP
- Motion pain/instability

Pelvic Ring

Classification – Young and Burgess



- **Young and Burgess Classification of Pelvic Ring Injuries**
- **LC: Anterior injury = rami fractures (horizontal)**
 - LC I: Sacral fracture on side of impact
 - LC II: Crescent fracture on side of impact
 - LC III: Type 1 or 2 injury on side of impact with contralateral open-book injury
- **APC: Anterior injury = symphysis diastasis/rami fractures**
 - APC I: Minor opening of symphysis and SI joint anteriorly
 - APC II: Opening of anterior SI, intact posterior SI ligaments (PSILs)
 - APC III: Complete disruption of SI joint
- **VS type: Vertical displacement of hemipelvis with symphysis diastasis or rami fractures anteriorly, iliac wing, sacral fracture, or SI dislocation posteriorly**

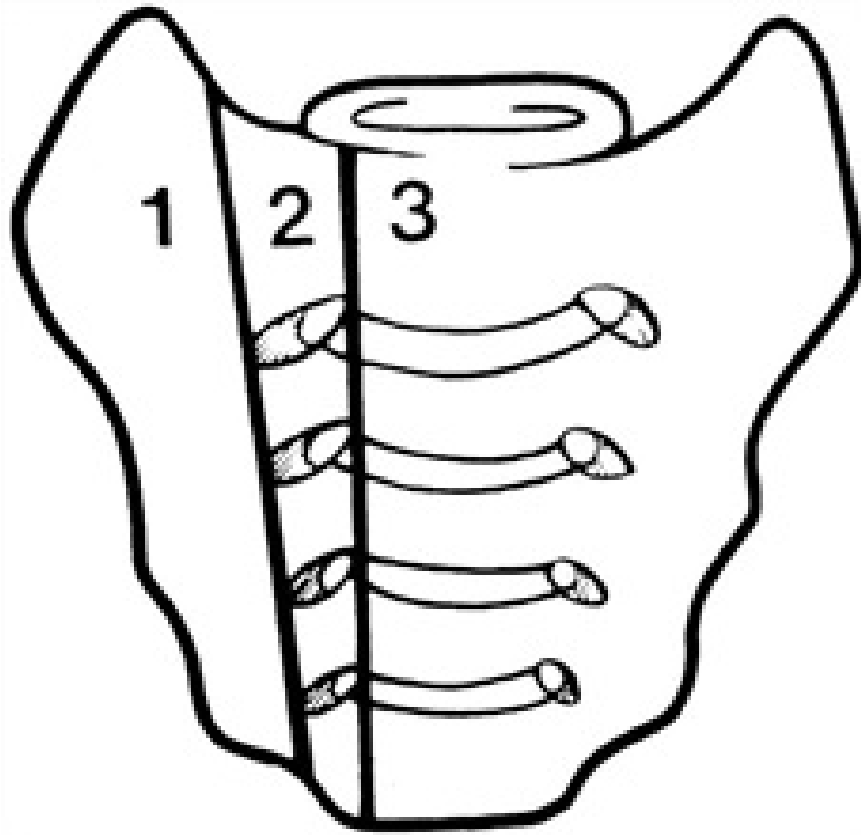
Innominosacral Dissociation: Mechanism of Injury as a Predictor of Resuscitation Requirements, Morbidity, and Mortality. Whitbeck, M Gordon Jr; Zwally, H Jay II; **Burgess**, Andrew R. Journal of Orthopaedic Trauma: [January 2006 - Volume 20 - Issue 1 - p S57-S63](#)

Classification – Tile

- **Tile Classification of Pelvic Ring Injuries**
- **Type A: Pelvic ring stable**
 - A1: Fractures not involving the ring (i.e., avulsions, iliac wing, or crest fractures)
 - A2: Stable minimally displaced fractures of the pelvic ring
- **Type B: Pelvic ring rotationally unstable, vertically stable**
 - B1: Open book
 - B2: LC, ipsilateral
 - B3: LC, contralateral, or bucket-handle-type injury
- **Type C: Pelvic ring rotationally and vertically unstable**
 - C1: Unilateral
 - C2: Bilateral
 - C3: Associated with acetabular fracture



Classification - Denis



- Zone 1
 - Lateral to foramen
- Zone 2
 - Through foramen
- Zone 3
 - Medial to foramen
 - Neurologic injury most common in zone 3 fractures

Hemodynamic Instability

- Less common in low energy pelvic ring injuries
- Objective measurements that may indicate HD instability
 - SBP < 90 mm Hg
 - Need for transfusion > 2 u
 - Ongoing drop in Hgb/Hct
 - Serum Lactate > 2.5
 - Base deficit > 5
- Treatments
 - Pelvic binder/sheet (level of trochanters)
 - External fixator
 - Preperitoneal pelvic packing



Treatment - Nonsurgical

- Indications: Stable injuries can be treated nonsurgically.
 - Isolated unilateral ramus fractures
 - Avulsion fractures
 - APC1
 - Some LC1 (incomplete sacral fx, < 1 cm displacement)
 - minimally displaced LC2?
- Integrity/severity of injury of posterior ring is highly important
- EUA
- Nonoperative treatment of intermediate severity lateral compression type I pelvic ring injuries with minimally displaced complete sacral fracture. Gaski GE et al. JOT 2014;28(12):674-80.
- Examination under anesthetic for occult pelvic ring instability. Sagi HC, et al. JOT. 2011;25(9). 529-537.

Treatment - Nonsurgical

- Toe touch to full weight bearing with assistance depending on severity of fx
 - Small Denis zone I fx's or isolated unilateral ramus fx's can often WBAT immediately with a walker
- + or - X-rays after mobilization to look for displacement
- Negative stress examination under anesthesia reliably predicts pelvic ring union without displacement. Whiting PS, et al. JOT. 2017;31(4):189-93.
- Pelvic ring fractures in the elderly. Kuper MA, et al. EFFORT Open Rev. 2019;4(6):313-20.

Treatment - Nonsurgical

- Bony healing typically around 6-8 weeks and FWB often allowed with ER injury
- With vertically unstable or bilateral fracture pattern, may delay WB up to 3 months
- Unstable pelvic ring injuries: how soon can patients safely bear weight? Marchand LS, et al. JOT. 2019;33(2):71-7.

Surgical Indications

- APC 2 & 3
- Vertically unstable
- LC 3, most LC 2
- Some LC 1 fx's
 - with complete sacral involvement including the posterior sacral cortex and/or large hematoma posterior to the sacrum may be a sign of instability
- EUA
 - >2.5 cm PS widening on ER stress
 - >1 cm pubic body vert displacement on push/pull
 - >1 cm ramus or symphyseal overlap on IR stress
- Inability to mobilize with nonsurgical Tx



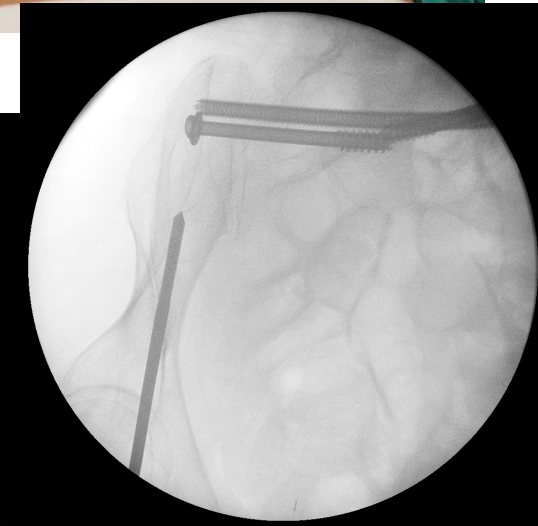
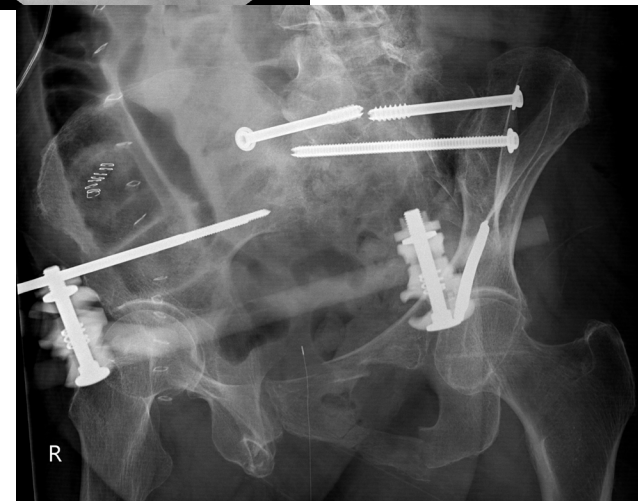
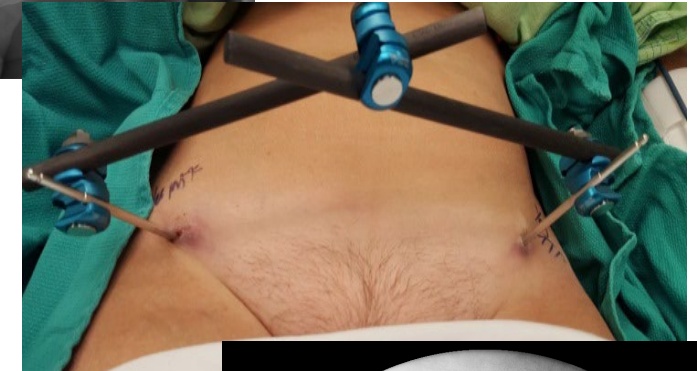
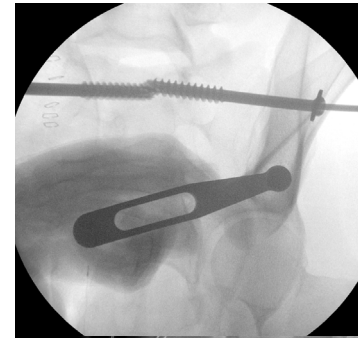
Special Considerations Geriatric Pelvic Fx

- Osteoporosis
- Locked plating?
- Vit D/Calcium
- DEXA
- Prescription treatments for osteoporosis
- DVT prophylaxis
- Difficulty in mobilizing
 - Whereas a young adult may be able to comply with toe touch weight bearing, some geriatric patients may not. TTWB on one leg may amount to wheelchair bound in geriatric patients along with accompanying risks (pressure sores, DVT, etc)



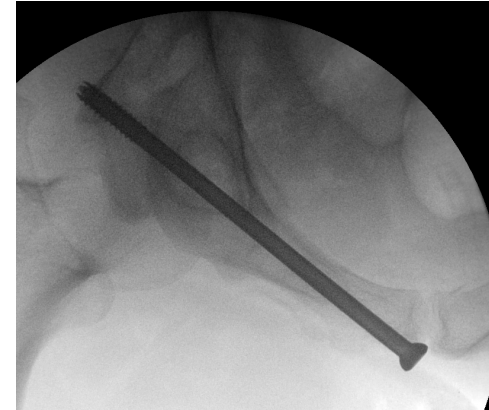
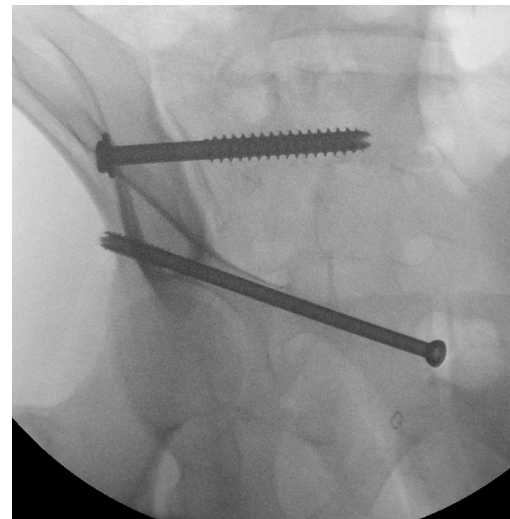
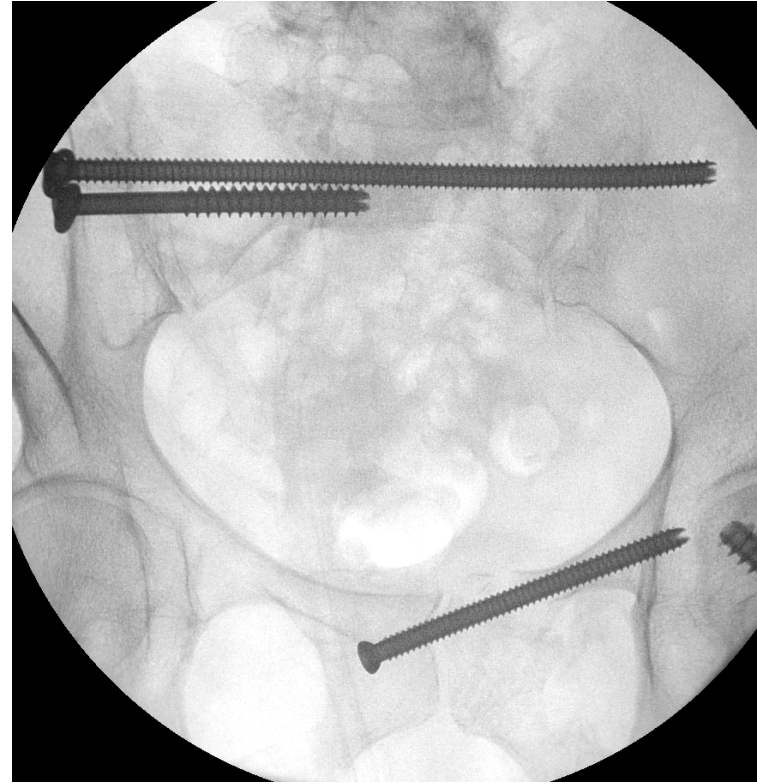
External Fixation

- Can provide stability to the anterior pelvic ring
- Pins in crest or AIIS
 - Pin trajectory viewed on iliac oblique and obturator inlet
- Can be applied for
 - resuscitation until definitive fixation
 - patients with highly comminuted anterior ring not amenable to percutaneous screw fixation
 - to help with mobilization in otherwise stable appearing injury in patient unable to weight bear due to pain
 - as adjunct fixation in high energy injury/poor bone quality



Ramus Screws

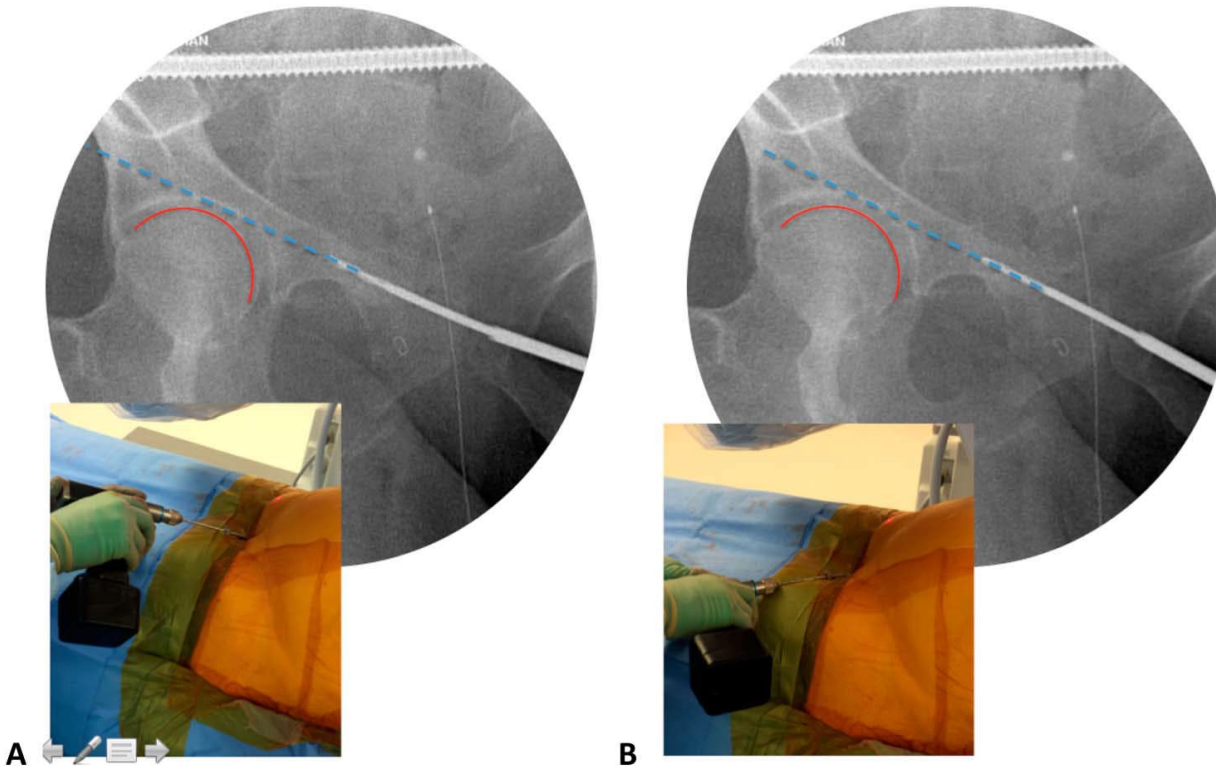
- Antegrade or retrograde
- May cross symphysis if adequate medial bone stock not present
- Views
 - Obturator outlet (view superior/inferior screw trajectory, especially at joint)
 - Iliac inlet (view anterior posterior screw trajectory near joint)
 - Inlet/outlet views near symphysis



Ramus Screws – Technique (for cannulated screws)

- Retrograde
 - Starting point pubic tubercle (approximately)
 - After obtaining start point drill over wire to open cortex and allow direction adjustment with further advancement of wire
 - A slightly bent wire can be used to avoid hip joint if necessary
 - Inlet (/iliac inlet) view for anterior/posterior direction of wire
 - Obturator outlet view for superior/inferior direction of wire
 - Antegrade-retrograde technique can be used if necessary (Weatherby et al)
 - Antegrade (similar to retro technique)
 - Starting point approx. base of gluteal pillar
 - Inlet view for anterior/posterior direction of wire
 - Obturator outlet view for superior/inferior direction of wire
- Intramedullary fixation techniques for the anterior pelvic ring. Eastman JG. JOT. 2018;32:s4-s13.
- The retrograde-antegrade-retrograde technique for successful placement of a retrograde superior ramus screw. Weatherby D, et al. JOT. 2017;31(7):e224-9.
- The percutaneous treatment of pelvic and acetabular fractures. Bates P, et al. 2010. <http://adamstarrmd.blogspot.com>.

Ramus Screw Technique (Retrograde)



- Guide wire inserted at starting point and starting point opened with larger bore drill
- Guide wire/small drill too inferior and patient thigh preventing proper trajectory

The retrograde-antegrade-retrograde technique for successful placement of a retrograde superior ramus screw. Weatherby D, et al. JOT. 2017;31(7):e224-9.

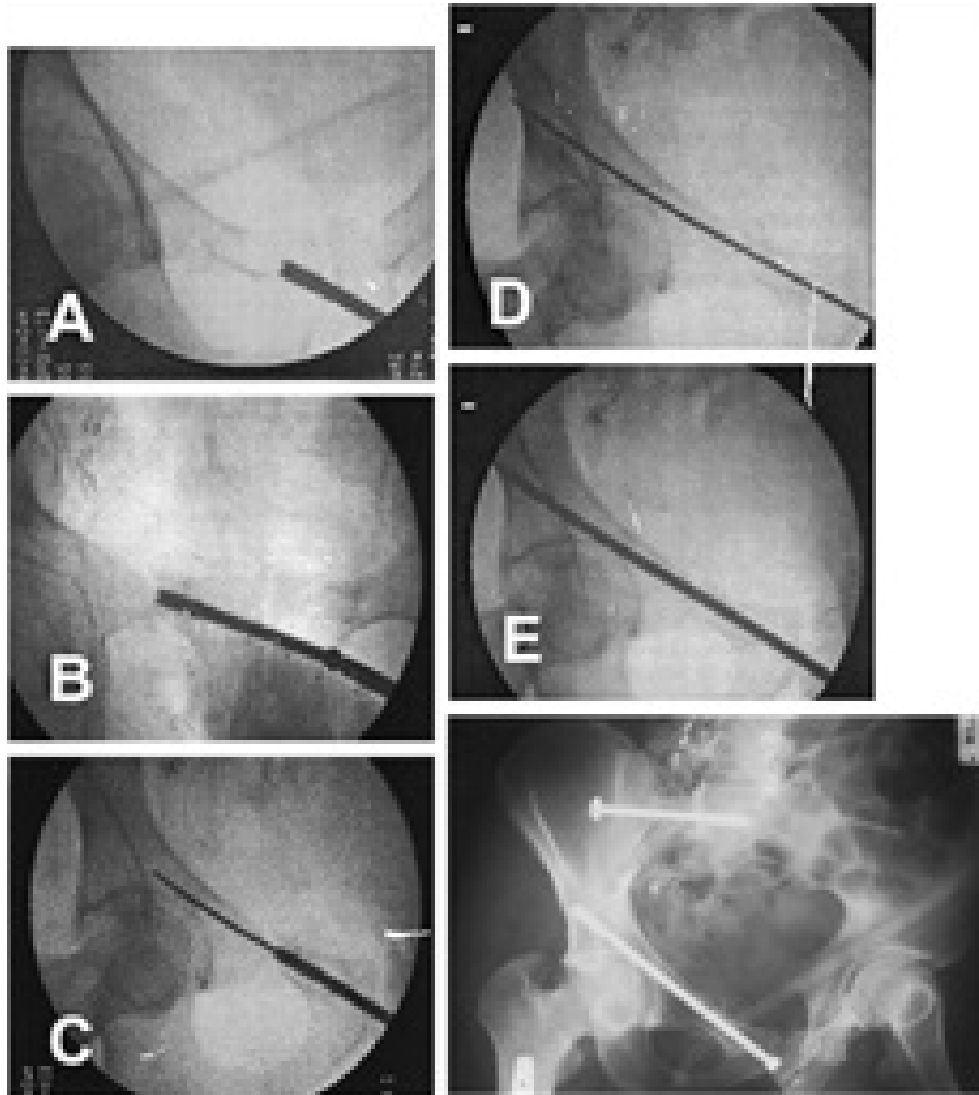
Ramus Screw Technique (Retrograde)



- Bent guidewire can be used to try to navigate above joint and through osseous fixation pathway (iliac outlet view)

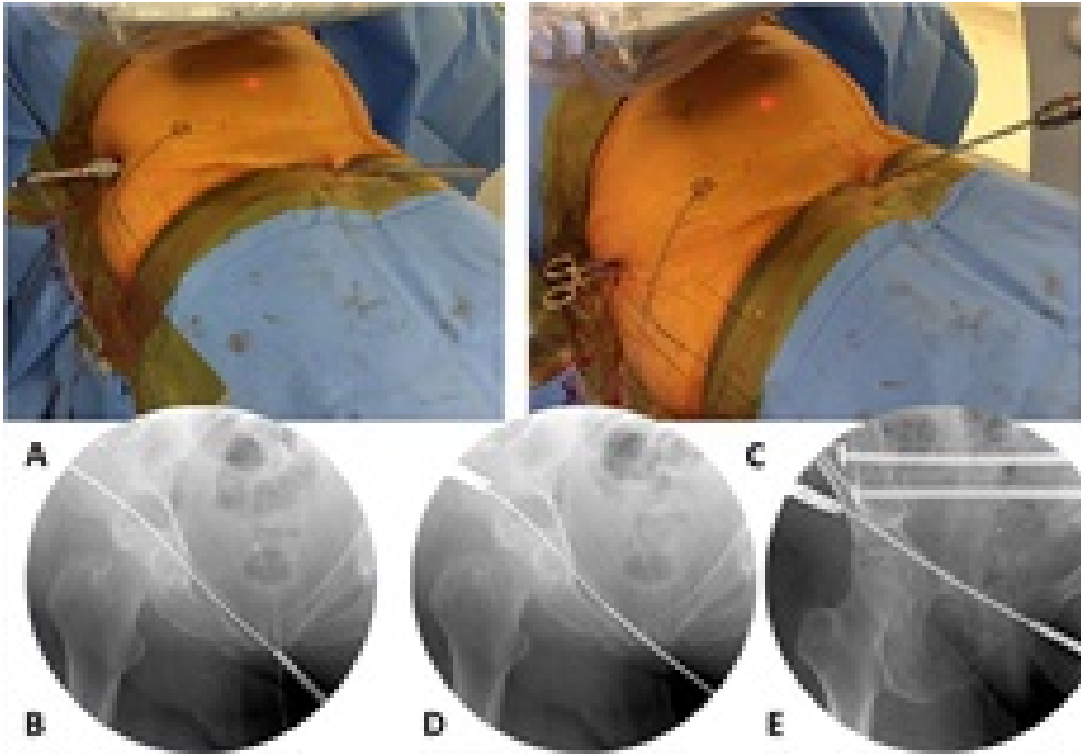
The retrograde-antegrade-retrograde technique for successful placement of a retrograde superior ramus screw. Weatherby D, et al. JOT. 2017;31(7):e224-9.

Ramus Screw Technique (Retrograde)



- Maneuvering the retrograde medullary **screw**: A: A temporary cannulated **screw** is advanced into the medial–distal fragment. B: The temporary **screw** and cannulated **screw** driver serve as a maneuvering device. C: The guidewire is directed centrally into the proximal–lateral fragment without penetrating the acetabular roof. D: The temporary **screw** is removed after insertion of the guidewire. E: A new cannulated **screw** is tightened to the lateral cortex of the ilium. F: The postoperative end result.

Ramus Screw Technique (Retrograde-Antegrade-Retrograde)

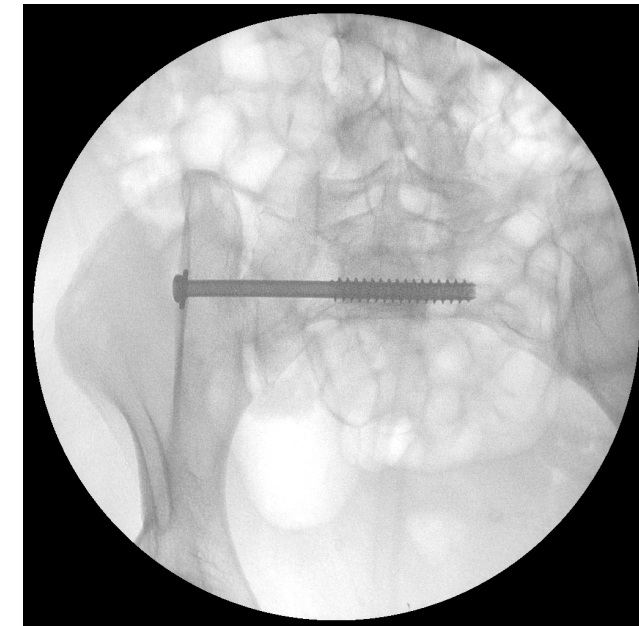
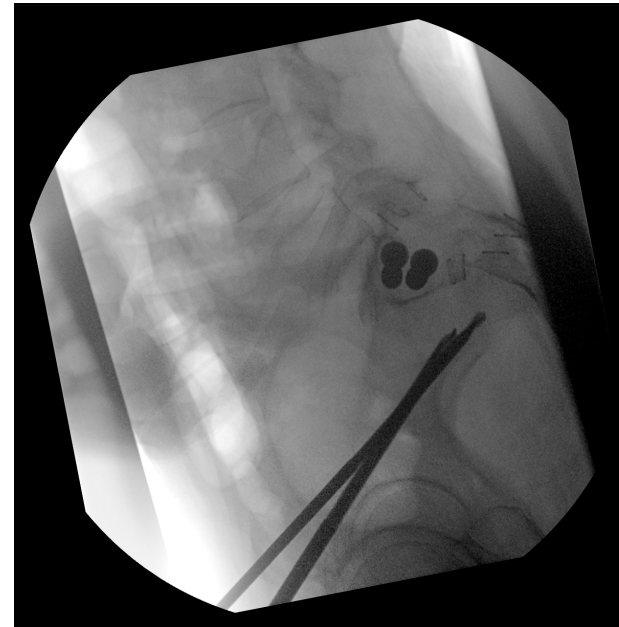


- When retrograde pathway cannot be established, wire can be placed antegrade and brought out the medial side (starting point for retrograde screw)
- Clinical photographs (A) and corresponding intraoperative fluoroscopic pelvic inlet view (B) demonstrating a T-handle chuck for wire advancement, and the cannulated **screw** length measurement guide used as a tool to retrieve the bent tip guide wire. Once obtained, the wire is advanced safely through the preexisting anterior incision without surrounding soft tissue injury. Ensuing clinical photograph (C) and corresponding fluoroscopic pelvic inlet view (D) and combined obturator oblique-outlet view (E) demonstrating retrograde **screw** placement over the antegrade placed guide wire. Note the percutaneous placement of a clamp on the guide wire to prevent unintentional wire advancement into a new soft tissue path during retrograde **screw** insertion.

The retrograde-antegrade-retrograde technique for successful placement of a retrograde superior ramus screw.
Weatherby D, et al. JOT. 2017;31(7):e224-9.

Ilio-sacral Screws

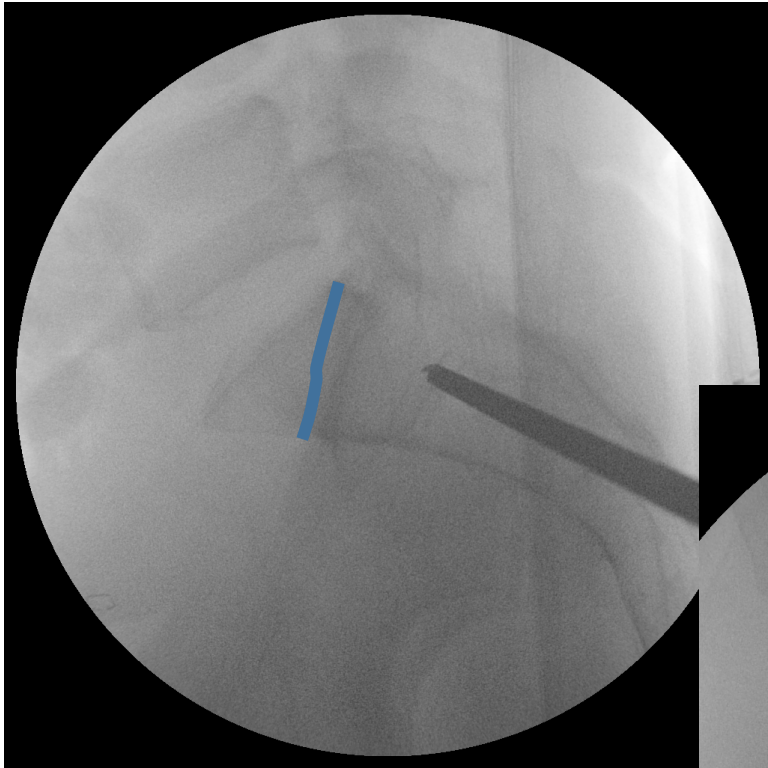
- Common treatment for posterior injuries
- Percutaneous reduction techniques
 - Allis/crest pin
 - Ball-spike
 - Manipulation of leg
 - Frame
- Views
 - Lateral (within sacral body and posterior to iliac cortical density)
 - Inlet (anterior to posterior screw trajectory)
 - Outlet (superior to inferior screw trajectory, sacral foramina)
 - Obturator inlet (screw head against cortex and TITS length)



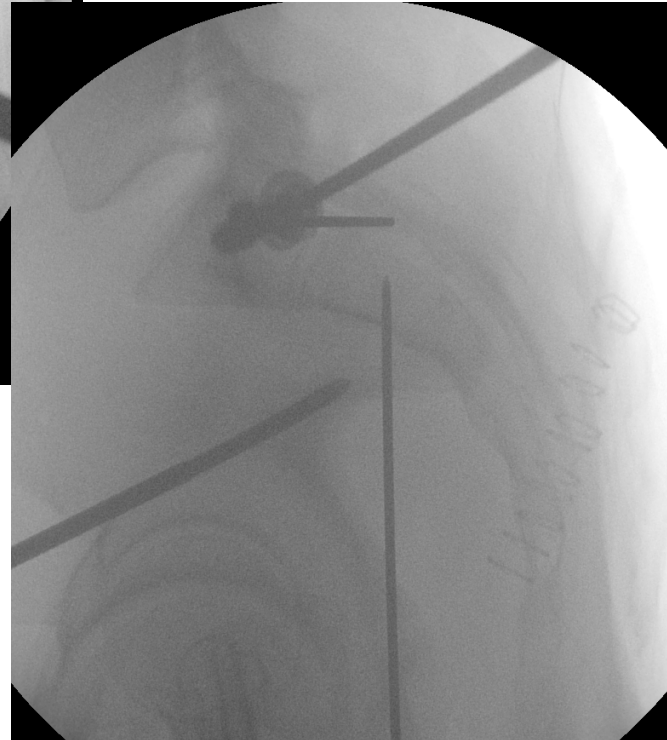
Iliosacral Screws – Technique (S1)

- Start with perfect lateral of the sacrum and obtain starting point (posterior S1 segment) with wire
 - Ensure screw within sacrum (posterior to iliac cortical density) as it passes sacral ala
- Alternate between inlet and outlet views to guide trajectory of wire within S1 segment
- Intraoperative fluoroscopic evaluation of screw placement during pelvic and acetabular surgery. Yi C, et al. JOT. 2014;28(1):48-56.
- The percutaneous treatment of pelvic and acetabular fractures. Bates P, et al. 2010.
<http://adamstarrmd.blogspot.com>.

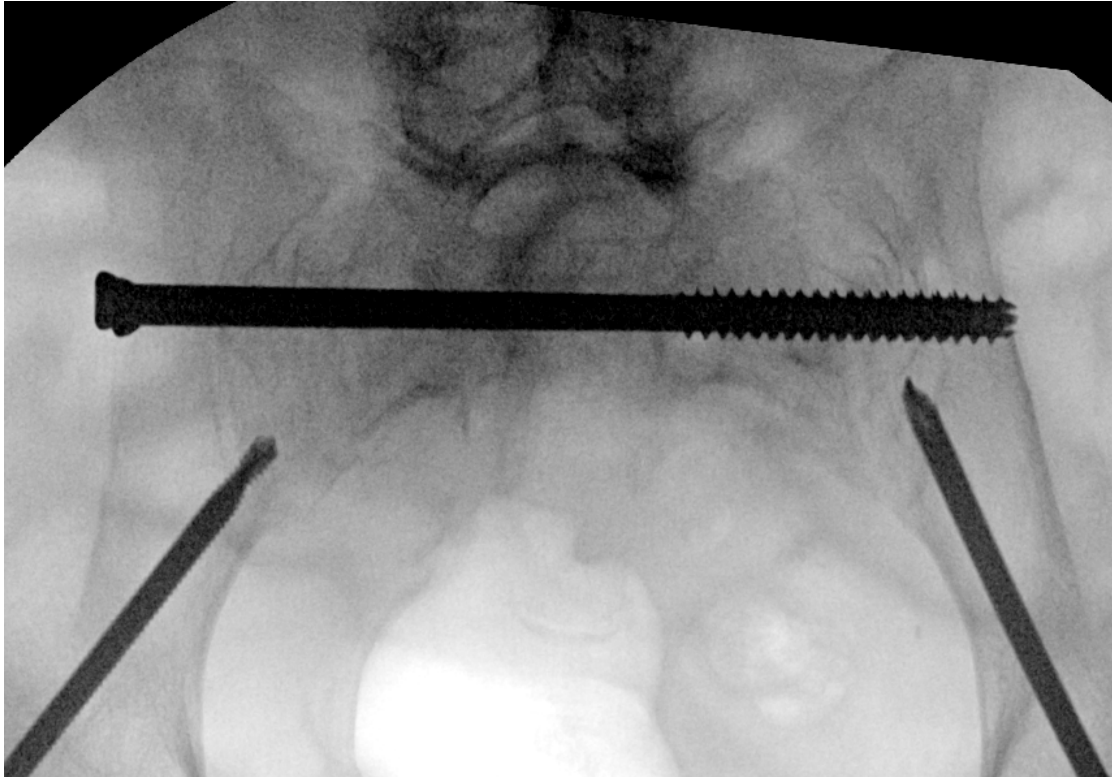
Iliosacral Screw Technique



- Lateral view
 - Use to obtain start point and again as wire/screw is passing sacral ala
 - Ensure no violation of iliac cortical density (sacral ala)
 - Center starting point on S2

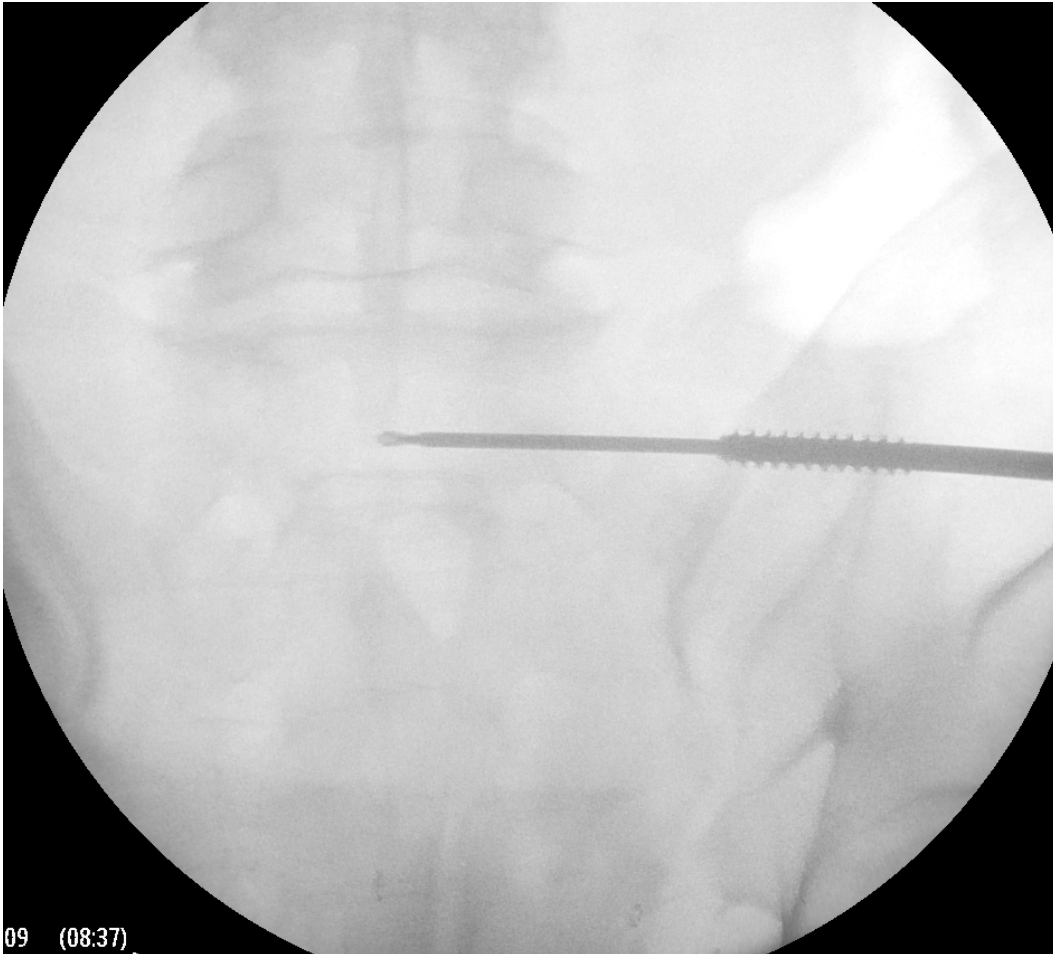


Iliosacral Screw Technique



- Inlet view
 - Evaluate anterior/posterior trajectory of screw

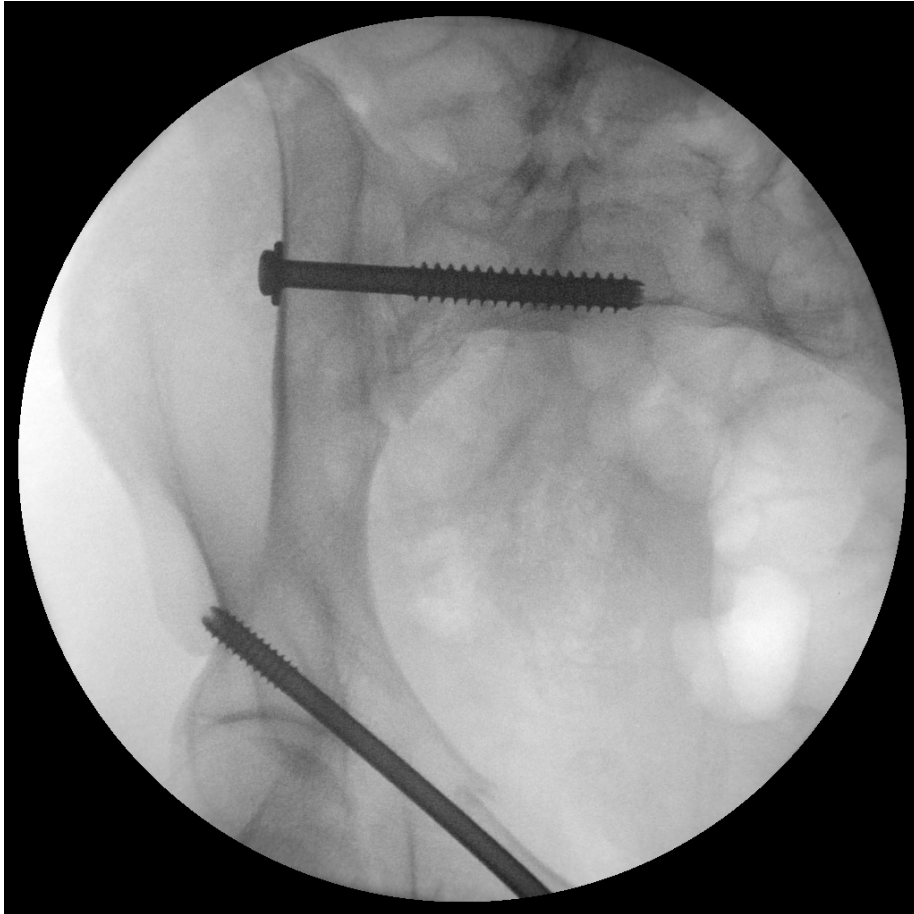
Iliosacral Screw Technique



- Outlet view
 - Evaluate superior/inferior trajectory of screw

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Iliosacral Screw Technique



- Inlet/Oblique view
 - Ensure screw head is fully down and contacting outer table
 - Can also be used to confirm proper length on the contralateral side for transiliac-transsacral screw

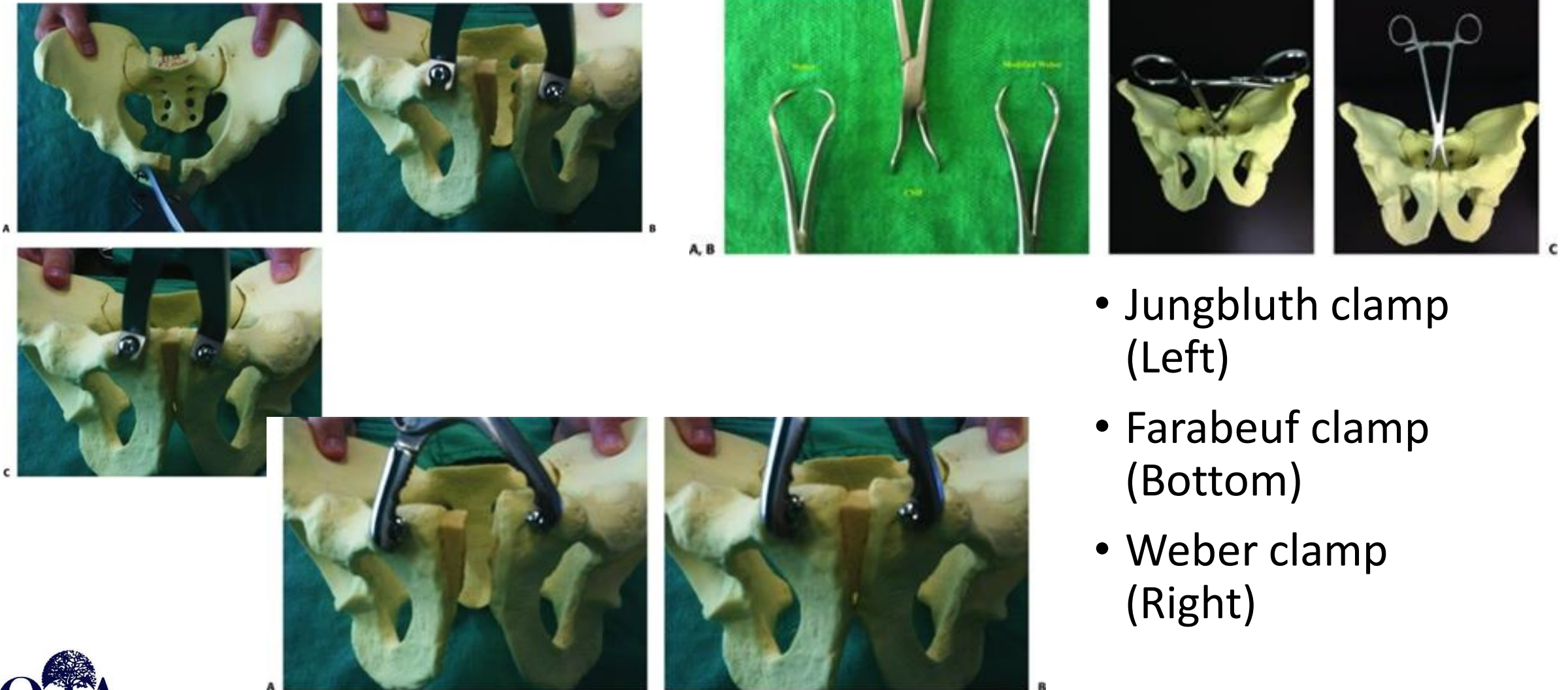
Ilio-sacral Screws

- Sanders D, et al. Transsacral-transiliac screw stabilization: effective for recalcitrant pain due to sacral insufficiency fracture. JOT. 2016;30(9):469-73.
 - Patients with failure of nonoperative tx of sacral insufficiency fx (avg 33 days)
 - Screw fixation statistically improved VAS and Oswestry scores after intervention
 - No complications in this small series



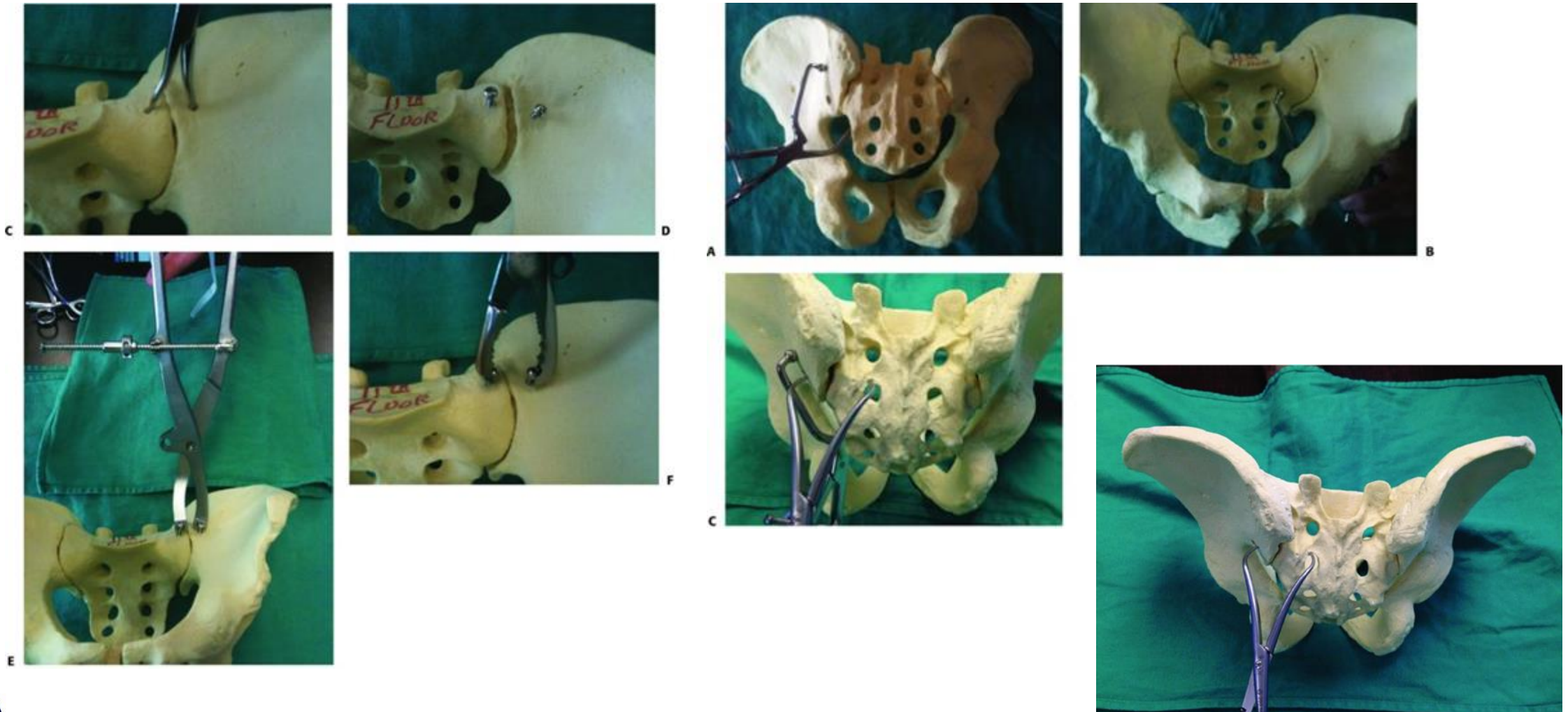
Sanders D, et al. Transsacral-transiliac screw stabilization. JOT. 2016;30(9):469-73.

Open Reduction Techniques – Anterior



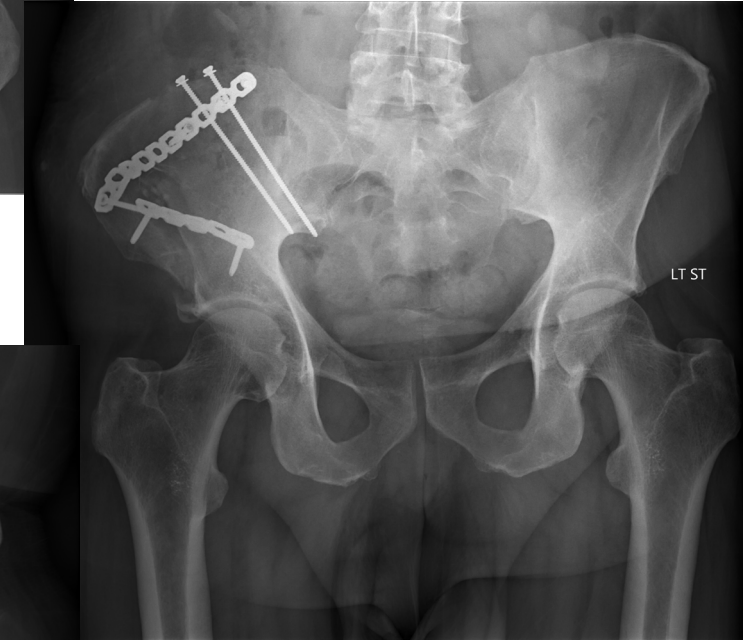
- Jungbluth clamp (Left)
- Farabeuf clamp (Bottom)
- Weber clamp (Right)

Open Reduction Techniques – Posterior Pelvic Ring



ORIF

- Symphyseal plating
- Ramus plating
- Iliac wing plating
- SI plating

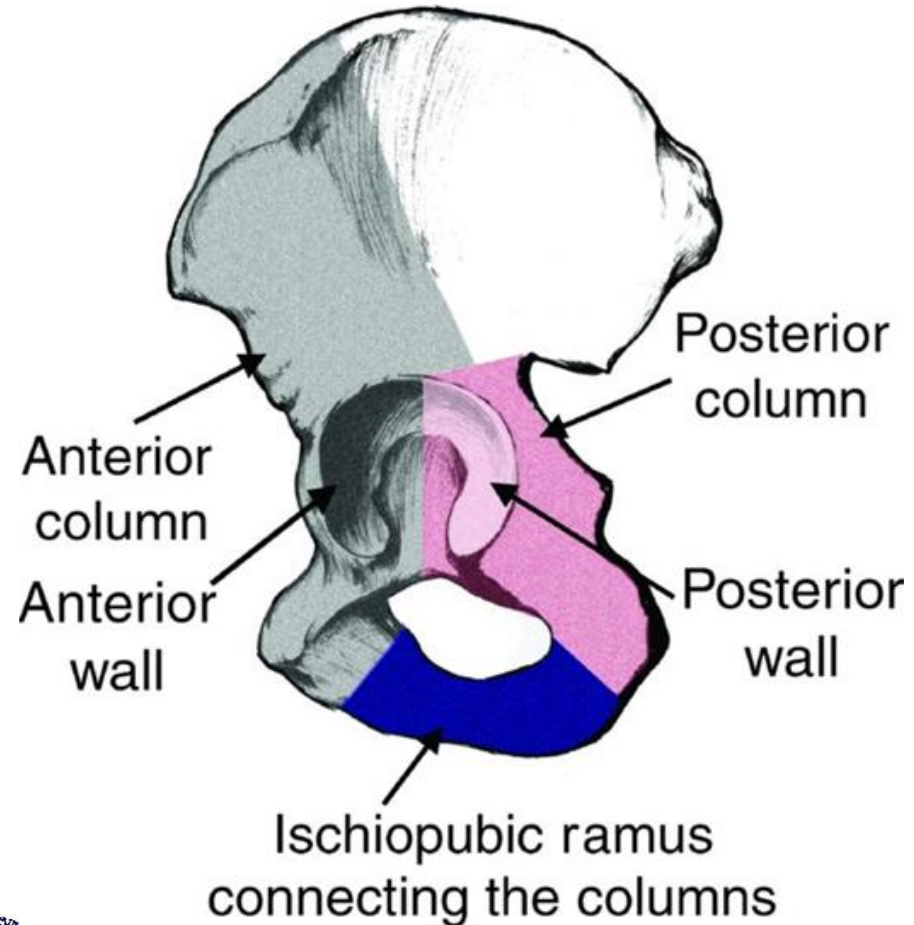


Postoperative Care

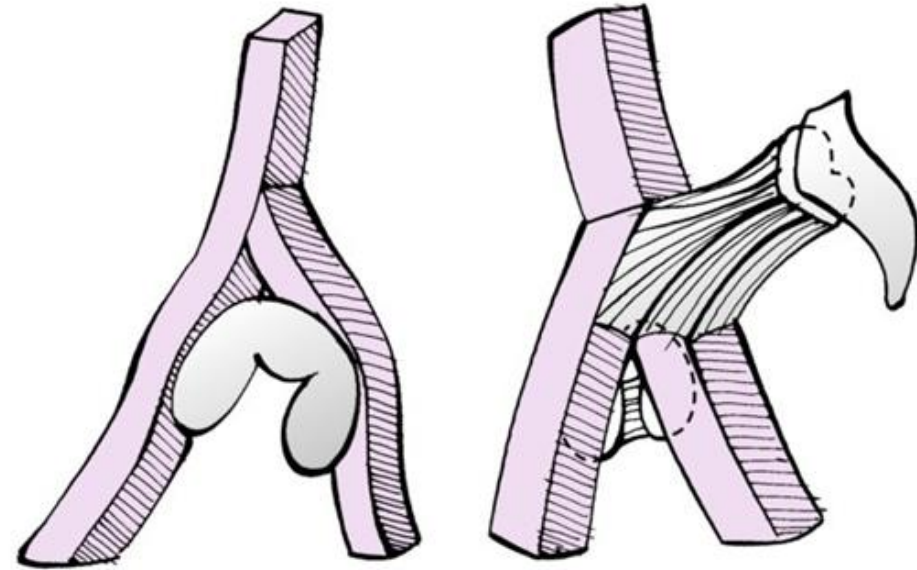
- Weight bearing is highly variable depending on fracture characteristics and associated injuries.
- Often, with anterior and posterior ring injury, TTWB will be performed on the affected side with WBAT on the nonaffected side
- Full WB at 6 weeks for injuries without vertical instability, possibly delayed up to 3 months with vertical instability
- DVT prophylaxis in most cases should be utilized for 2-6 weeks and can successfully consist of many treatment regimens.
 - Two common treatments are Lovenox for 4 weeks or Lovenox for 2 weeks followed by 4 weeks of Aspirin.
- Physical therapy can begin immediately with PROM, AROM, and AAROM

Acetabulum

Classification – Letournel and Judet

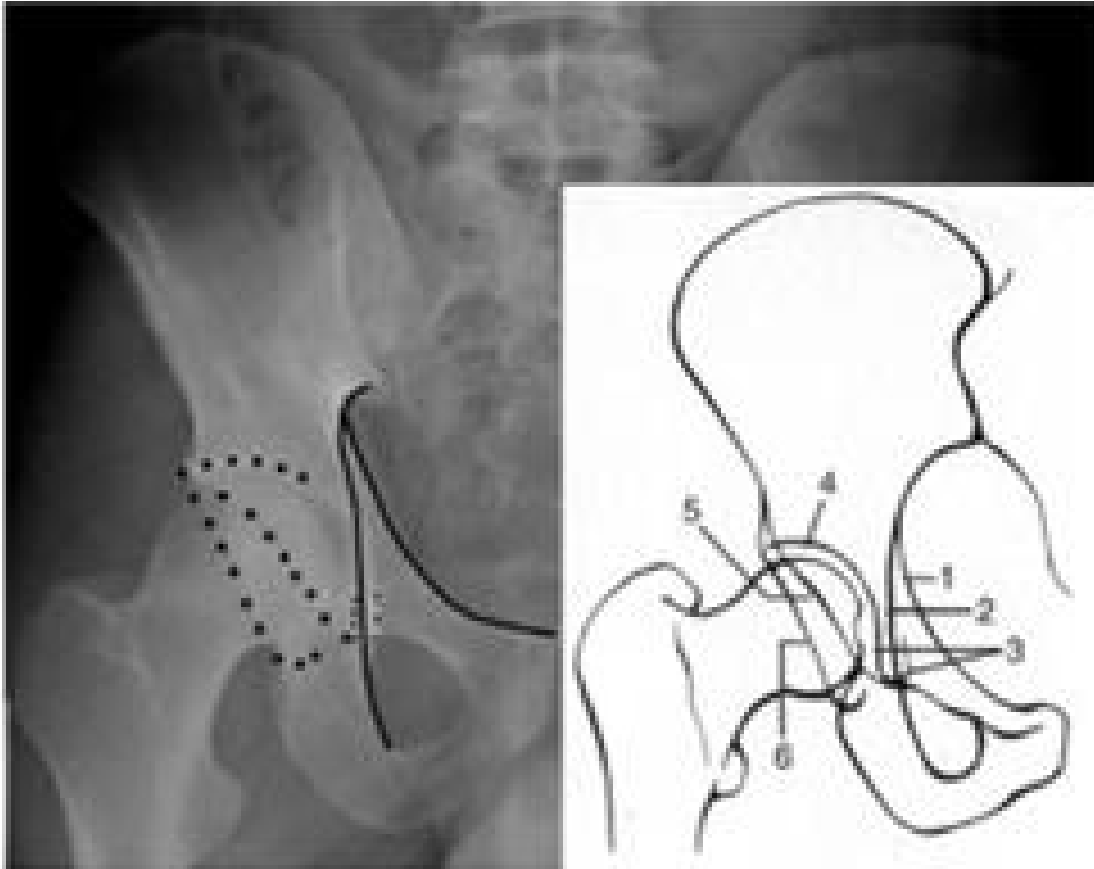


- Based on a “two column” structure



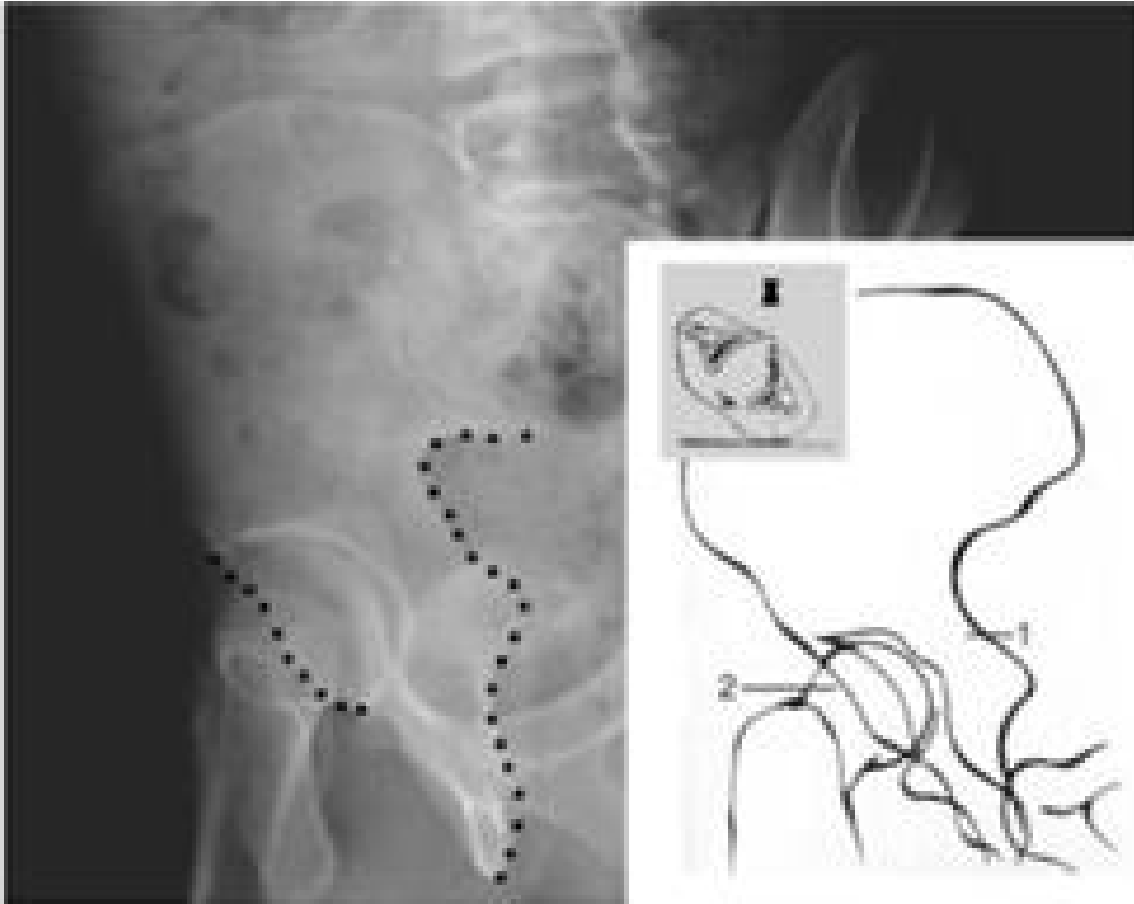
Moed BR, Bourdreau JA. Chapter 50. Rockwood and Greens Fractures in Adults. Philadelphia: Lippincott Williams & Wilkins, 9e, 2019

Classification – Letournel and Judet



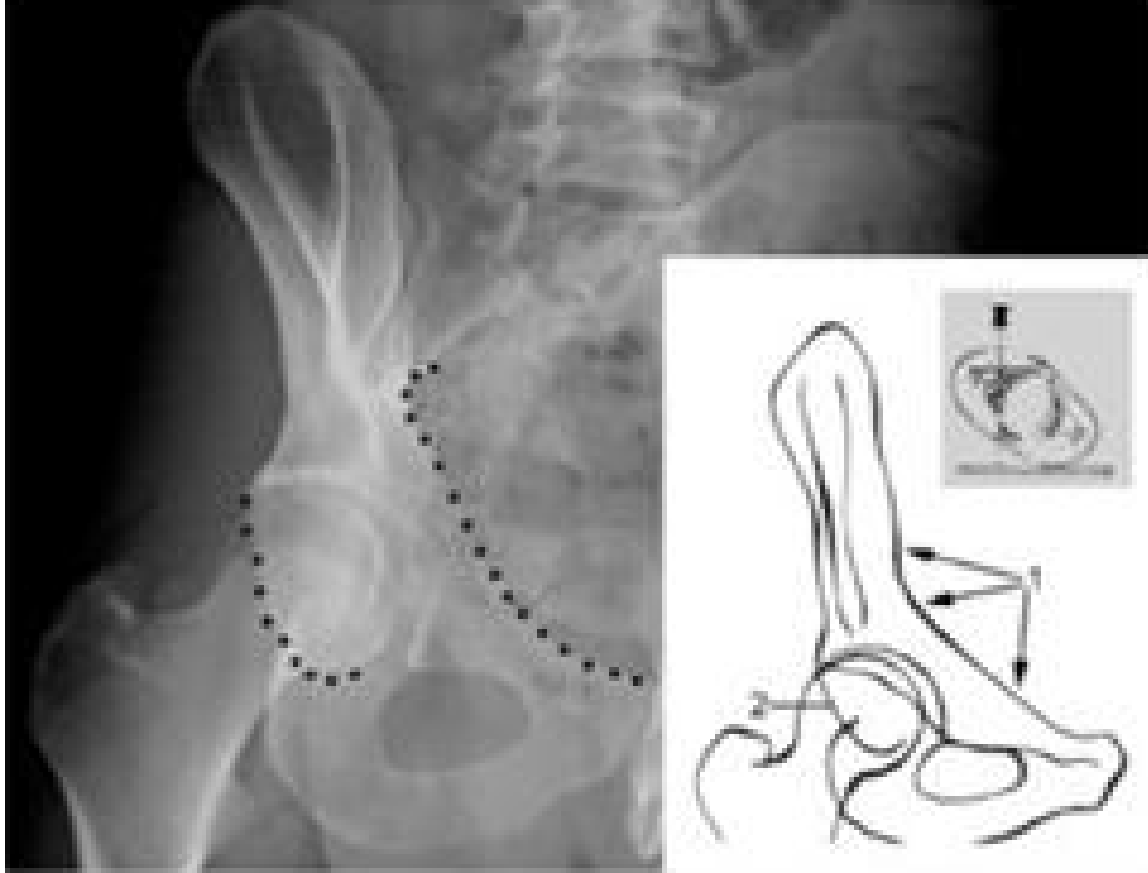
- AP radiographic lines:
 - 1 – iliopectineal line (ant column)
 - 2 – ilioischial line (post column)
 - 3 – teardrop
 - 4 – acetabular roof
 - 5 – anterior wall of acetabulum
 - 6 – posterior wall of acetabulum

Classification – Letournel and Judet



- Iliac oblique radiographic lines
 - 1 – posterior border of the innominate bone (posterior column)
 - 2 – anterior wall of acetabulum

Classification – Letournel and Judet

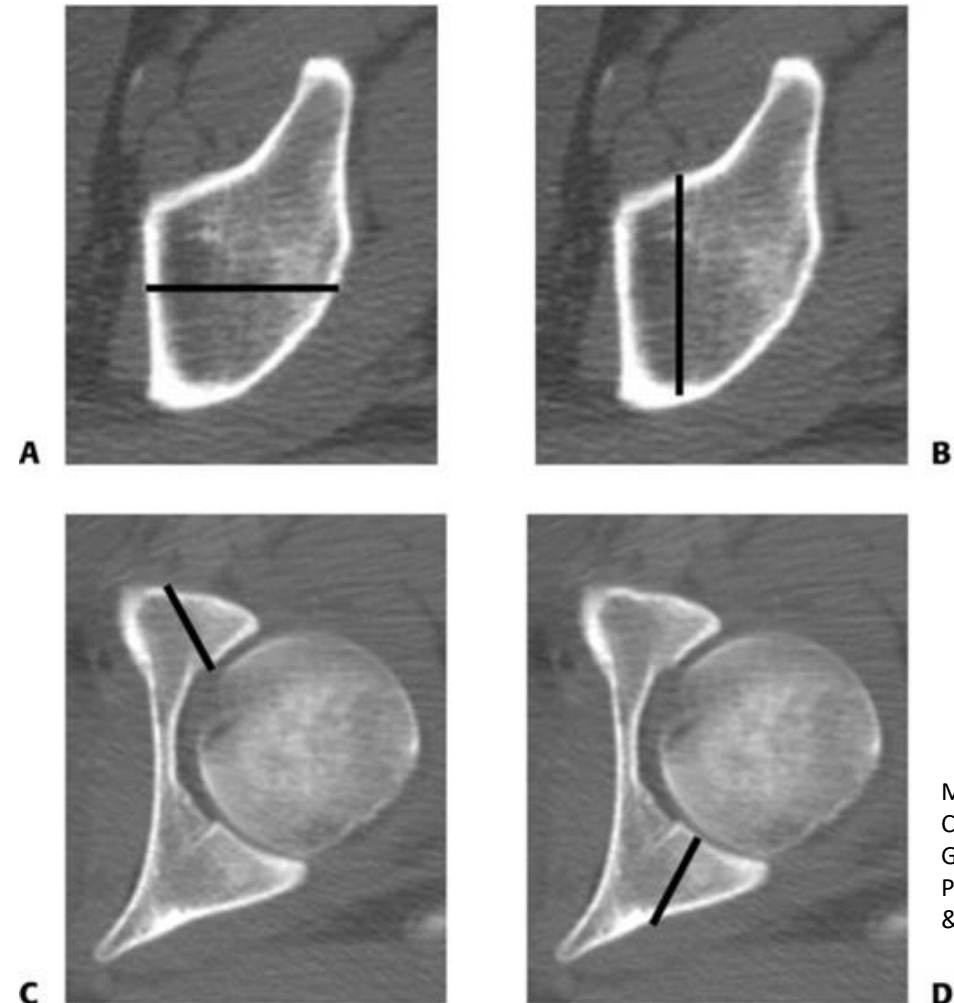


- Obturator oblique radiographic lines
 - 1 – iliopectineal line (anterior column)
 - 2 – posterior wall acetabulum

Moed BR, Bourdreau JA. Chapter 50. Rockwood and Greens Fractures in Adults. Philadelphia: Lippincott Williams & Wilkins, 9e, 2019

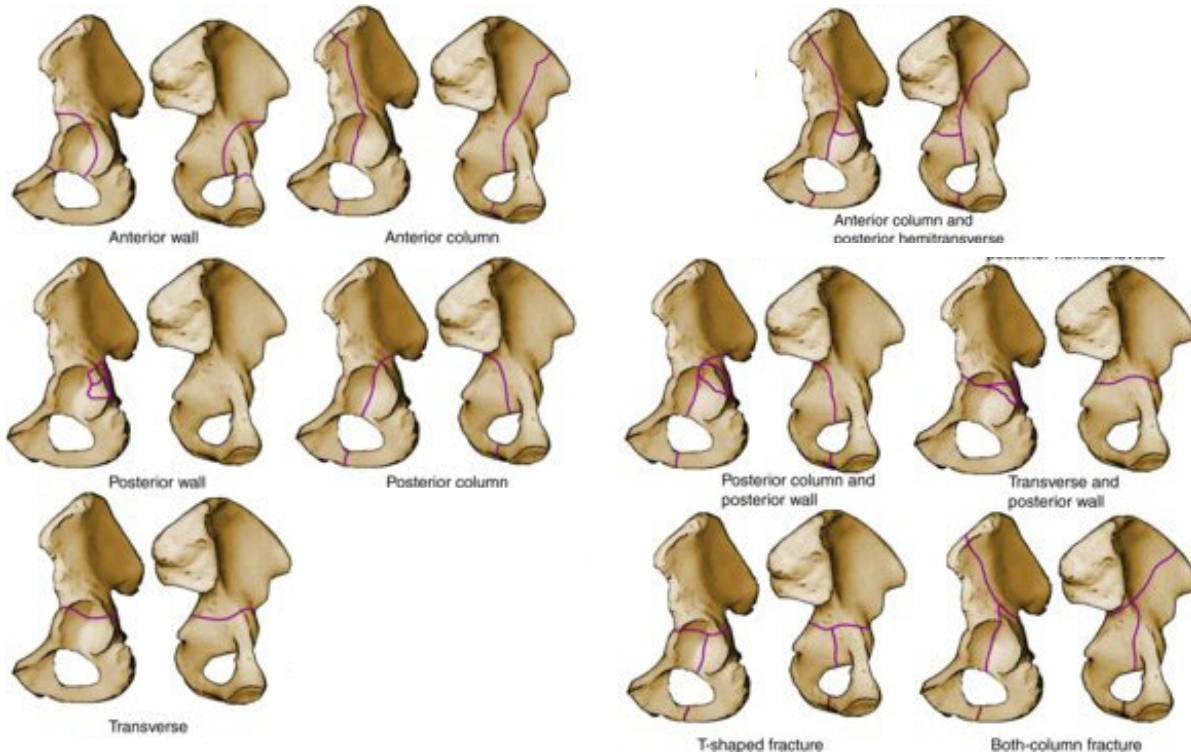
Classification – Letournel and Judet

- CT fracture lines
 - A: Column fx
 - B: Transverse fx
 - C: Anterior wall fx
 - D: Posterior wall fx



Moed BR, Bourdreau JA.
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Greens Fractures in Adults.
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Classification – Letournel and Judet

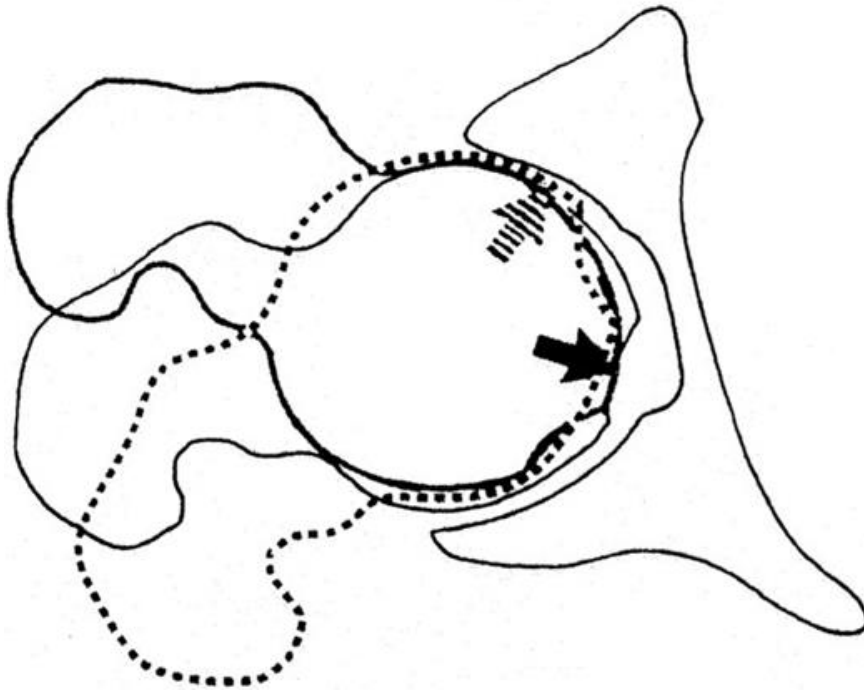


Elementary Patterns

Associated Patterns

- 5 elementary patterns
 - Anterior wall
 - Anterior column
 - Posterior wall
 - Posterior column
 - Transverse
- 5 associated patterns
 - Anterior column plus posterior hemitransverse
 - Posterior column plus posterior wall
 - Transverse plus posterior wall
 - T-type fracture
 - Both column (BC) fracture

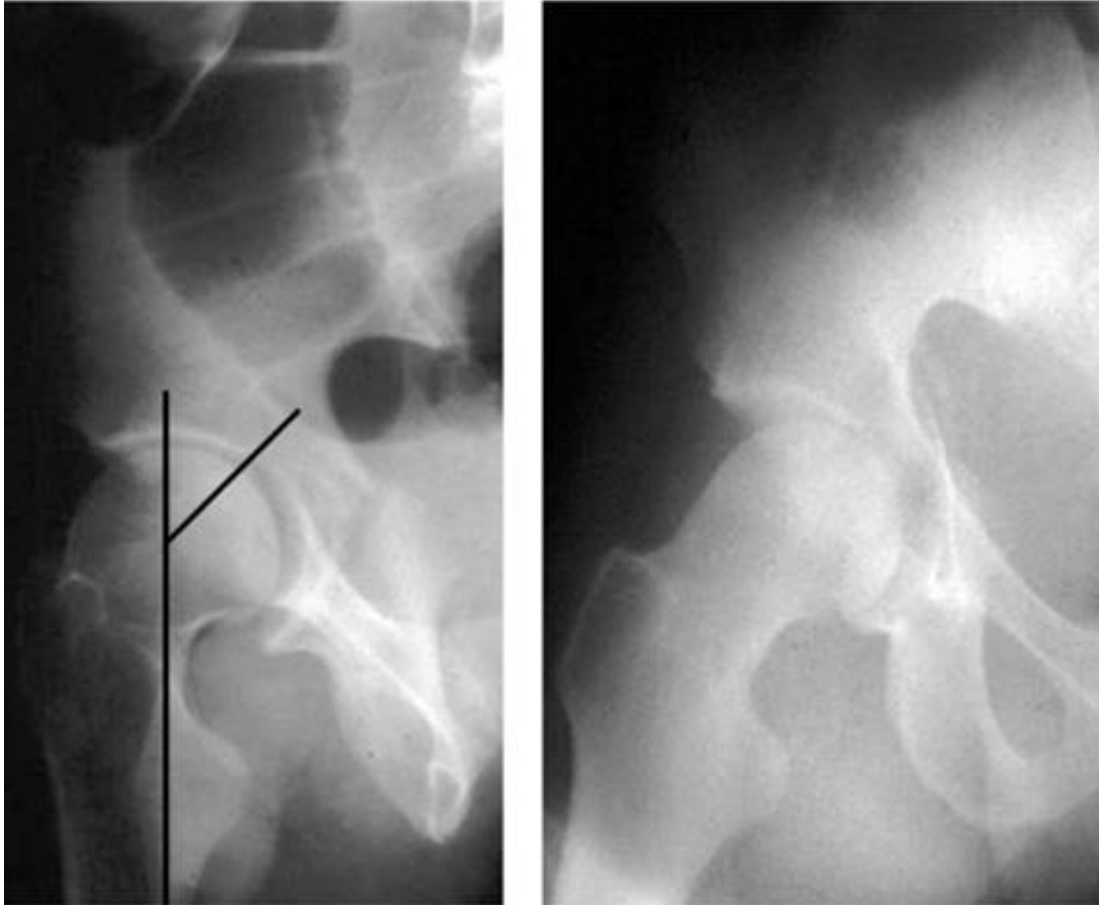
Mechanism/Direction of Force



- The resulting acetabular fracture will depend upon the position of the hip (rotation & flexion/extension) at the time of impact along with the direction of impact

Moed BR, Bourdreau JA. Chapter 50. Rockwood and Greens Fractures in Adults. Philadelphia: Lippincott Williams & Wilkins, 9e, 2019

Radiographic Evaluation – Roof Arc Measurements



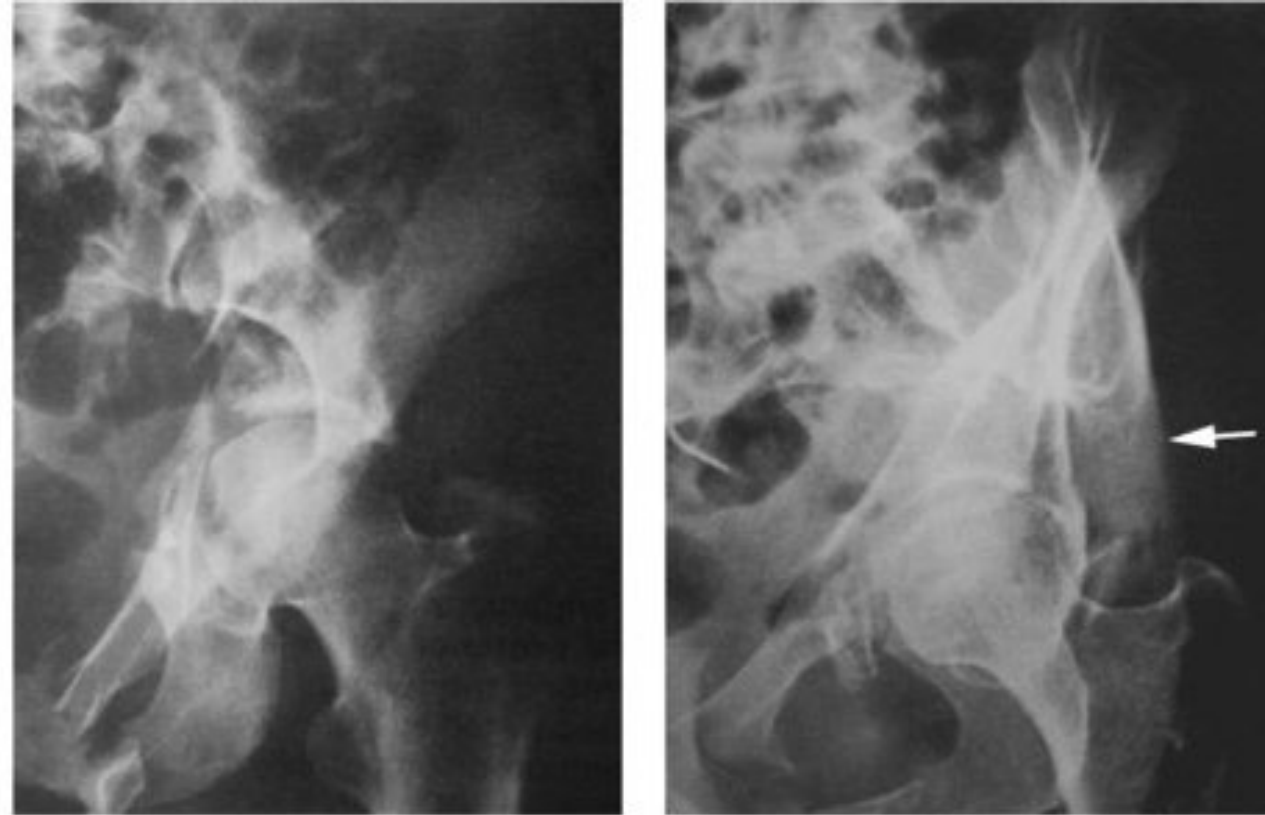
- Determined on AP and oblique views
- Do not apply to wall and BC fx's
- AP – medial roof arc
- Obturator oblique – anterior roof arc
- Iliac oblique – posterior roof arc
- Vertical line drawn through the center of the femoral head and connected to a second line from the center of the head to the acetabular fracture
- Historic recommendations for operative indications based on roof arc have varied somewhat. 45 degrees or greater on all views has been suggested for nonsurgical treatment, however...

Roof Arcs

- Matta (CORR 1986)
 - Operative treatment if displaced fx with:
 - Medial roof arc < 30
 - Posterior roof arc < 30
 - Anterior roof arc < 20
- Olson and Matta (JOT 1993)
 - Superior 10 mm equivalent to 45 degree roof arc, or first 3 CT cuts on axial view with 3 mm cuts
- Vrahas (JBJS 1999)
 - Biomechanical study, sufficient intact dome if:
 - MRA > 45
 - PRA > 70
 - ARA > 25
- Matityahu (JOT 2012)
 - Biomechanical study, sit to stand loads require:
 - MRA > 90.9
 - PRA > 101.4
 - ARA 67.3

Secondary Congruence

- Seen in some BC fx's
- Can be an indication for treatment of BC fx nonsurgically
- May be especially pertinent in geriatric BC fx's
- Nonsurgical tx and if persistent pain and degenerative disease following healing can consider THA
- (Right) AP and obturator oblique showing secondary congruence in BC acetabular fx (white arrow indicates spur sign)



Moed BR, Bourdreau JA. Chapter 50. Rockwood and Greens Fractures in Adults. Philadelphia: Lippincott Williams & Wilkins, 9e, 2019

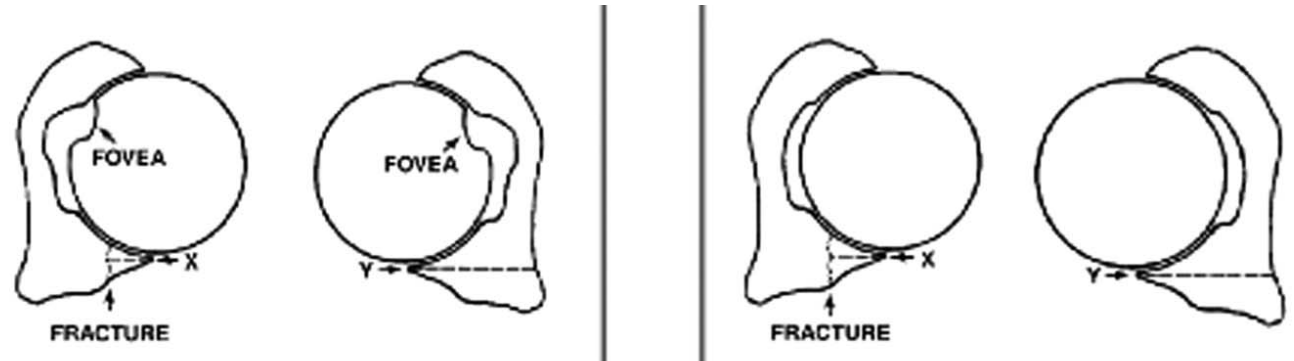
Secondary Congruence



- (Left) BC acetabular fx with secondary congruence
- Levine R, et al. Biomechanical Consequences of Secondary Congruence After Both-column Acetabular Fracture. J Orthop Trauma. 2002;16(2):87-91.
 - Secondary congruence does not produce an acetabulum equal to the prefracture state
 - Decreased anterior and posterior surface contact area
 - Increased contact pressures in the acetabular dome on either side of fx gap
- Despite these biomechanical findings small series show good outcomes at medium to long term follow up with secondary congruence

Stability (PW)

- Firoozabadi R, et al. Determining stability in posterior wall acetabular fractures. JOT. 2015;29(10):465-9.
 - Moed and Keith method of wall size measurements and cranial exit point of fx helped determine stability
 - Exit point of fx avg within 5.0 mm of dome for unstable fx
 - PW size less than 20% not a reliable predictor of instability
- Keith Method
 - Measured at level of fovea
 - PW fx size / intact PW size
- Moed Method
 - Measured at level of largest fx involvement
 - PW fx size / intact PW size

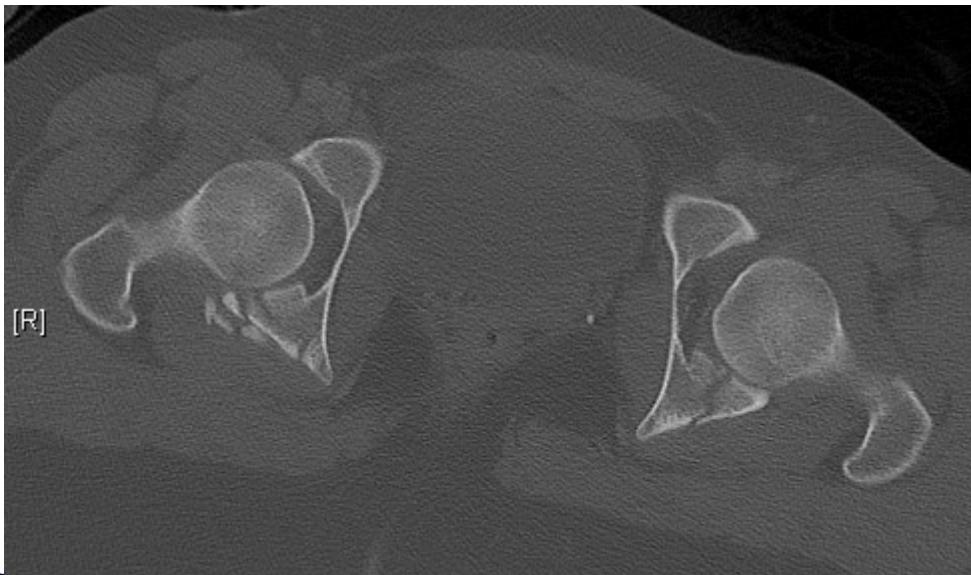


Keith

Moed

Stability (PW)

- Examination Under Anesthesia (EUA) is gold standard for determining hip instability
- Some have suggested all PW fx's being considered for nonop tx receive EUA



- Riehl J, et al. Examination under anesthesia for posterior wall acetabular fracture: A survey of the OTA membership. Bull Hosp Jt Dis. 2016;74(2):124-9.
 - Exam performed with pt supine
 - Live fluoroscopy used during examination
 - AP and obturator oblique x-rays used for examination with c-arm on same side as examiner
 - Hip placed in flexion and adduction during exam with axial load applied to femur
 - Instability diagnosed with any subluxation of femoral head

Nonsurgical Treatment

Indications:

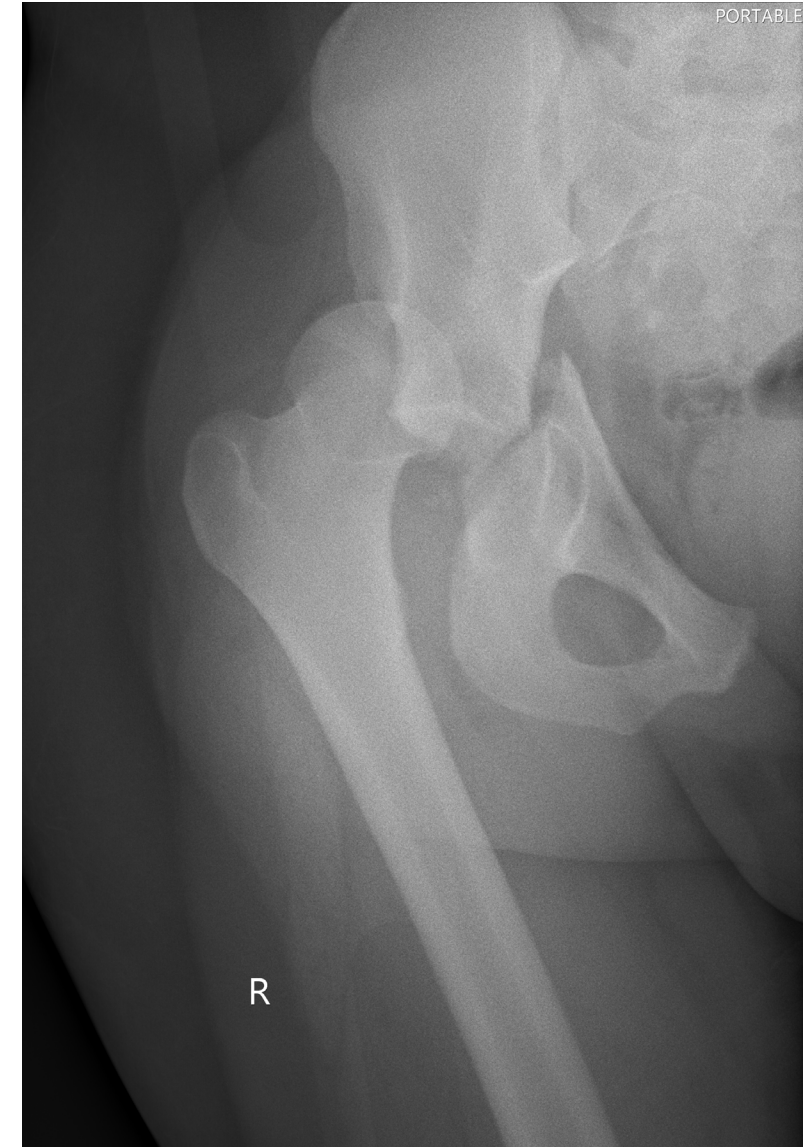
- Hip must be **stable with congruency** between femoral head and acetabulum in order to pursue nonsurgical treatment
- Fx outside of weightbearing dome or $< 2\text{mm}$ of displacement inside of weightbearing dome
- Secondary congruence

Treatment:

- Walker and TTWB for 6 weeks
 - NWB places higher joint reactive forces on the hip so TTWB is preferred
- Posterior hip precautions with PW fractures
- Resume progressive weight bearing at 6 weeks
- Consider DVT prophylaxis for 2-6 weeks

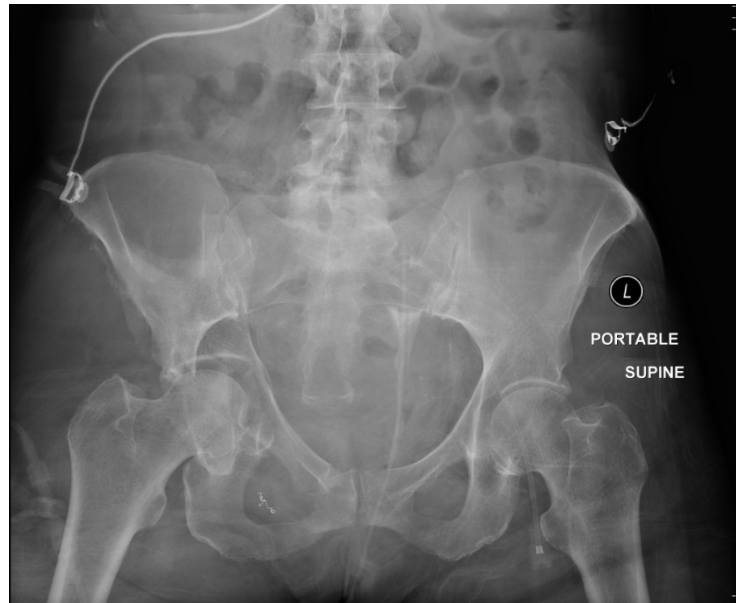
Operative indications

- Similar to indications in younger adults
- Roof arcs (see previous slides)
- Displacement > 2 mm in the weight bearing dome
- Hip instability/incongruency
- Manson TT, et al. Variation in treatment of displaced geriatric acetabular fractures among 15 level-1 trauma centers.
 - Significant variation among centers for operative vs nonoperative tx
 - Age <80 yrs, high energy mechanism, femoral head impaction, and lack of hip congruency significantly a/w operative tx
 - 88% received ORIF, 12% THA as initial tx



Special Considerations Geriatric Acetabular Fx

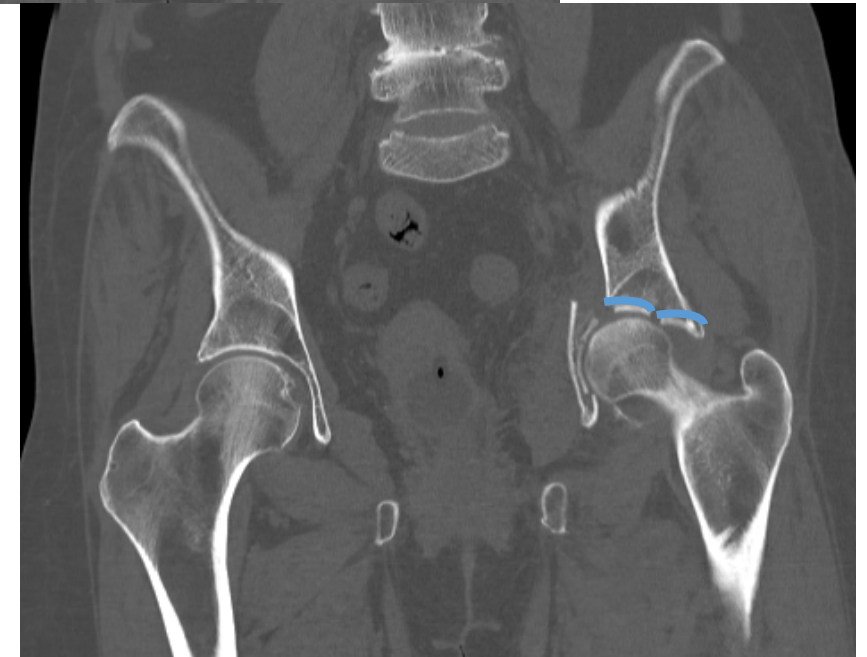
- More often fx's involving anterior column/wall, BC
- Quadrilateral surface fx (protrusio) and fx comminution more common
- Superior medial dome impaction (Gull Sign*)



- As with pelvic ring fx, early mobilization is an important goal to keep in mind
- Pre-existing hip pain/degenerative joint disease
- THA combined with ORIF

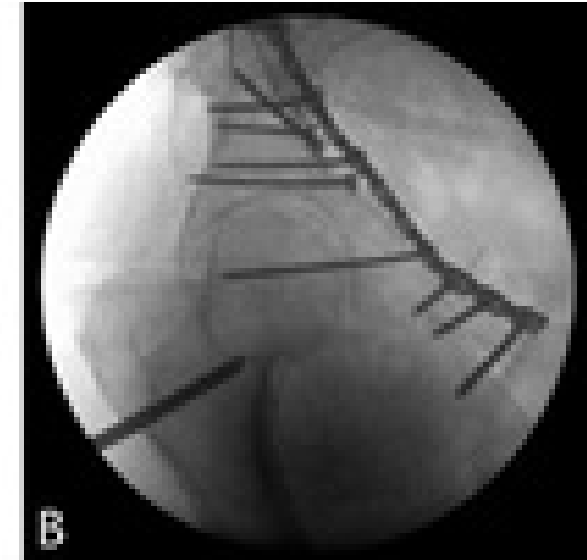
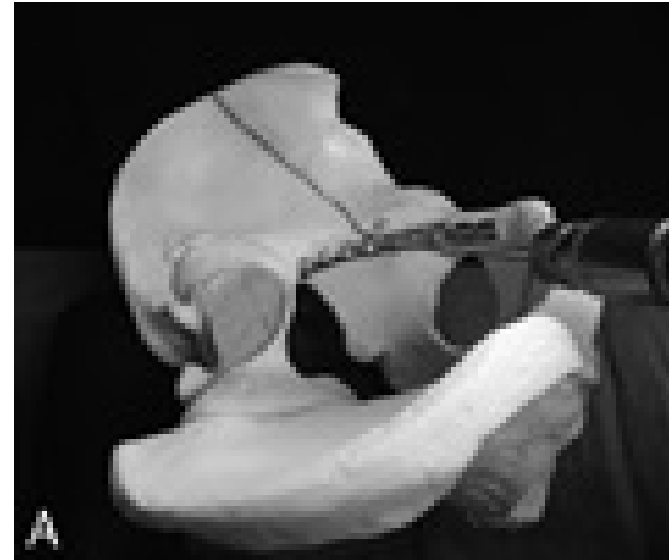
Gull Sign

- Anglen JO, Burd TA, Hendricks KJ, Harrison P. The "Gull Sign": a harbinger of failure for internal fixation of geriatric acetabular fractures. J Orthop Trauma. 2003 Oct;17(9):625-34.
 - Superomedial dome impaction on preoperative radiographs predicted failure (termed "Gull Sign")



Gull Sign

- Laflamme GY, et al. Direct reduction technique for superomedial dome impaction in geriatric acetabular fractures. JOT. 2014;28(2):e39-43.
 - AIP
 - Mobilize quadrilateral fracture line to directly visualize impacted articular fragment
 - Reduce and fix with 3.5 mm cortical subchondral screws



Intrapelvic Reduction and Buttress Screw Stabilization of *Dome Impaction* of the *Acetabulum*
A Technical Trick. Casstevens, Christopher MD; Archdeacon, Michael T. MD, MSE; d'Heurle, Albert MD; Finnan, Ryan MD. Journal of Orthopaedic Trauma: [June 2014 - Volume 28 - Issue 6 - p e133-e137](#)

ORIF Combined THA

- Although similar results can be achieved with ORIF of acetabular fx's in geriatric patients compared with younger adults, ORIF combined with THA becomes a much more viable option in geriatric patients
- Especially consider in cases with:
 - Pre-existing arthritis
 - Severe articular cartilage damage
 - Concurrent femoral head fracture
 - Marginal impaction
 - Superior dome impaction

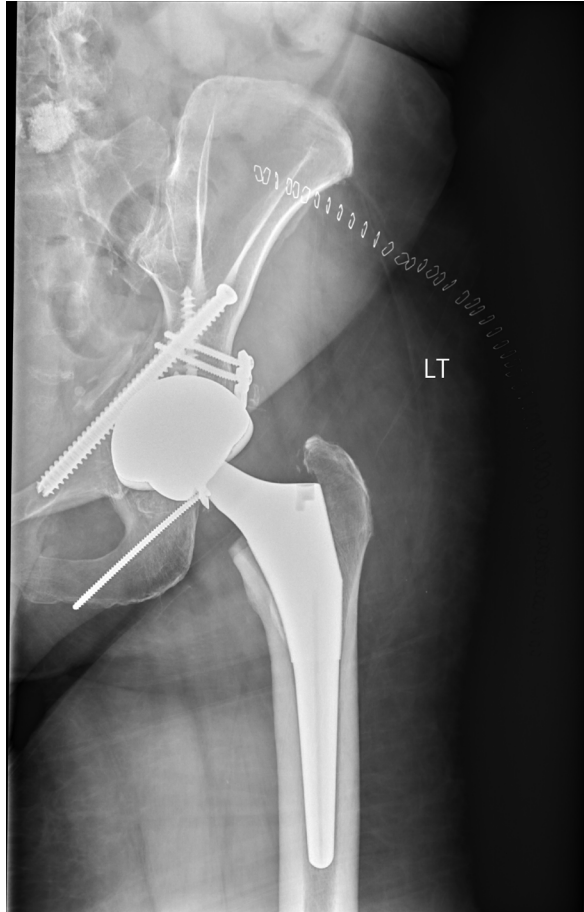
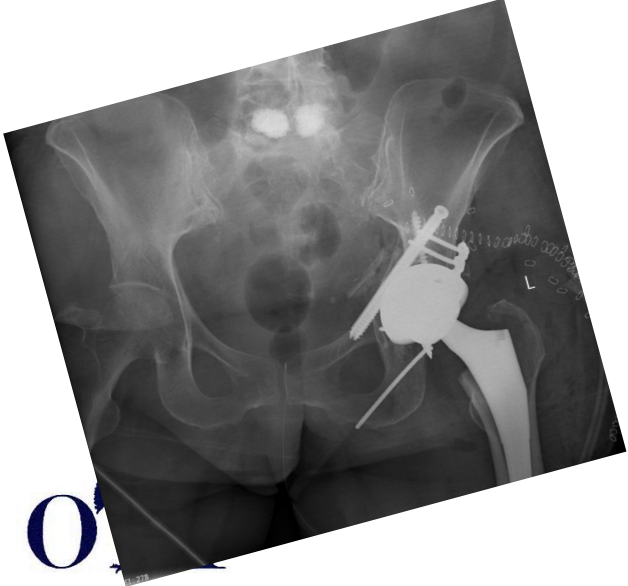
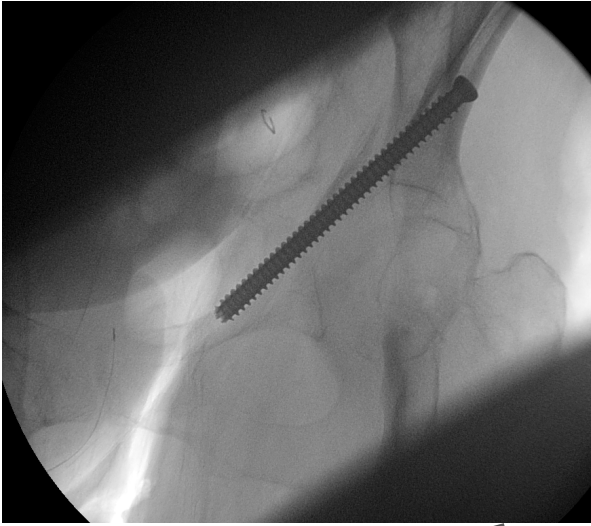


ORIF Combined THA Case 1



- 70 y/o female with left femoral neck fx and ACPHT fx
- Superior dome impaction
- Quadrilateral plate fx, medialization

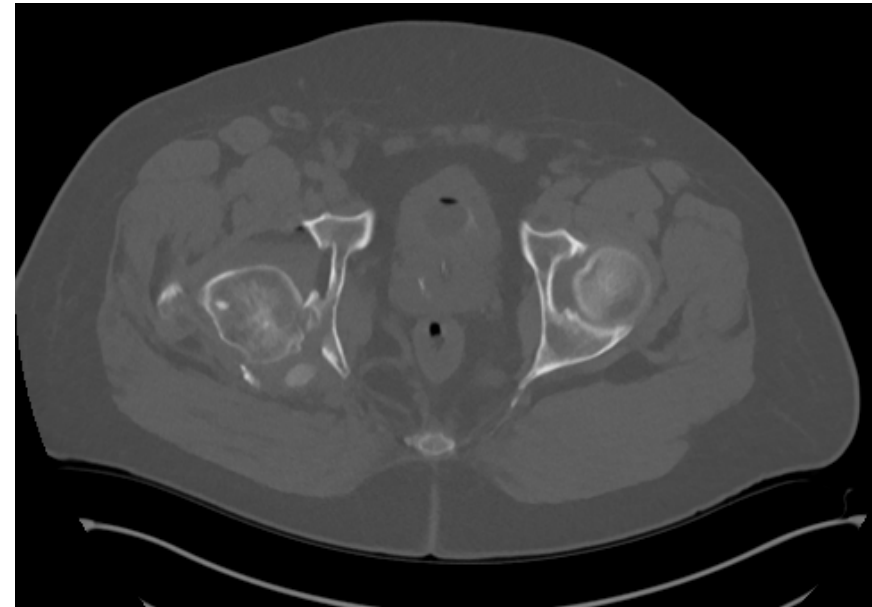
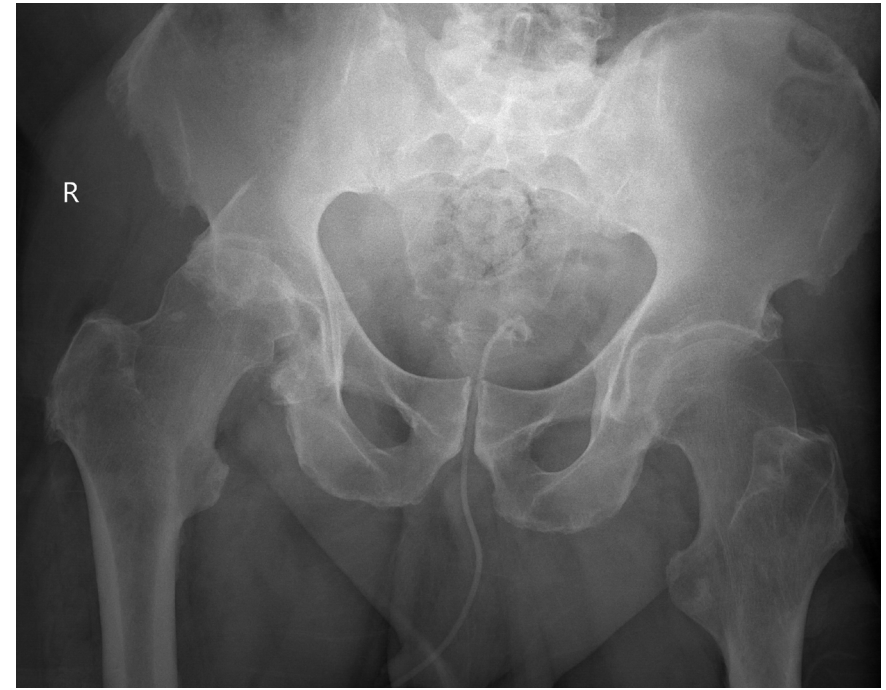
ORIF Combined THA Case 1



- Kocher-Langenbeck approach
 - AC screw placed
 - Posterior column/wall plated
 - THA performed
-
- HO prophylaxis postoperatively
 - 50 lbs partial WB immediately, FWB 6 wks
 - DVT prophylaxis: Lovenox 2 wks, ASA 4 wks

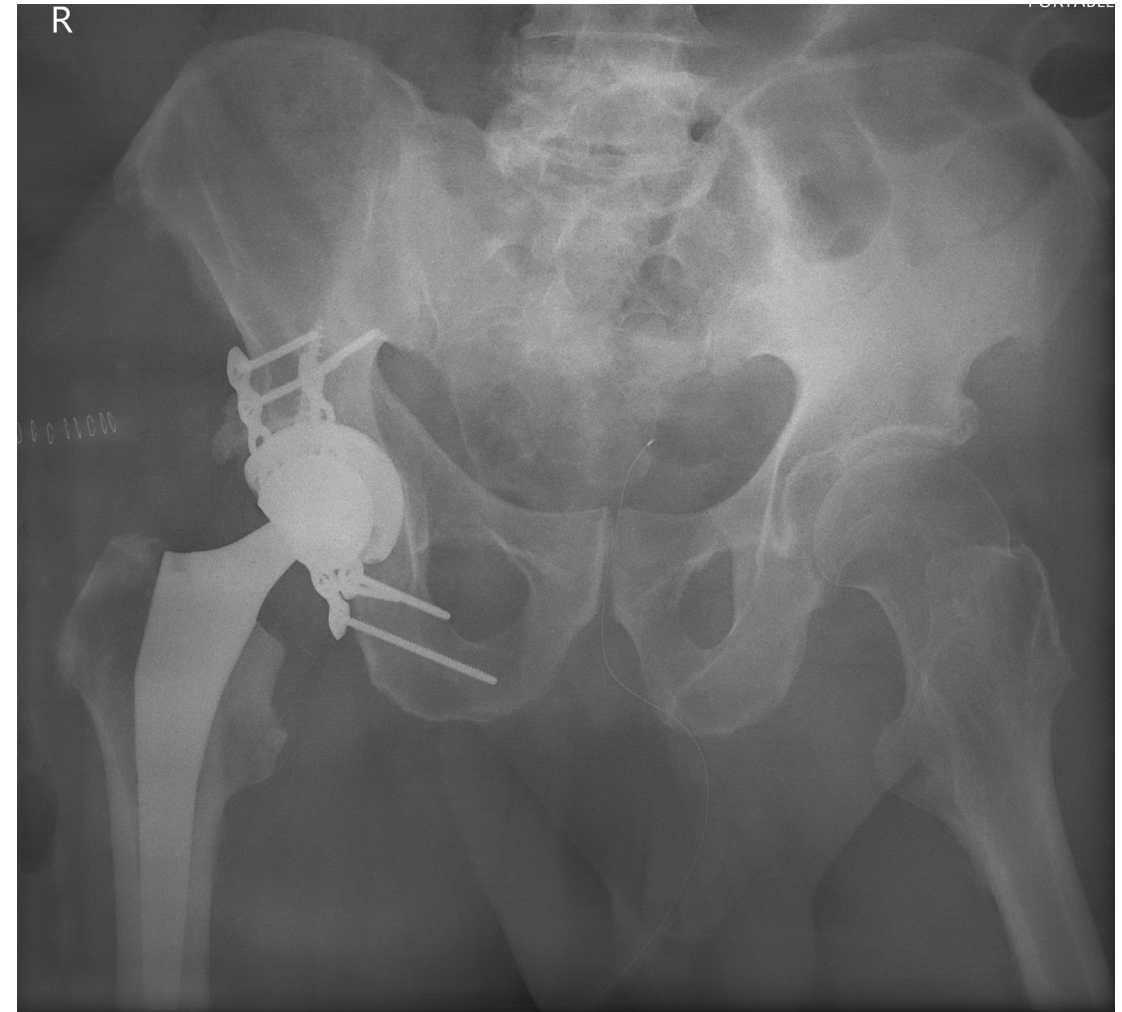
ORIF Combined THA Case 2

- 65 y/o male with posterior column + PW fx dislocation
- Posterior acetabular marginal impaction
- Superior dome impaction
- Femoral head cartilage damage found at time of surgery



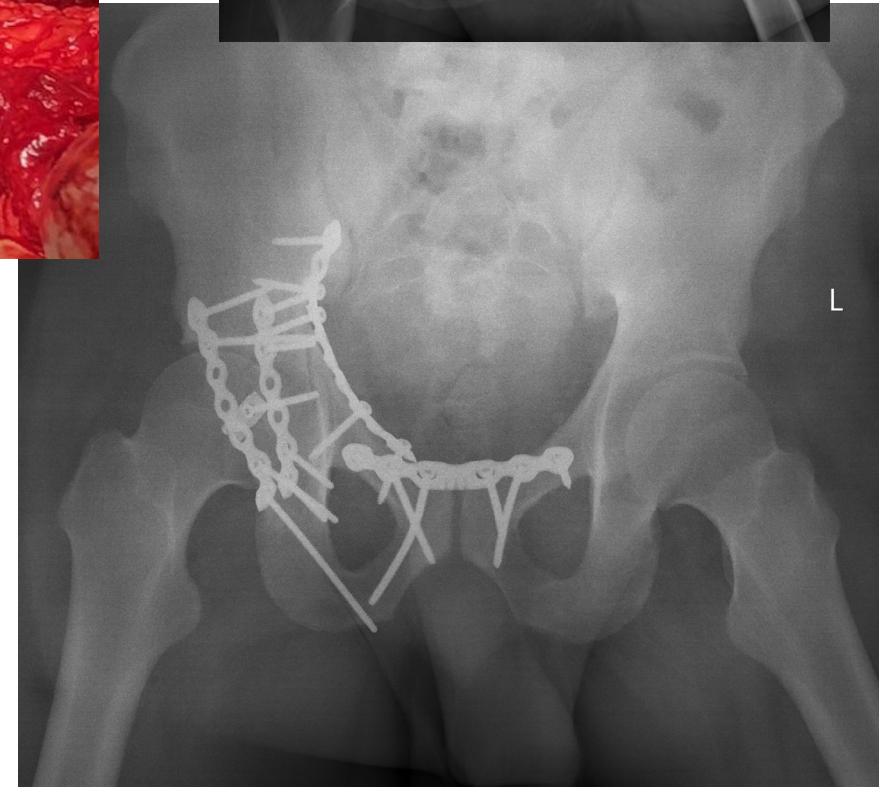
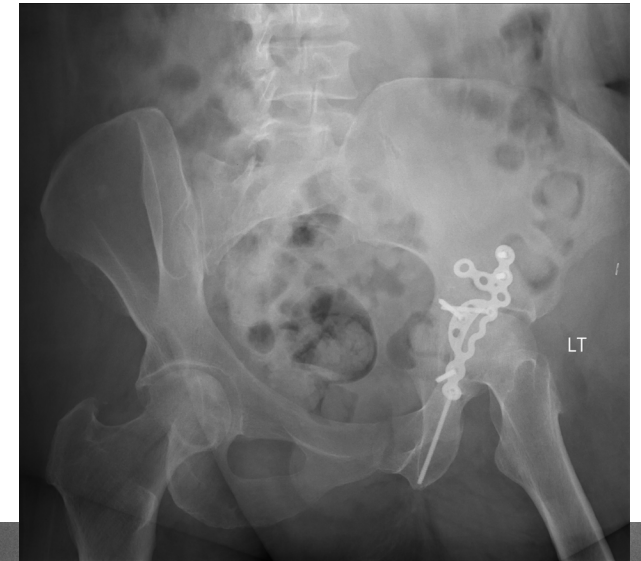
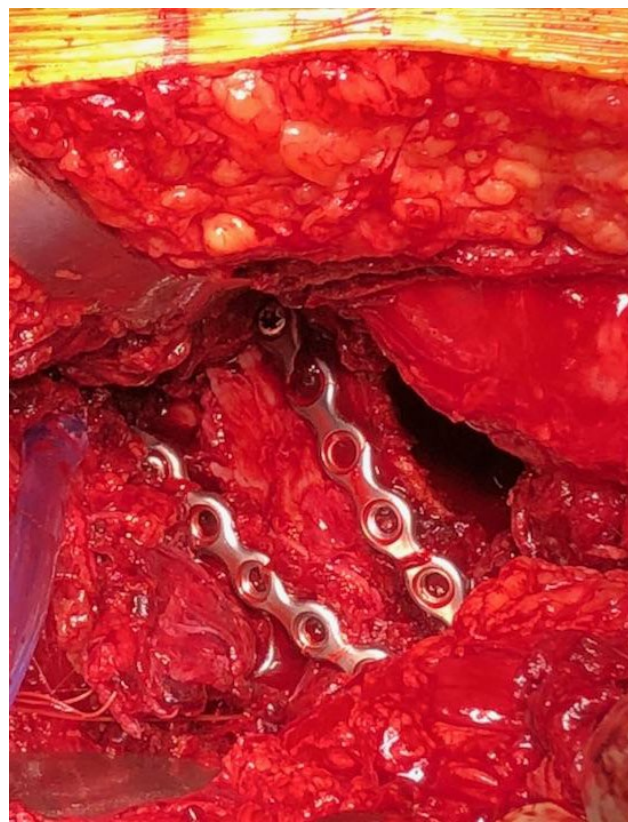
ORIF Combined THA Case 2

- Kocher-Langenbeck approach
- ORIF performed of posterior column and posterior wall
- THA then performed
- HO prophylaxis postoperatively
 - Single dose radiation to hip within 72 hrs postop
- WBAT immediately postop
- Posterior hip precautions
- DVT proph: Lovenox 2 wks, ASA 4 wks



Other Treatments

- Similar to younger adults
 - ORIF
 - Percutaneous fixation
- May be more of a need for locking plates
- Be prepared to reduce and bone graft areas of impaction



Outcomes

- O'Toole R, et al. How often does open reduction and internal fixation of geriatric acetabular fractures lead to hip arthroplasty? JOT. 2014;28(3):148-53.
 - 1 yr mortality 25%
 - THA conversion 28% (0.4-5.5 yrs)
 - WOMAC scores after conversion to THA similar to elective THA
 - Failure rate of conversion to THA in patients with a PW component to fx was twice those without

Outcomes

- Bible J, et al. One-year mortality after acetabular fractures in elderly patients presenting to a level-1 trauma center. JOT. 2014;28(3):154—9.
 - Mortality rates are lower in elderly patients with isolated acetabular fractures than in those with concurrent injuries to other organ systems, long bone fx, or pelvic ring fx
 - One year mortality rate (avg age 71.1 yrs) was 8.1%
 - 23.3% mortality in nonisloated group
 - When considering only patients who survived initial hospitalization, mortality similar between groups
 - Trend toward higher mortality in nonop tx in isolated fxs

Outcomes

- Glogovac G. Time to surgery and patient mortality in geriatric acetabular fractures. JOT;2020;34(6):310-15.
 - 183 pts 65 yrs and older treated operatively
 - Overall 1 yr mortality 15%
 - No difference in mortality when surgical intervention within or after 48 hrs
 - Increased mortality independently a/w advancing age
- Gary JL, et al. Functional outcomes in elderly patients with acetabular fractures treated with minimally invasive reduction and percutaneous fixation. JOT. 2012;26(5):278-83
 - No differences found in minimally invasive Tx compared to ORIF and published rates of conversion to THA, objective outcome scores
 - 1 yr mortality 13.9%

Further Reading

Geriatric Pelvis Fx

- Banierink H, Ten Duis K, de Vries R, et al. Pelvic ring injury in the elderly: Fragile patients with substantial mortality rates and long-term physical impairment. *PLoS One*. 2019;14(5):e0216809. Published 2019 May 28.

Geriatric Acetabular Fx

- Butterwick D, Papp S, Gofton W, Liew A, Beaulé PE. Acetabular fractures in the elderly: evaluation and management. *J Bone Joint Surg Am*. 2015 May 6;97(9):758-68.
- Antell NB, Switzer JA, Schmidt AH. Management of Acetabular Fractures in the Elderly. *J Am Acad Orthop Surg*. 2017 Aug;25(8):577-585.

Summary

- Pelvis

- ATLS, Resuscitate
- Stable injuries treated nonsurgically (protected weight bearing, mobilization)
- Integrity of posterior ring is imperative in terms of stability
- EUA may be needed to determine stability
- Percutaneous techniques often utilized in unstable injuries

- Acetabulum

- Can be highly comminuted with poor bone quality compared to younger patients with acetabular fractures
- Hip must be stable with congruency between femoral head and acetabulum in order to pursue nonsurgical treatment
- ORIF combined with THA more often utilized as treatment in geriatric acetabular fractures

Thank you

