Hip Dislocations and Femoral Head Fractures

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Disclosure

- All images belong to Thomas Moore, MD or OTA core curriculum archived images unless otherwise indicated

Objectives

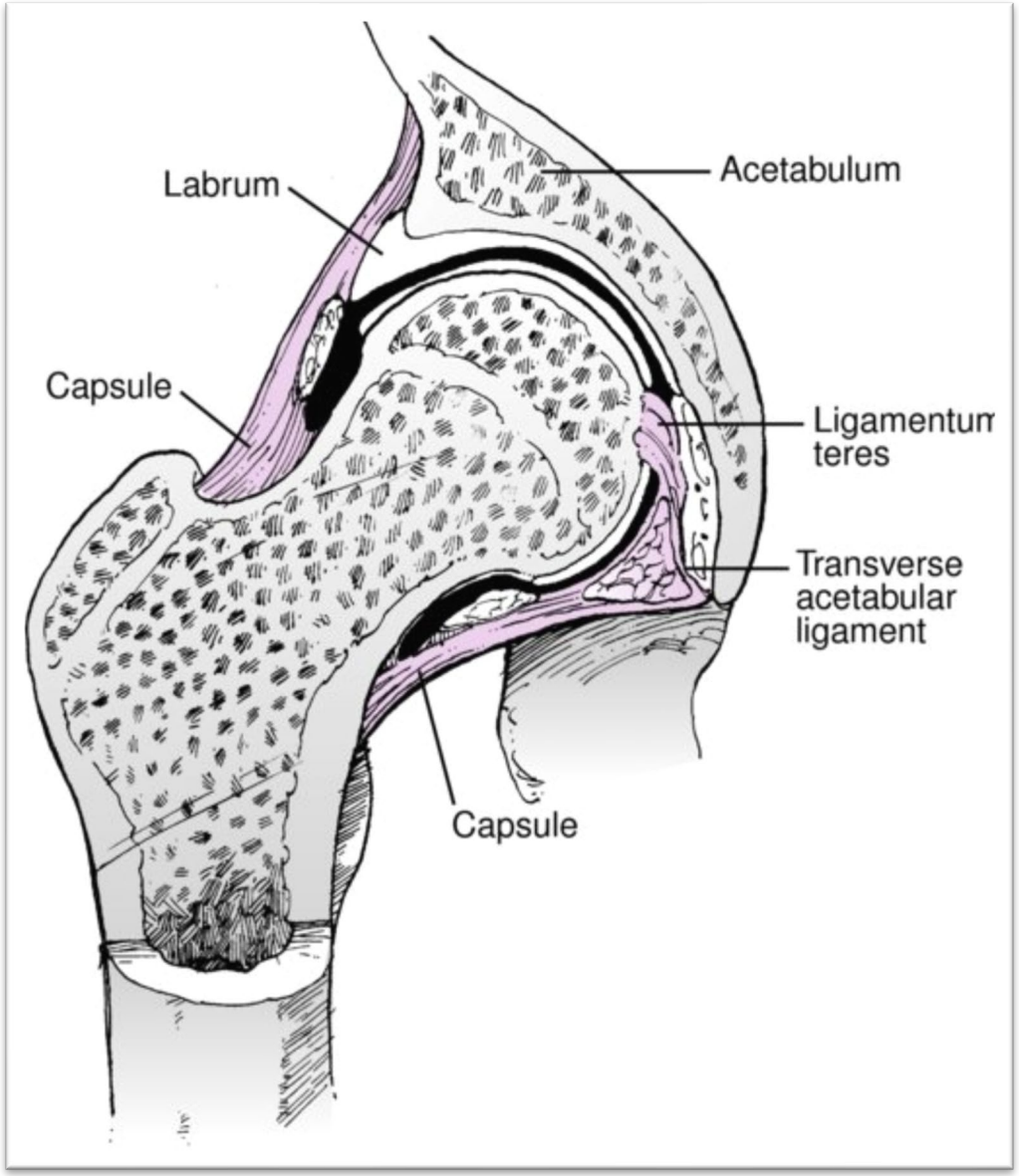
1. **Understand hip anatomy and how it applies to the treatment of hip dislocations and femoral head fractures**
2. **Recognize the associated injuries with hip dislocation/femoral head fracture**
3. **Use the Pipkin classification and other important variables to determine treatment algorithms for femoral head fracture**
4. **Understand the expected outcomes and common complications associated with hip dislocation and femoral head fracture**

Introduction

- The hip joint is inherently stable
- Native hip dislocations:
  - High energy and mostly in young individuals
- Femoral head fractures
  - Often associated with hip dislocation/subluxation
- Prompt hip reduction is paramount

Hip Joint Stability

- Hip: ball and socket joint
  - Allows wide ROM, but also highly constrained
- Acetabular labrum deepens the socket
  - 40% of the femoral head contacts acetabular articular cartilage
  - 10% of the femoral head contacts the labrum
- Multiple large muscles use the hip joint as a fulcrum point
  - This directly relates to hip stability and necessitates a constrained joint



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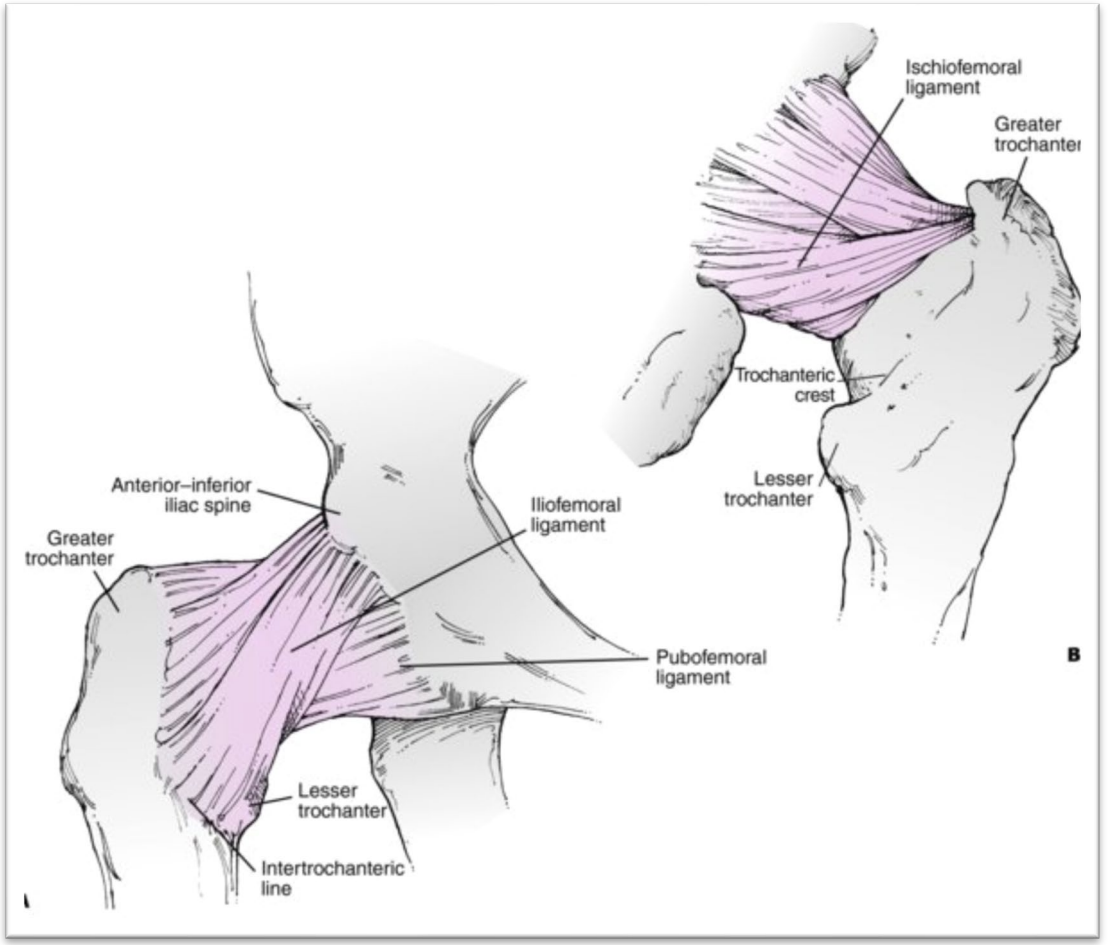
Hip Joint Stability

- Hip joint capsule
  - from acetabulum to the intertrochanteric ridge anteriorly and the femoral neck posteriorly
- Iliofemoral ligament
- Pubofemoral ligament
- Ischiofemoral ligament



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Hip Joint Anatomy

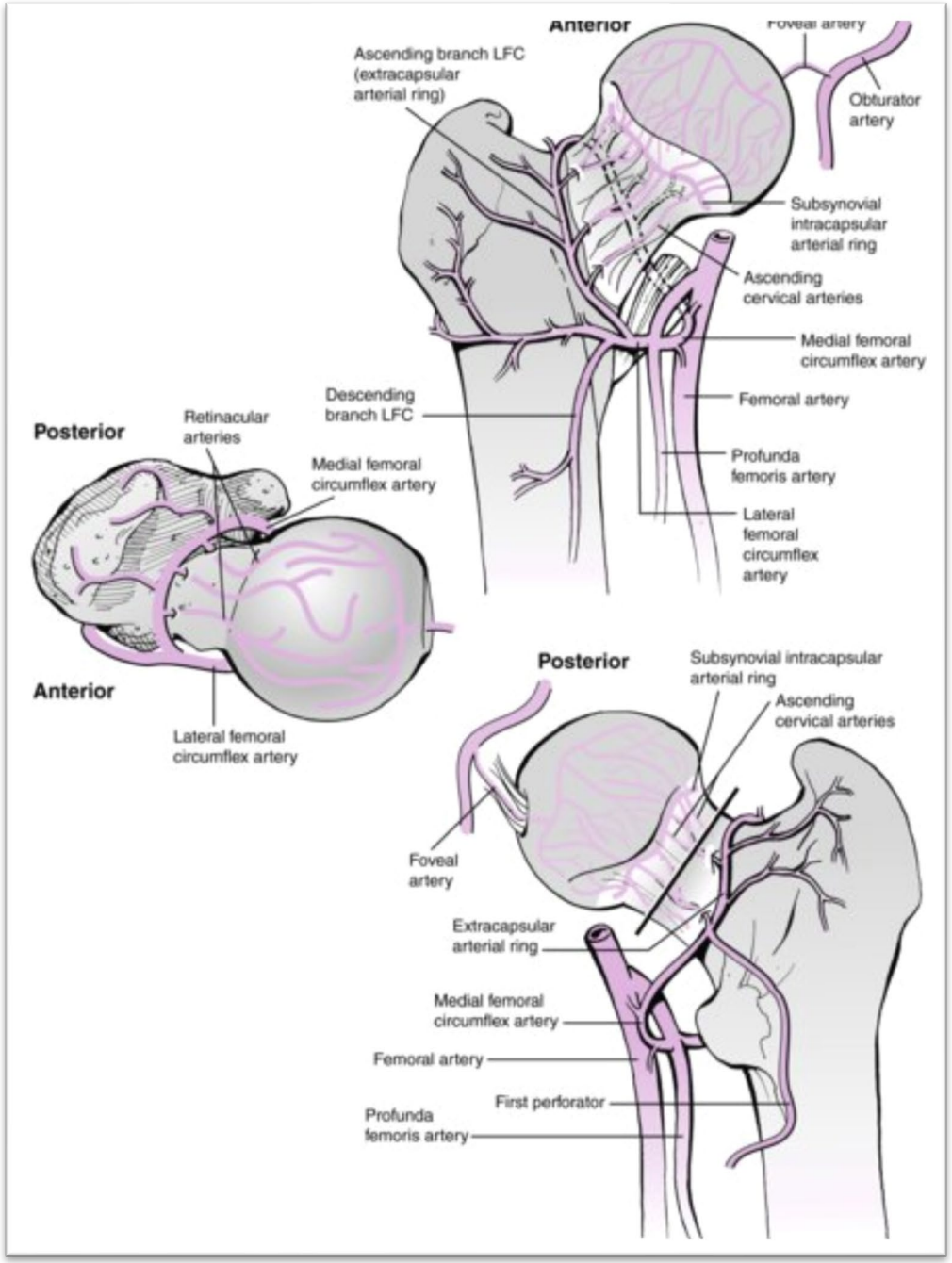
- Femoral Head: forms approximately 2/3 of a sphere
  - Articular cartilage is thickest on the medial and central surfaces

- Acetabulum: opens facing obliquely anteriorly and inferiorly
  - Horseshoe shaped cartilage: thickest laterally and peripherally

Hip Joint Vascularity

- Medial femoral circumflex artery
  - Predominant blood supply to fem head
  - Gives rise to subsynovial intracapsular arterial ring
    - Lateral epiphyseal artery – terminal branch

- Ascending cervical arterial branches are highly susceptible to kinking and compression with hip dislocation



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Associated Injuries

- Hip Dislocation
  - Intra-abdominal, chest, and head injury common
  - 95% of patients with a hip dislocation after MVC will have an associated injury requiring hospital admission
    - Suraci et al *J Trauma* 1986
  - ~25% may have major knee trauma
    - significant portion of these may not be found at initial hospitalization
    - Tabuenca et al *CORR* 2000

Associated Injuries

- Hip dislocation patients: 95% had associated injuries
  - 33% orthopedic injuries only
  - 24% head injury, 21% craniofacial injury, 21% thoracic injury
  - Trauma General Surgery evaluation warranted in hip dislocation patients
  - Hak/Goulet *J Trauma* 1999
- Sciatic nerve injury
  - 10% of adult and 5% of pediatric hip dislocations
  - Peroneal division most commonly affected
  - Careful testing of all branches is necessary

Associated Injuries

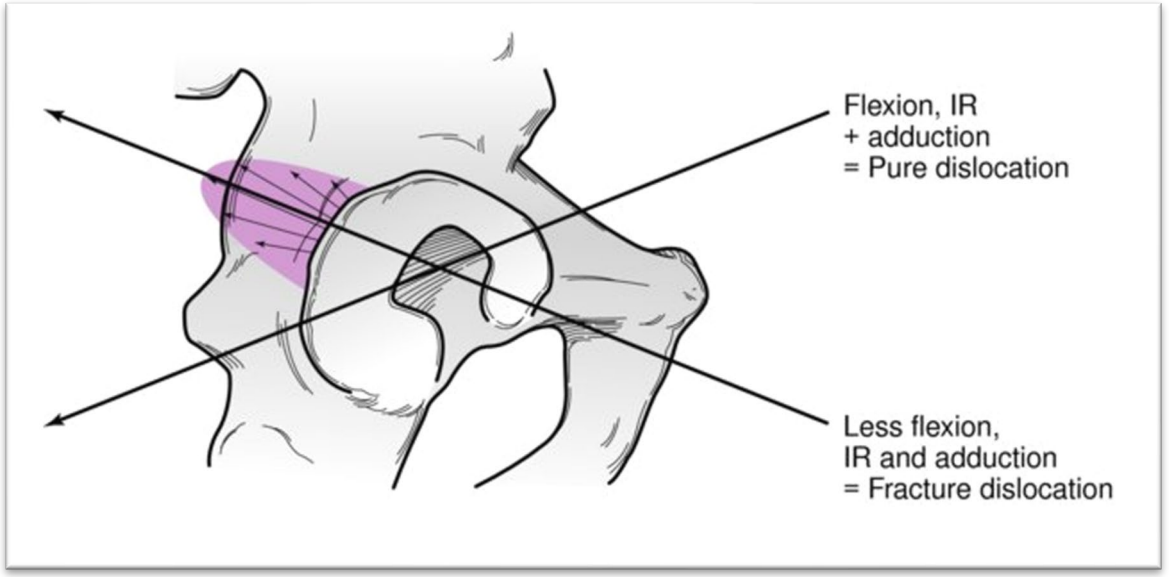
- Native hip dislocations
  - Acetabular fracture: up to 70%
  - Femoral head fracture: 5-15%

Hip Dislocation Mechanism of Injury

- MVC
  - Flexed hip and flexed knee
  - Dashboard injury, often unrestrained
- Fall, pedestrian struck by vehicle, industrial accidents, sports related injury
- Posterior hip dislocation: 90%
- Anterior hip dislocation: 10%

Mechanism of Injury

- Posterior Hip Dislocation
  - Letournel used vector analysis
    - Hip adduction and/or internal rotation leads to pure hip dislocation
    - Less adduction or less internal rotation may portend a fracture/dislocation



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  - Upadhyay et al *JBJSBr* 1985
    - In hips with less femoral anteversion, there was an increased risk of pure hip dislocation

Mechanism of Injury

- Anterior Hip Dislocation
  - Hyper-abduction and extension
  - Position of hip (amount of flexion) determines type of anterior hip dislocation
    - Hyperflexion of the hip: inferior/obturator dislocation
    - Hip extension: anterior hip dislocation over superior ramus
  - Associated femoral head *impaction* is common
    - Femoral head *shear* fracture more common in posterior dislocation

Physical Exam

- Posterior Dislocation
  - Hip flexed with leg internally rotated, shortened and adducted
- If associated femoral head/neck/shaft fracture, exam may differ

Typical posterior hip dislocation appearance

Physical Exam

- Anterior Dislocation
  - Extreme external rotation and hip abduction
    - More hip extension -> superior pubic dislocation
- If associated femoral head/neck/shaft fracture, exam may differ

Anterior Hip Dislocation
Superior or “Pubic”

Physical Exam

- Anterior Dislocation
  - Extreme external rotation and hip abduction
    - More hip flexion -> inferior obturator dislocation
- If associated femoral head/neck/shaft fracture, exam may differ

Anterior Hip Dislocation
Inferior or “Obturator”

Radiographic Evaluation

- AP Pelvis X-ray
  - Part of the primary survey, ATLS protocol
  - Evaluate hip joint congruity
    - If hip dislocated, the direction of hip dislocation should be determined
      - Posterior dislocation: femoral head is smaller and commonly overlaps the acetabulum
        - femoral rotation: less apparent lesser troch and fem neck in profile = internal rotation
      - Anterior dislocation: femoral head is larger, femoral is usually medial or inferior to the acetabulum
- If AP pelvis is good quality and is carefully inspected, proceed with hip reduction after appropriate exam and patient workup

Radiographic Evaluation

- Critically look for femoral head fracture, acetabular fracture, femoral neck fracture, and pelvic ring injury
- CT scan with fine cuts
- If femoral neck fracture, surgical stabilization of this prior to manipulation is warranted

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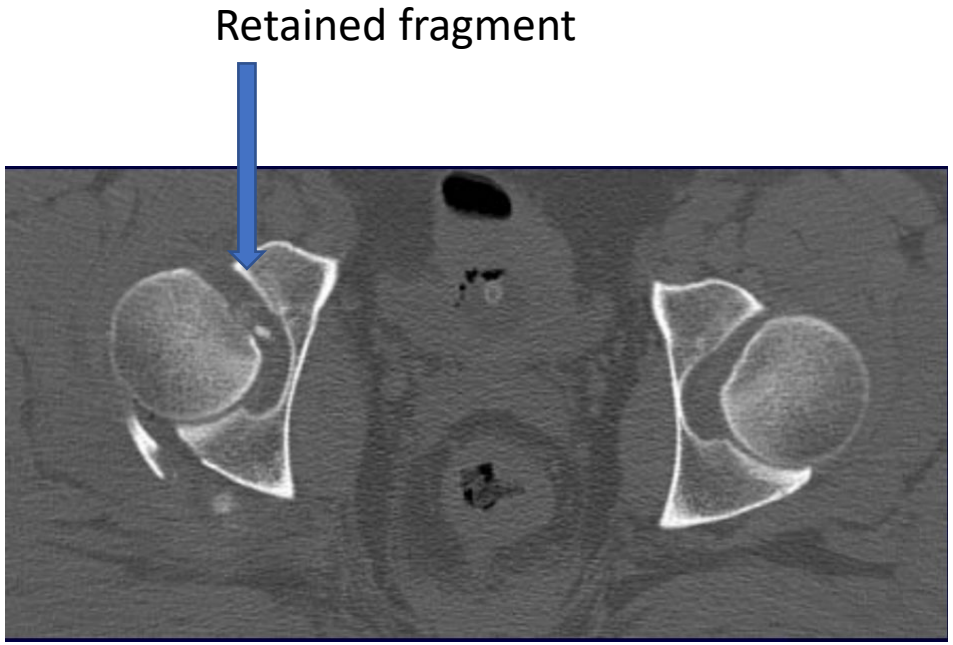
Radiographic Evaluation

- Post Reduction Radiographs
  - AP pelvis and Judet view x-rays
  - Thin cut CT scan
    - Superior at confirming concentric reduction
    - Identifies number and location of retained intra- articular fragments
    - Can identify impaction injury of femoral head/acetabulum, if present



Classification of Hip Dislocation and Femoral Head Fractures

AO/OTA classification for Hip Dislocation

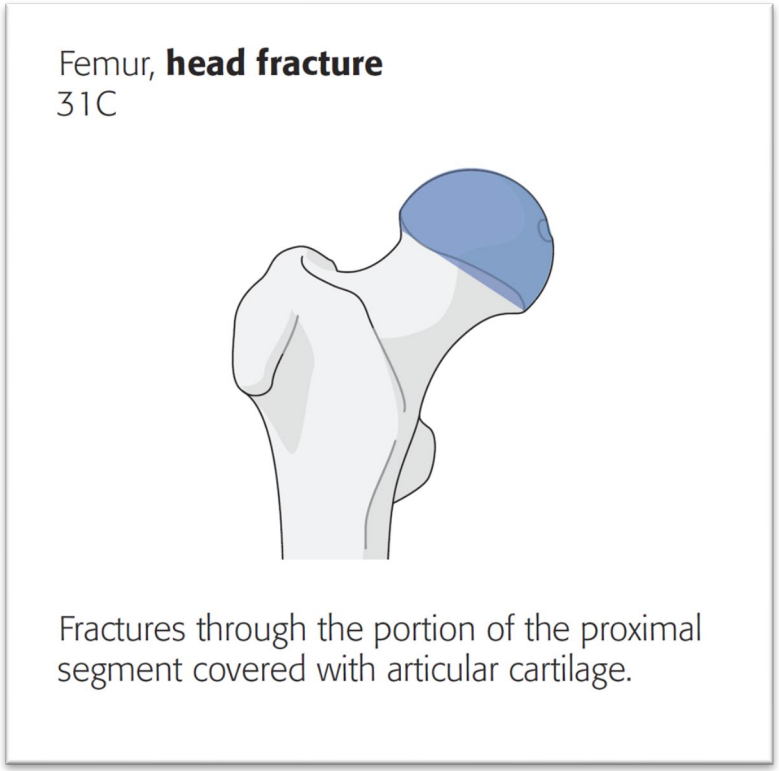
- 30[5_]
  - 30[5a]
    - Anterior hip dislocation
  - 30[5b]
    - Posterior hip dislocation
  - 30[5c]
    - Medial hip dislocation
  - 30[5e]
    - Obturator type/Inferior dislocation

- AO/OTA Universal Modifiers

5		**Dislocation**
	5a	Anterior (volar, palmar, plantar)
	5b	Posterior (dorsal)
	5c	Medial (ulnar)
	5d	Lateral (radial)
	5e	Inferior (with hip is also obturator)
	5f	Multidirectional

Meinberg EG, Agel J, Roberts CS, Karam MD, Kellam JF. Fracture and Dislocation Classification Compendium-2018. J Orthop Trauma. 2018 Jan;32 Suppl 1:S1-S170. S7

AO/OTA classification: Femoral Head Fracture



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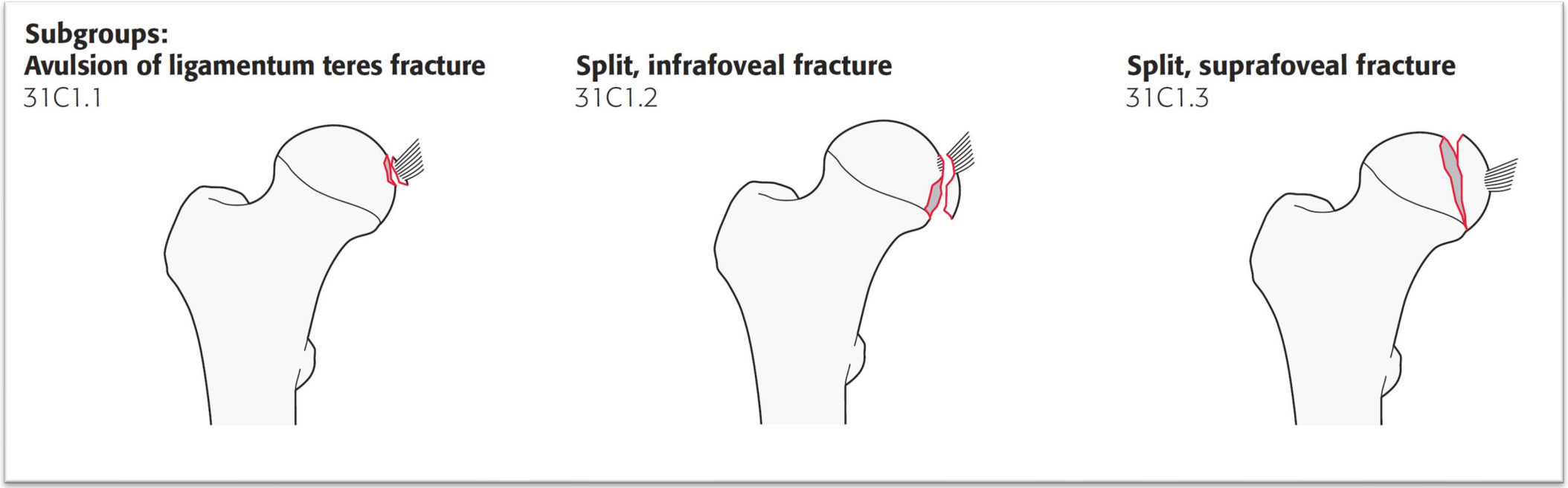
- 31C1
  - Split Fracture
- 31C2
  - Depression Fracture
- Associated dislocations are coded using universal modifier in square brackets (previous slide)
  - [5_]

AO/OTA classification: Femoral Head Fracture

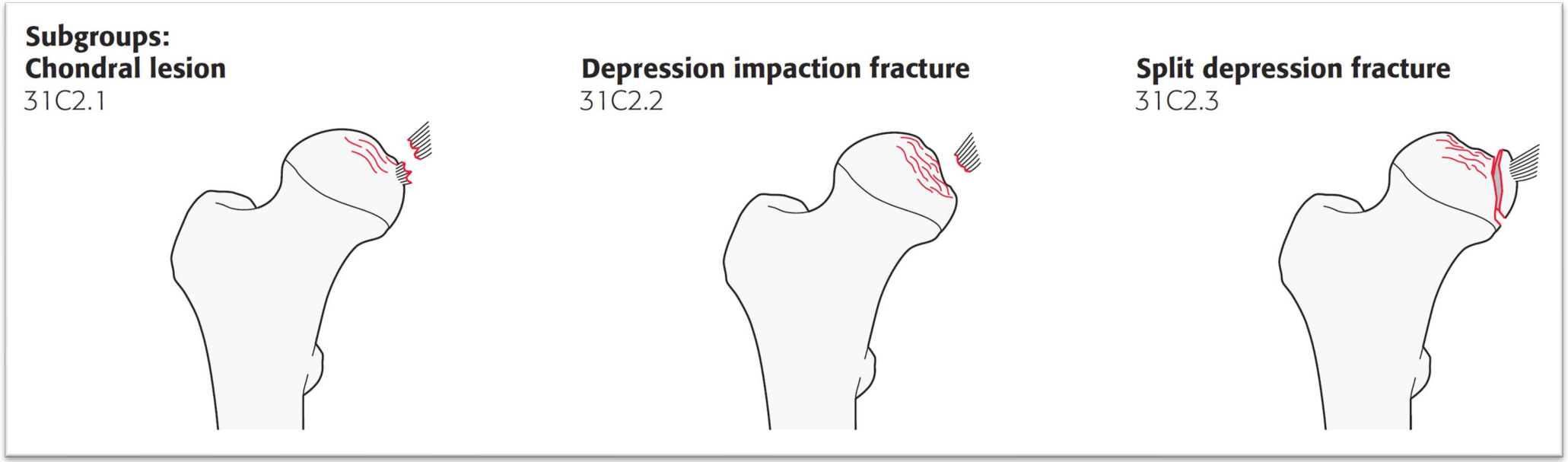
- 31C1
  - Split Fracture



Meinberg EG, Agel J, Roberts CS, Karam MD, Kellam JF. Fracture and Dislocation Classification Compendium-2018. J Orthop Trauma. 2018 Jan;32 Suppl 1:S1-S170. S36

AO/OTA classification: Femoral Head Fracture

- 31C2
  - Depression Fracture



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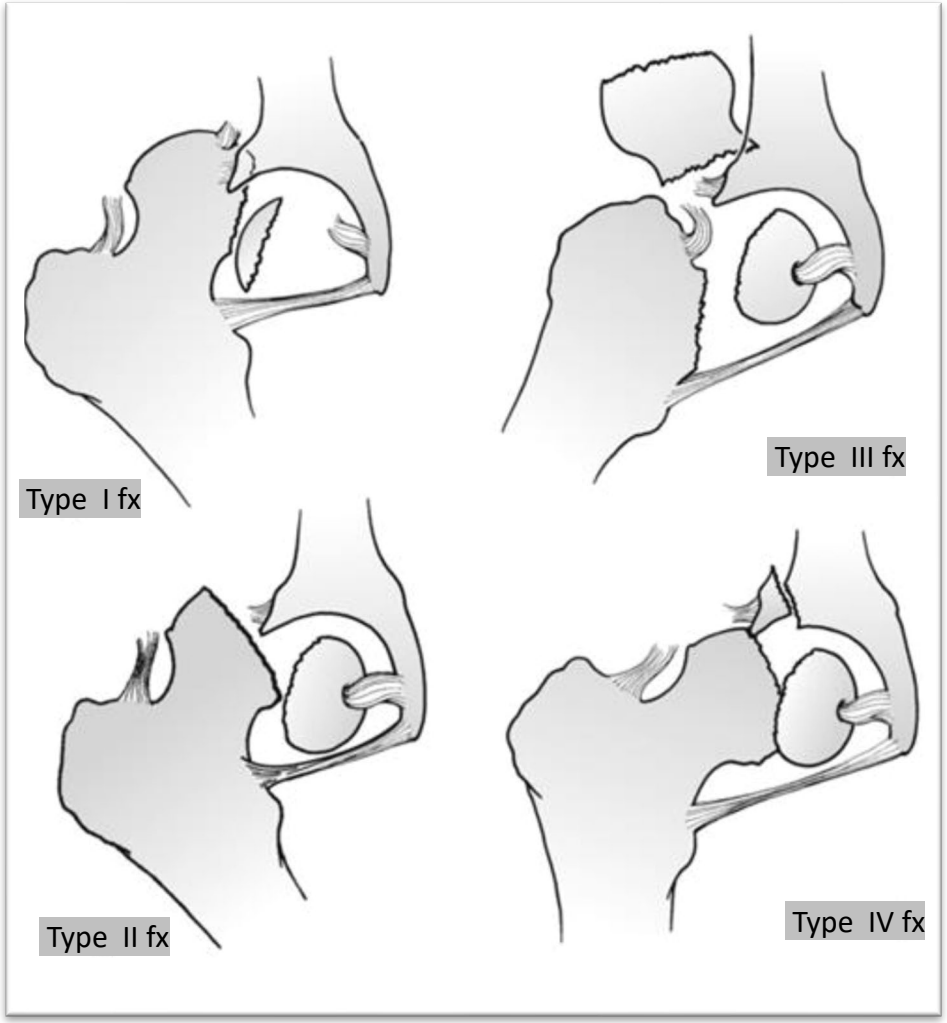
Thompson and Epstein: Post Hip Dislocation

- Type I Pure dislocation with or without minor fracture
- Type II Dislocation with single large posterior wall fragment
- Type III Dislocation with comminuted posterior wall
- Type IV Dislocation with acetabular floor fracture
  - most commonly transverse/posterior wall fracture-dislocation
- Type V Dislocation with femoral head fracture

Thompson and Epstein JBJS 1951

Pipkin Classification of Posterior Hip Dislocation/Femoral Head Fracture

- Type I: fx caudad to fovea
- Type II: fx cephalad to fovea
- Type III: fem head fx with associated femoral neck fx
- Type IV: fem head fx with associated acetabular fx



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Epstein Classification: Anterior Hip Dislocations

- Type I Superior

- Type II Inferior
  - A no fracture
  - B associated fracture of fem head or neck
  - C associated fracture of acetabulum

Epstein *CORR* 1973

Reduction Timing

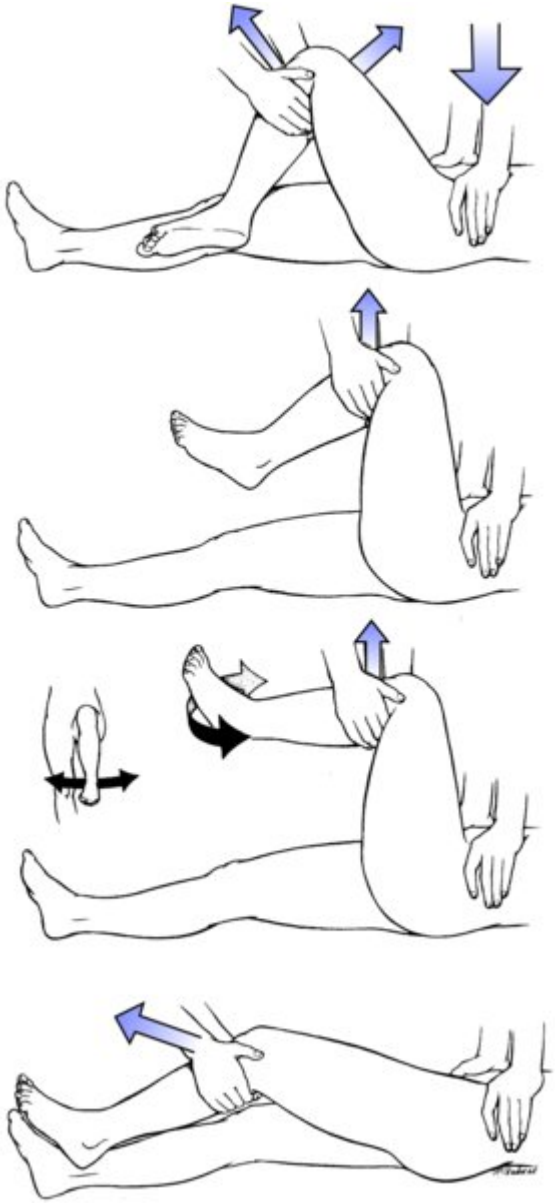
- Dislocated native hip joint is an emergency
  - Emergent reduction may restore blood flow through kinked or compressed vessels
- Overall rate of AVN after hip dislocation: 2-10%
    - 5.627 times greater risk of AVN if reduction >12 hrs. from injury, Kellam *JOT* 2016
    - Many advocate reduction time of $\leq$ 6 hours from injury
      - Mehlman *CORR* 2000, Hougaard *Arch Orthop Trauma Surg* 1986
- Procedure requires proper anesthesia
  - Inadequate analgesia/sedation may cause more pain for patient and a more difficult procedure
  - Conscious sedation often adequate
  - General Anesthesia: if used for associated injuries, can be very helpful for hip relocation

Reduction Maneuvers

- The patient must be fully relaxed
  - Setting can be ER or OR
  - ER may not be able to give adequate sedation and relaxation
  - Consider other injuries, medical co-morbidities
  - Consider the potential need for fluoro, full paralysis, etc

Allis Maneuver for Posterior Hip Dislocation

- Pt is supine
- Traction/counter traction technique
  - Assistant provides downward force on ASIS
  - Surgeon flexes hip and knee then longitudinal traction
    - Start with extremity in IR and adduction
    - Gently rotate extremity during traction



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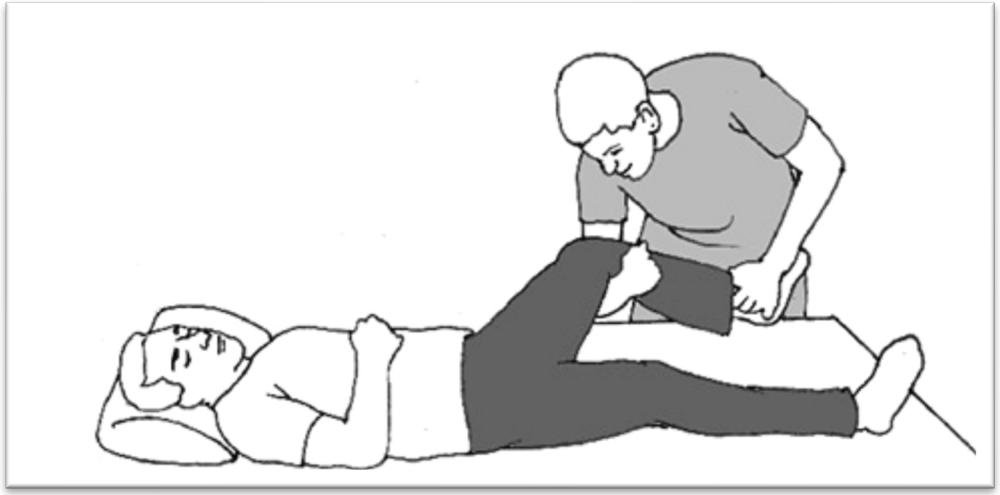
Posterior Hip Dislocation Reduction Maneuvers

- There are many other reduction techniques and several modifications to Allis maneuver described
  - Many intended to increase safety of provider/surgeon
  - For example
    - Stimson
    - Bigelow
    - Lefkowitz
    - “East Baltimore Lift”
      - multiple assistants used to provide traction

Stimson Gravity Maneuver

With permission. Waddell BS et al. A Detailed Review of Hip Reduction Maneuvers: A Focus on Physician Safety and Introduction of the Waddell Technique. *Orthop Rev (Pavia)*. 2016;8(1):6253. Fig 11, 2

Bigelow Maneuver



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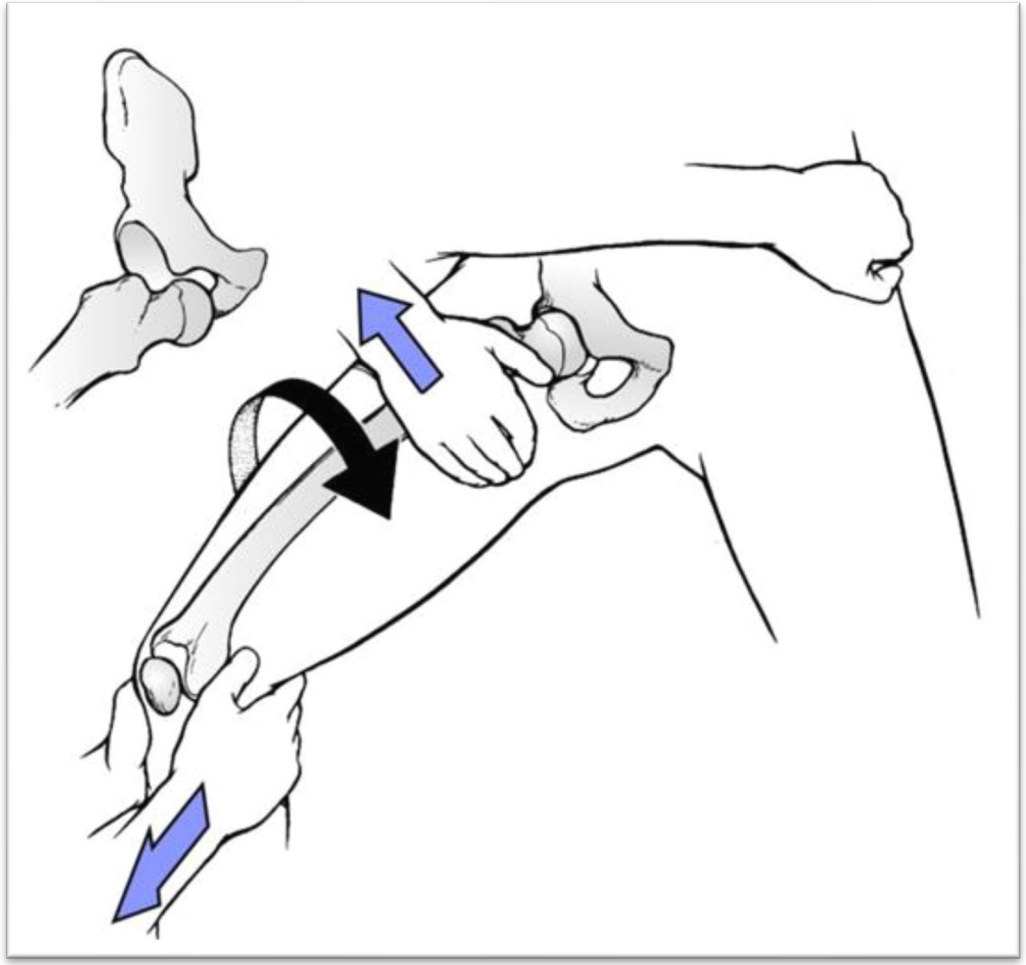
Lefkowitz Maneuver

With permission. Waddell BS et al. A Detailed Review of Hip Reduction Maneuvers: A Focus on Physician Safety and Introduction of the Waddell Technique. *Orthop Rev (Pavia)*. 2016;8(1):6253. Fig 3, 5

East Baltimore Lift

Anterior Hip Dislocation: Walker Modification

- Supine patient
- For inferior dislocation:
  - Continuous traction
  - Gentle hip flexion with lateral force on inner thigh
- For superior dislocation
  - Continuous traction
  - Gentle internal rotation
  - Extension of the hip may be required
    - Have bump ready to allow for this
- Continuous traction better than short jerky motions



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Post-Reduction Stability Testing

- Obtain AP pelvis/Judet views and AP/lateral of affected hip
  - Ensure concentric reduction

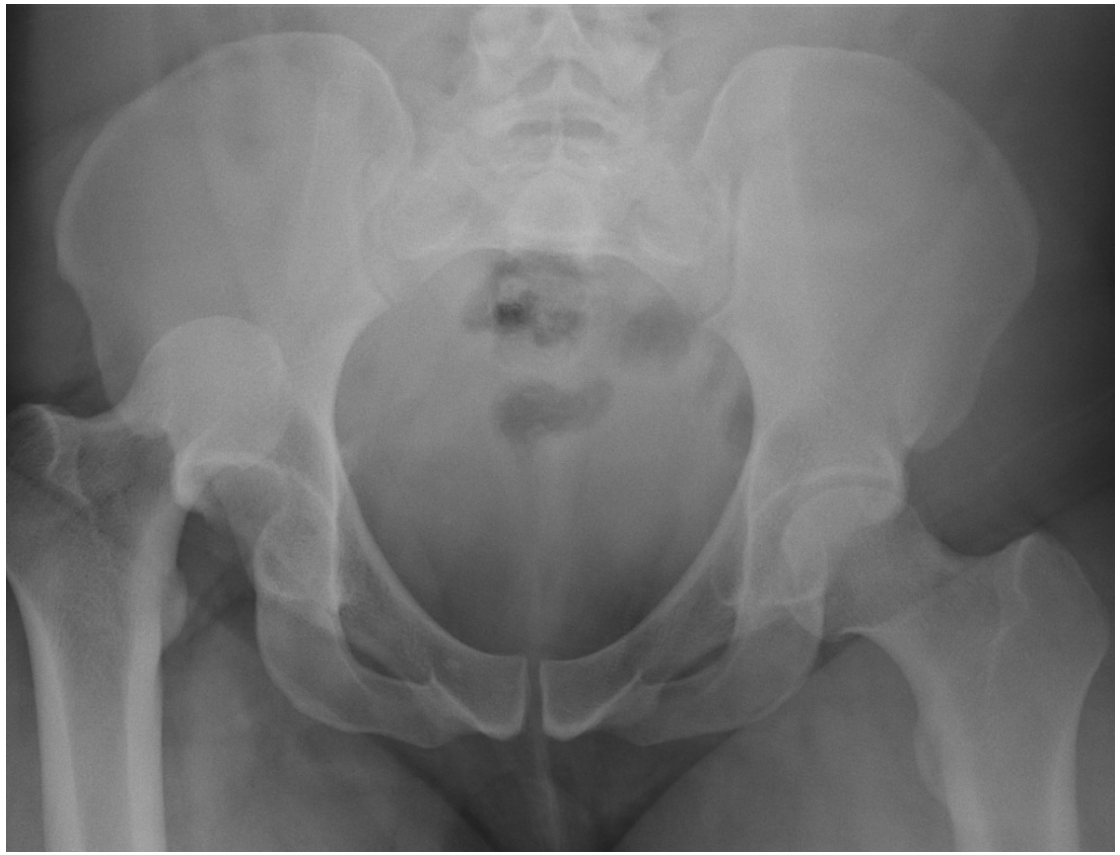
- Examine hip by flexing to 90 degrees
  - If hip unstable, consider skeletal traction
  - In hips with small posterior wall acetabular fractures, if no obvious instability, this does not rule out dynamic hip instability

- CT scan: thin slice

Hip Dislocation: Nonoperative Treatment

- If hip stable after reduction and congruent joint
  - Small fragment in cotyloid fossa can be tolerated, as long as joint is concentrically reduced
- Posterior hip precautions: limit adduction, IR, and flexion
- Early mobilization
- Touch down weight-bearing for 4-6 weeks
- Repeat x-rays before allowing weight-bearing

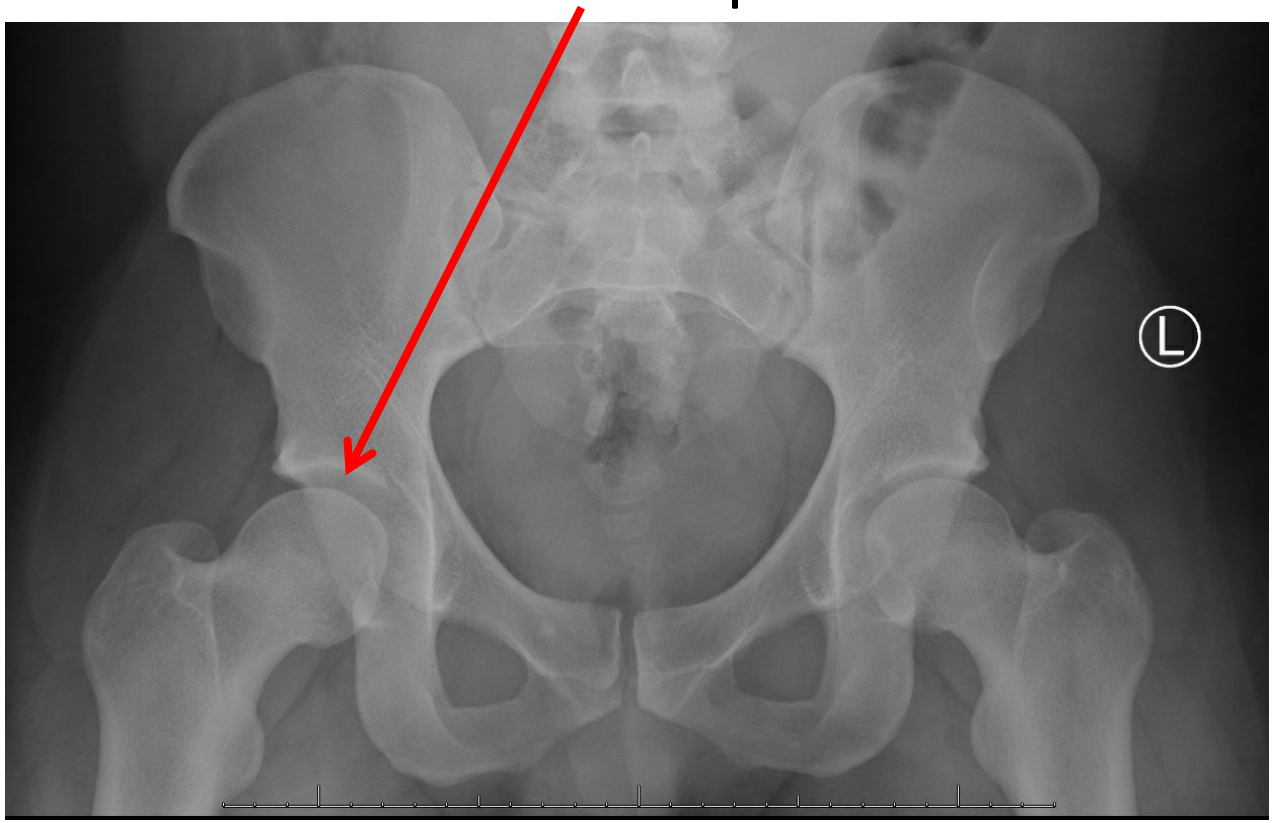
Case example



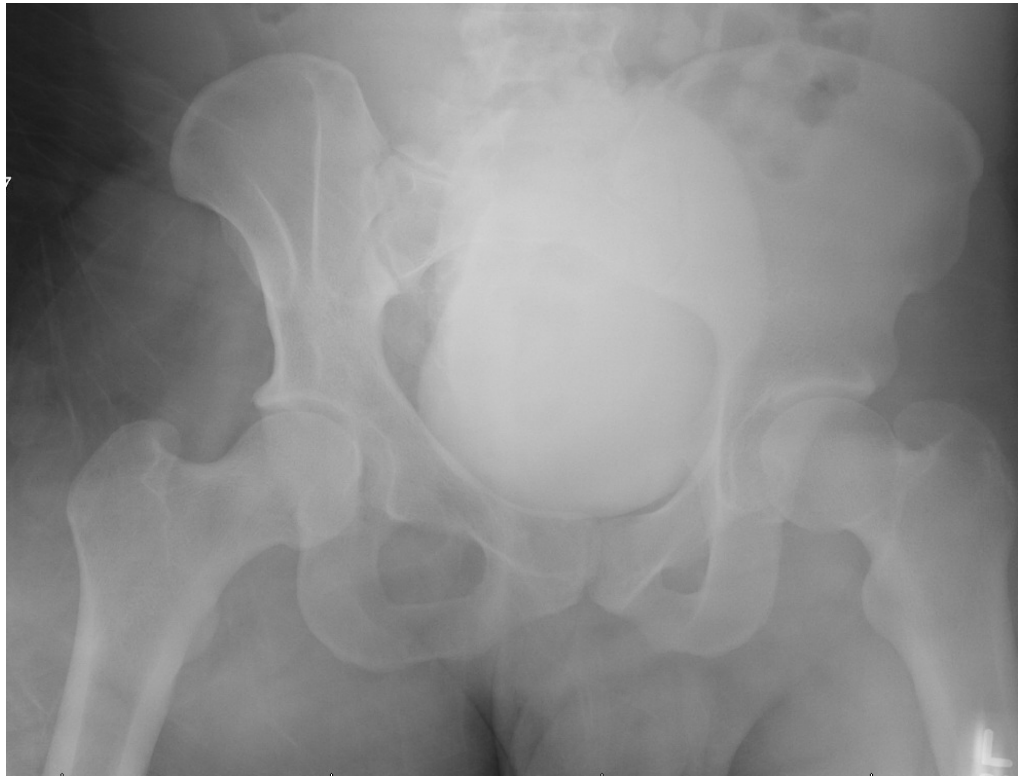
- 25 y/o male MVC
  - Posterior hip dislocation without fracture
- Allis maneuver closed reduction under conscious sedation in ER

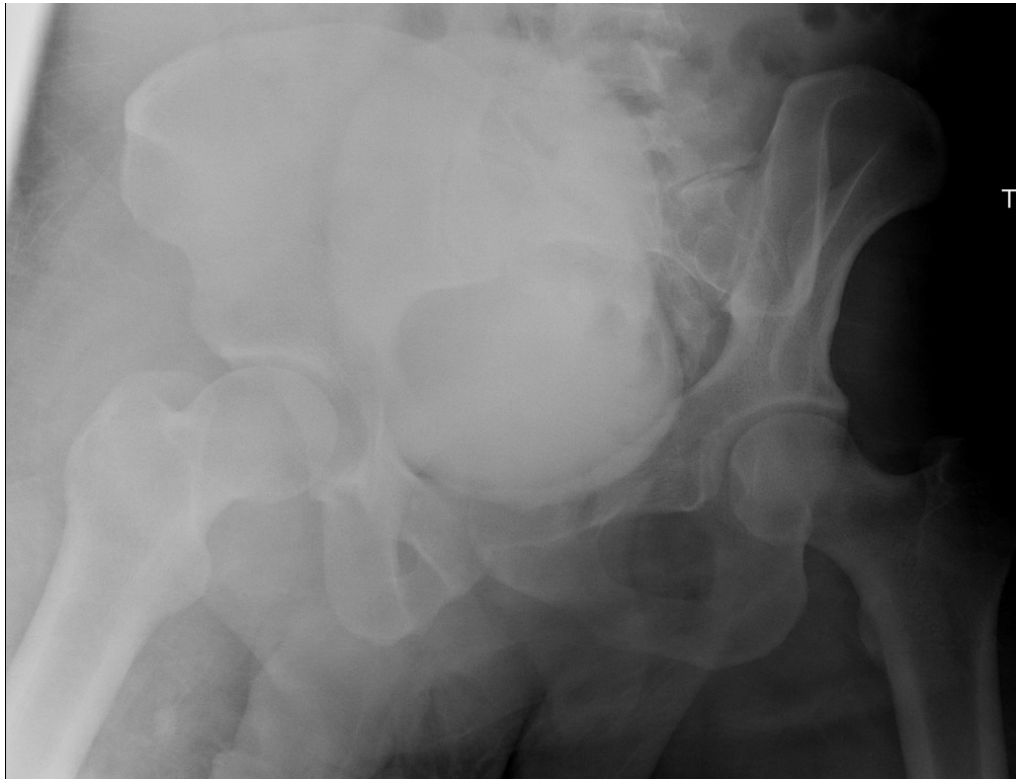
Case example

- 25 y/o male MVC
  - Posterior hip dislocation without fracture
- After closed reduction: non-concentric hip reduction



- Plan: open reduction, possible labral/capsular repair
- After CT, but before Judet XRs were obtained, pt's hip reduces and is now congruent/concentric





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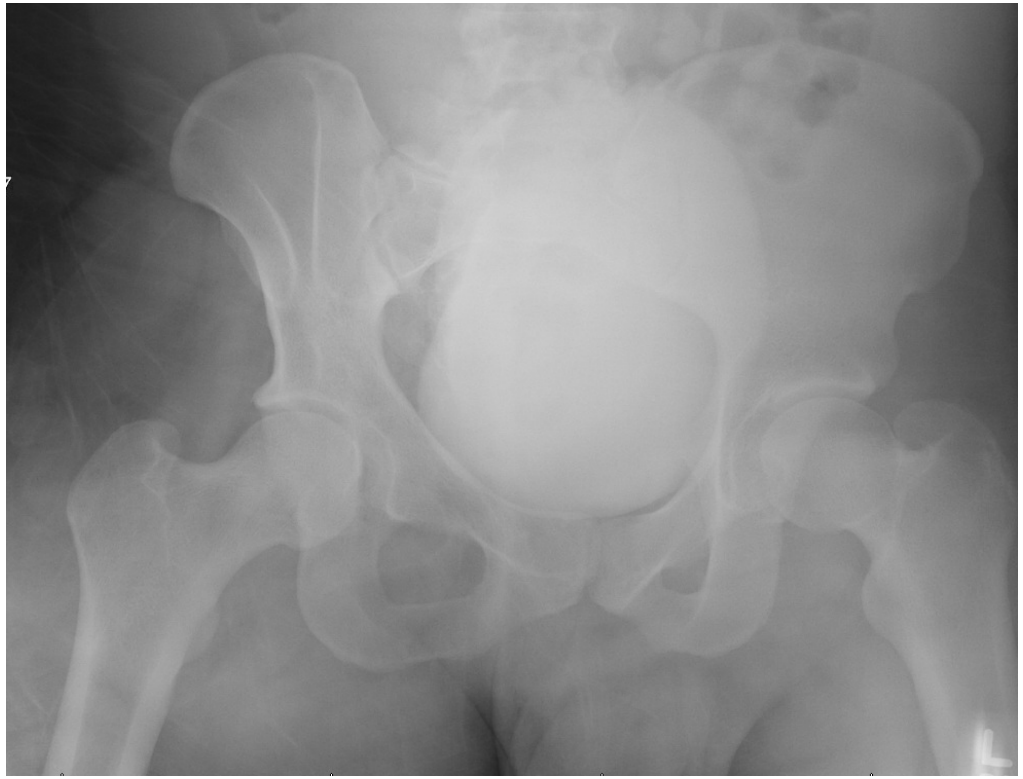
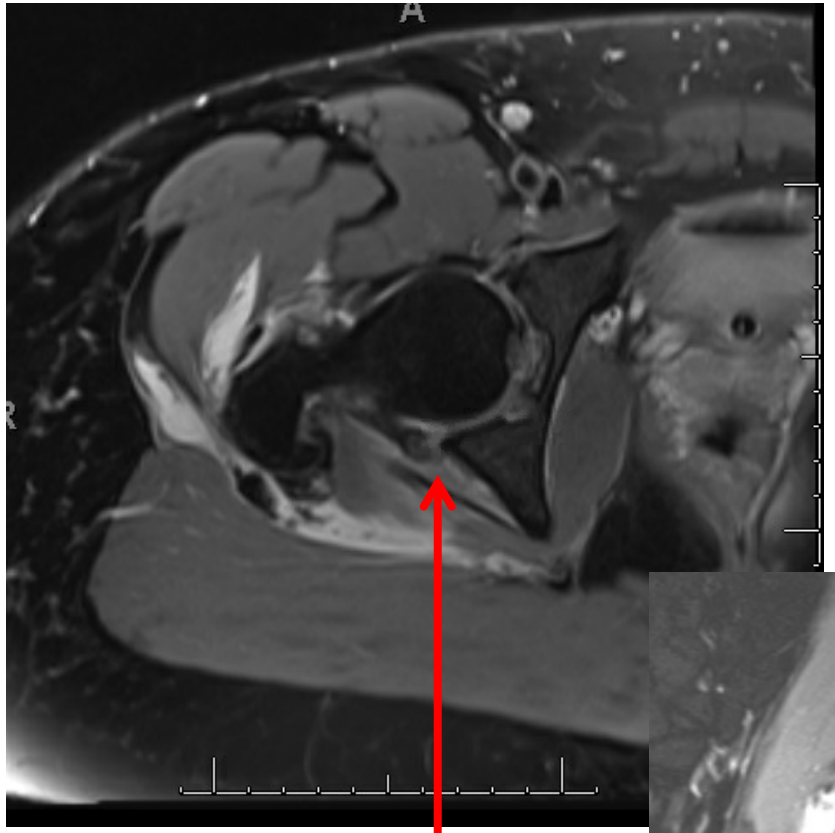
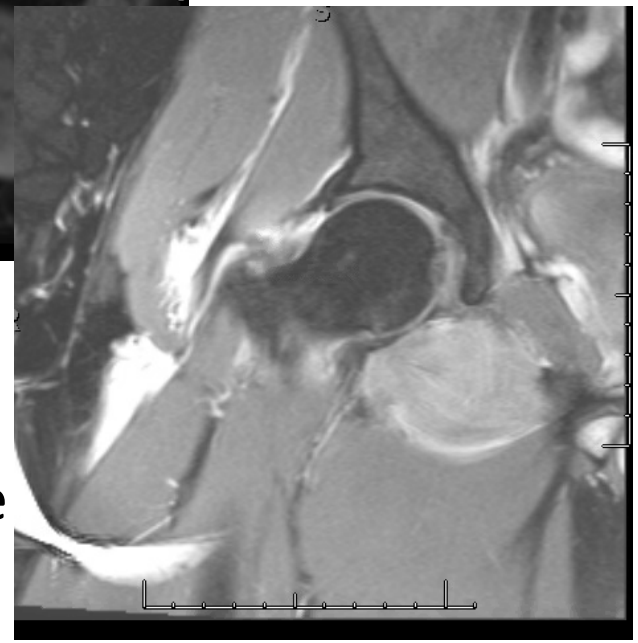




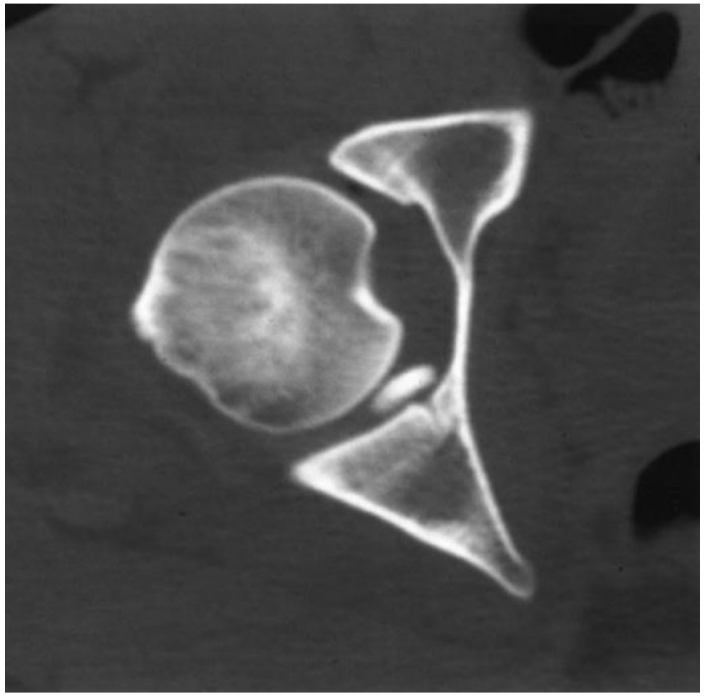


- MRI ordered:
  - posterior labral tear
  - Nothing in joint anymore
- **Nonop tx**
  - TTWB for 6 weeks

Hip Dislocation: Operative Treatment

Indications for Operative Treatment

- Irreducible hip dislocation
- Hip dislocation with femoral neck fracture
- Incarcerated fragment in joint space
- Incongruent reduction
- Unstable hip after reduction



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The Irreducible Hip Dislocation

- Emergent surgical open reduction if patient overall condition allows
- Pre-op CT
  - if it will not cause delay
  - femoral head/acetabular fracture involvement
    - surgical approach/operative planning
  - Use to identify number, location and size of bone fragments
- Closed reduction attempt in OR
  - Beware that repeated attempts often not successful and may harm neurovascular structures, articular cartilage, or cause fracture.
  - Stannard et al, *Clin Orthop Relat Res*, 2000

Anterior Irreducible Hip Dislocation

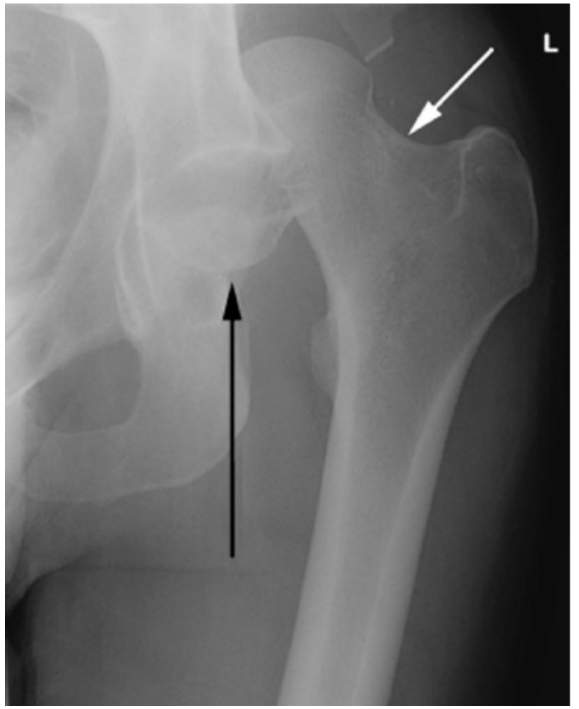
- Possible causes:
  - Fem head buttonhole through capsule
  - Rectus femoris
  - Labrum
  - Psoas tendon

Posterior Irreducible Hip Dislocation

- Possible causes:
  - Piriformis tendon
  - Obturator internus tendon
  - Gluteus maximus
  - Posterior capsule
  - Ligamentum teres
  - Posterior wall/bone fragment
  - Iliofemoral ligament
  - Labrum

The Irreducible Hip Dislocation

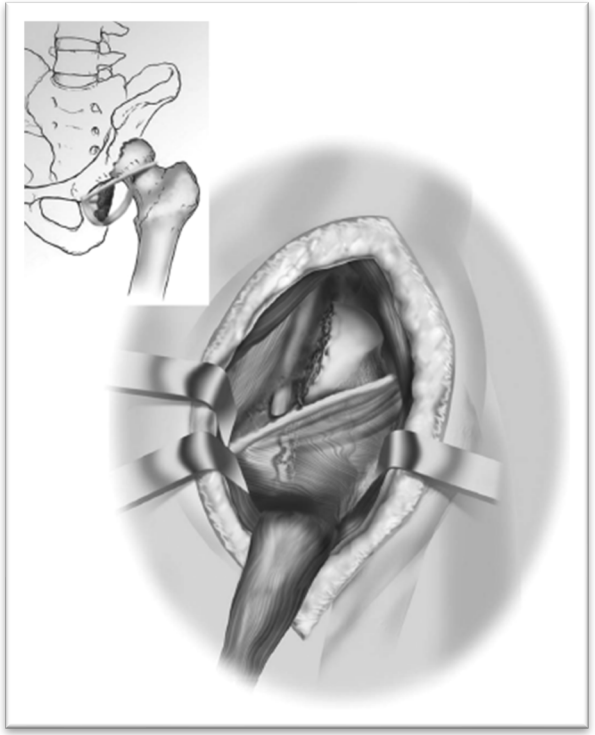
- Be aware of the irreducible posterior fracture dislocation without posterior wall fx
  - Exam: hip only slightly flexed, neutral rotation, shortened
  - Minimal to **no motion** possible at hip
  - Fem head/neck dislocated posterosuperior through constricting capsulolabral defect
  - Mehta S, Routt M *JOT* 2008



Mehta S, Routt ML Jr. Irreducible fracture-dislocations of the femoral head without posterior wall acetabular fractures. *J Orthop Trauma*. 2008 Nov-Dec;22(10):686-92. Fig 2,3

The Irreducible Hip Dislocation

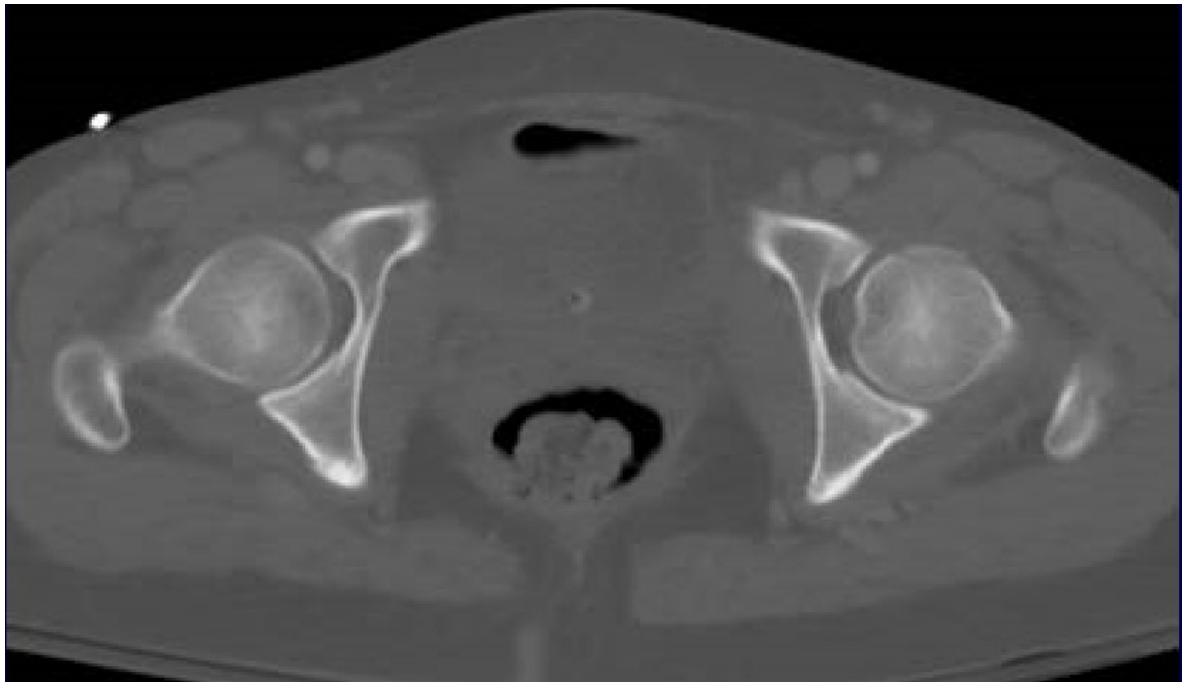
- Be aware of the irreducible posterior fracture dislocation without posterior wall fx
  - Exam: hip only slightly flexed, neutral rotation, shortened
  - Minimal to **no motion** possible at hip
  - Fem head/neck dislocated posterosuperior through constricting capsulolabral defect
  - Mehta S, Routt M *JOT* 2008
- In this subset of femoral head fracture dislocations, open reduction necessary
    - Smith Peterson approach with ORIF femoral head fx



Mehta S, Routt ML Jr. Irreducible fracture-dislocations of the femoral head without posterior wall acetabular fractures. *J Orthop Trauma*. 2008 Nov-Dec;22(10):686-92. Fig 7, 5

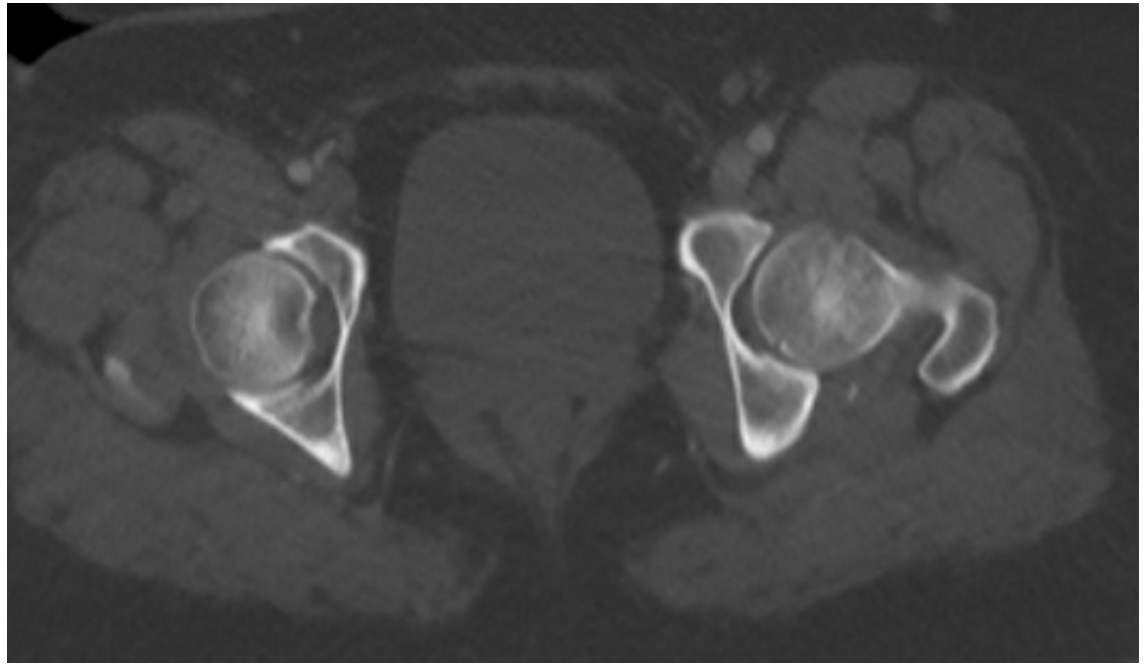
Nonoperative Treatment of Hip Dislocation with Femoral Head fracture:

- If hip stable after reduction and congruent hip joint
- Pipkin type I femoral head fracture that is reduced
- Same non-operative protocol as pure hip dislocations



Nonoperative Treatment of Hip Dislocation with Femoral Head fracture:

- If hip stable after reduction and congruent hip joint
  - Pipkin type II femoral head fracture that is anatomically reduced
    - Nonop tx possible
    - Risk of re-displacement
      - Butler *JBJS* 1981
      - Swiontkowski et al *JOT* 1992



Operative Treatment of Hip Dislocation with Femoral Head Fracture

- The decision regarding surgical approach, technique, and fixation versus excision is often debated
  - Key factors
    - Location of fracture
      - Pipkin I vs II
      - More anterior/posterior or superior/inferior
    - Size of femoral head fragment
    - Shear injury versus impaction (or both)
    - Presence and location of incarcerated fragments in joint
    - Associated posterior wall acetabular fracture

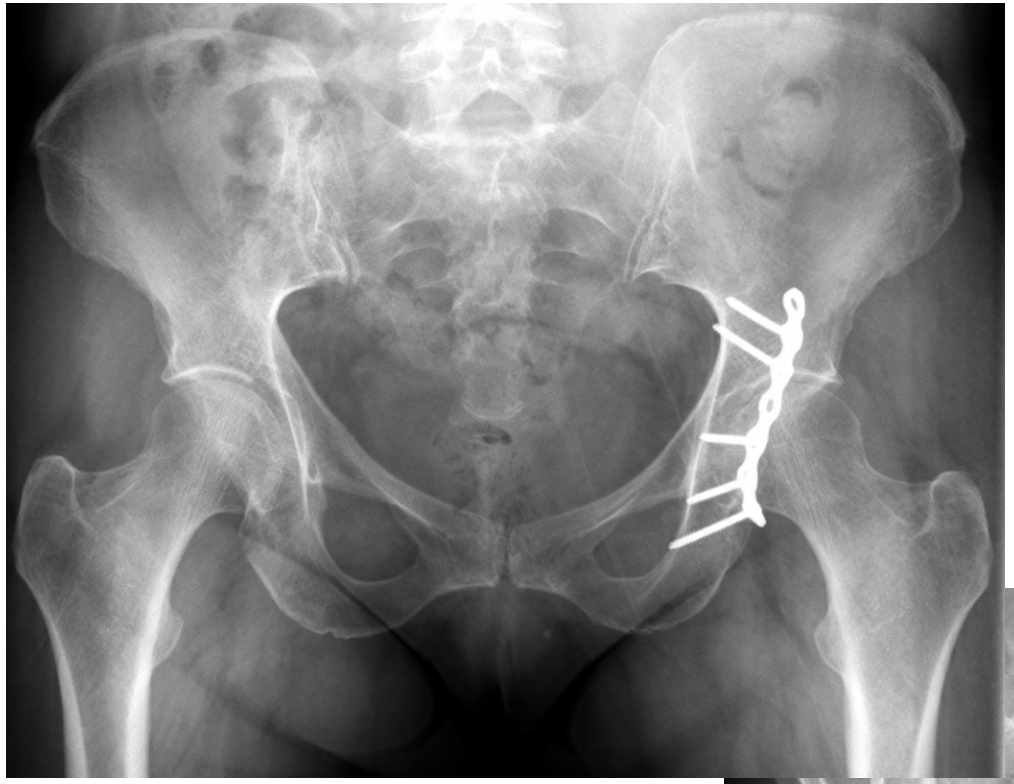
Open Reduction with or without Debridement

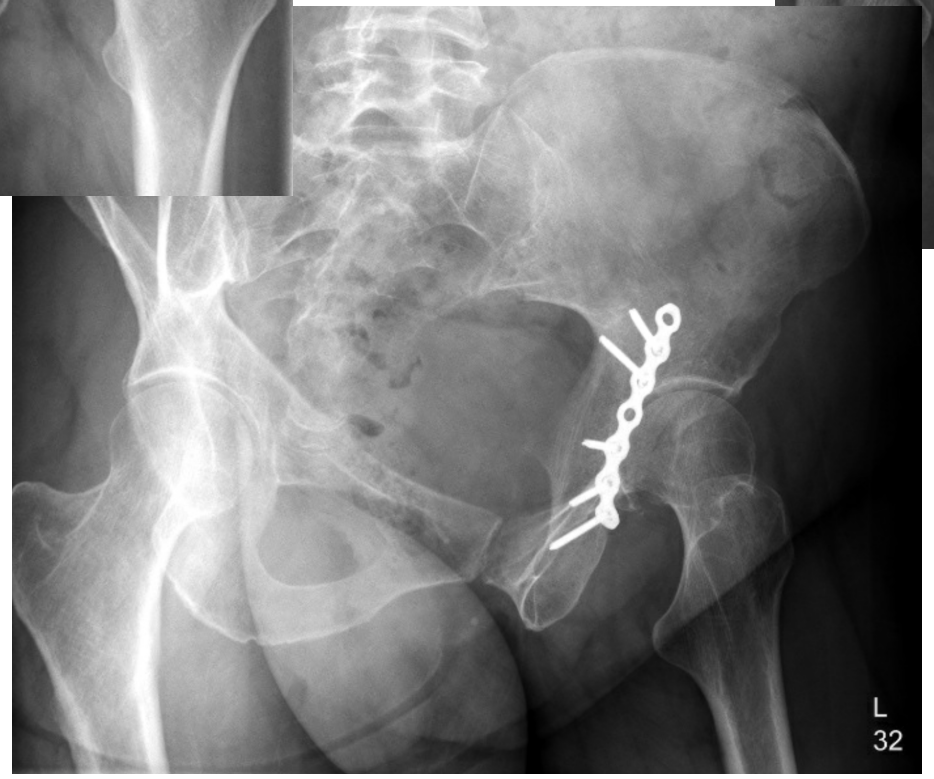
- Free fragments between femoral head and acetabulum need to be removed
  - preOp CT scan can determine donor site
- Open hip reduction with removal of incarcerated fragments
  - Small avulsions from femoral head
  - Pipkin I fxs that aren’t reduced
  - Loose fragment from posterior wall of acetabulum
- Arthroscopic debridement also an option in some cases

Case Example

- 56 y/o female, MVC
- Posterior hip d/l with post wall and infra-foveal femoral head fx

- 56 y/o female, MVC
  - Closed reduction
- Posterior wall acetabular fx
- Small and displaced infra foveal femoral head fx





- Kocher-Langenbeck
  - ORIF post wall
  - **Excision** of femoral head fracture from posterior approach

Open Reduction and Internal Fixation

- Pipkin I fractures that are large and displaced
- Small fractures may be excised or debrided

Kain M and Tornetta P. Hip Dislocations and Femoral Head Fractures. In. Tornetta P, Ricci WM, eds. Rockwood & Greens Fractures in Adults, 9e. Philadelphia, PA. Wolters Kluwer Health, Inc; 2019. Fig 51-28

Open Reduction and Internal Fixation

- Pipkin II fractures
  - Involve weight bearing femoral head and should not be excised
- ORIF with plan to approach fragment according to size, location and fracture line orientation

Open Reduction and Internal Fixation Pipkin I/II

- Anterior approach
  - Smith Peterson/ Heuter interval
  - Anterolateral/ Watson Jones
    - Often preferred for irreducible anterior hip dislocations
    - Farther from the possibly abnormal position of femoral neurovascular bundle due to femoral head
  - Supine position most common
  - Leg free allows hip flexion and other hip positions to visualize fracture(s)
- Posterior approach
  - For some irreducible posterior dislocations

Pipkin III Fracture Dislocation

- Pipkin III fractures are operative
  - Poor prognosis in many outcome studies
- In young patients with hip dislocation and femoral neck fracture, ORIF should be performed
  - Identification of fracture is paramount
    - If plain XR inadequate, obtain CT scan
  - Stabilization of the non/minimally displaced femoral neck should occur prior to manipulation
- Consider arthroplasty in the physiologic or chronologically elderly patient

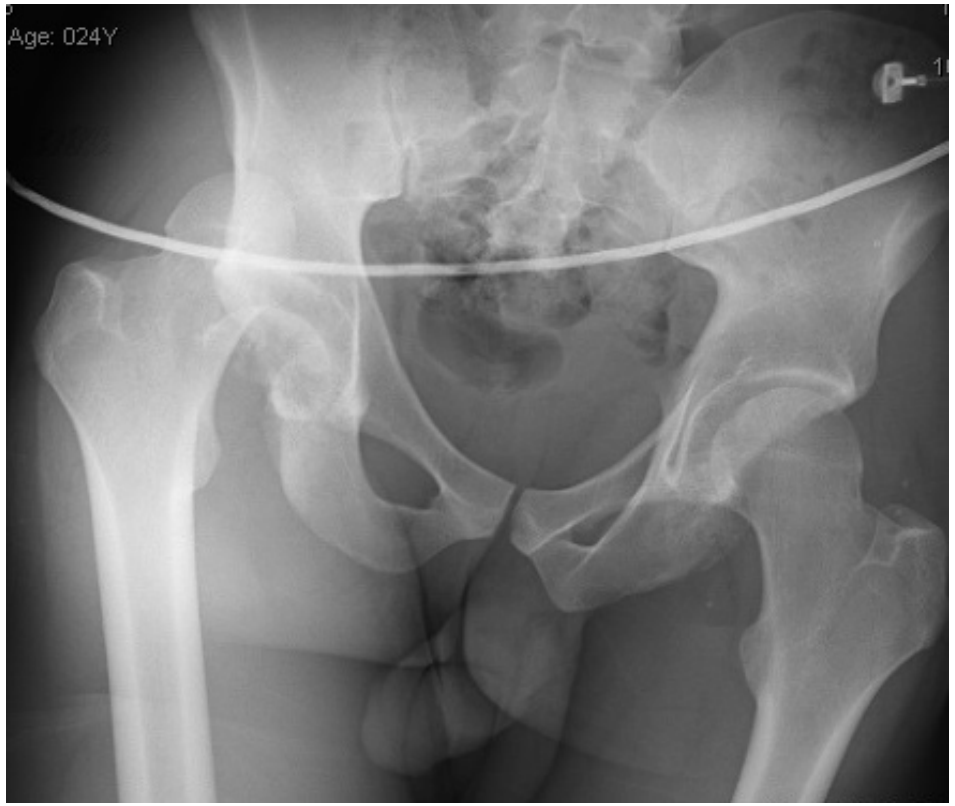
Courtesy of Dr. Michael Sridhar, MD

Open Reduction and Internal Fixation

- Pipkin IV fractures
  - Successful treatment requires appropriate management of both femoral head and acetabulum
- Surgical Hip Dislocation is warranted if acetabular fracture requires ORIF and is amenable to posterior approach
- Anterior approach can be utilized for femoral head fx if location/size warrants.
  - Staged posterior approach for acetabulum, if needed

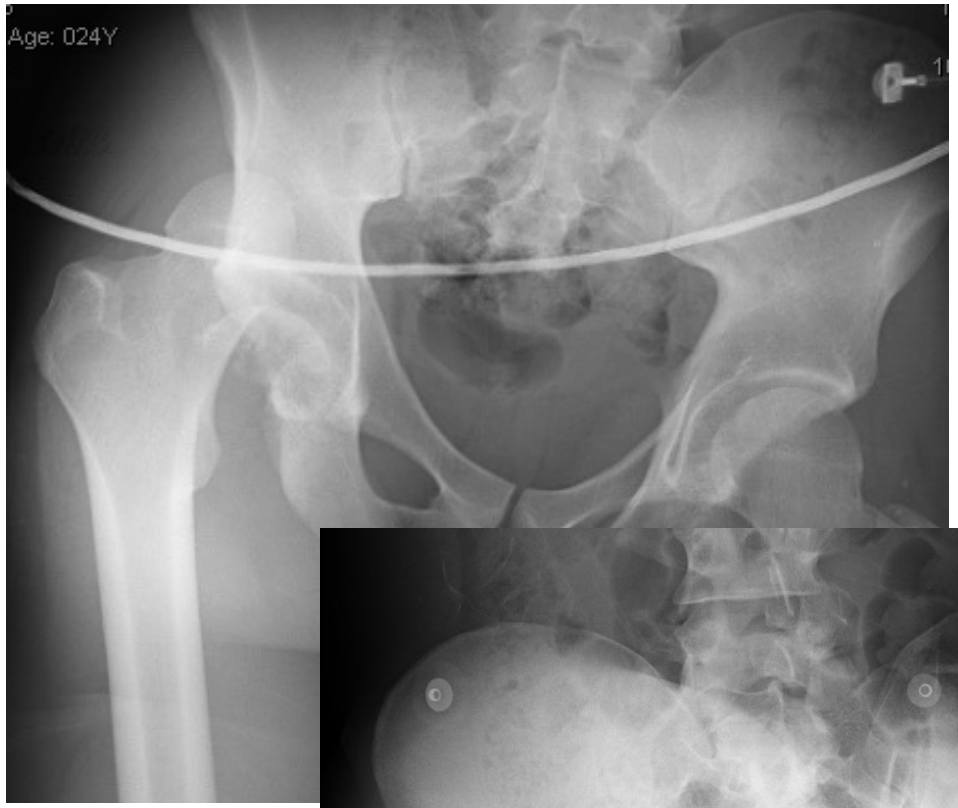
Case Example

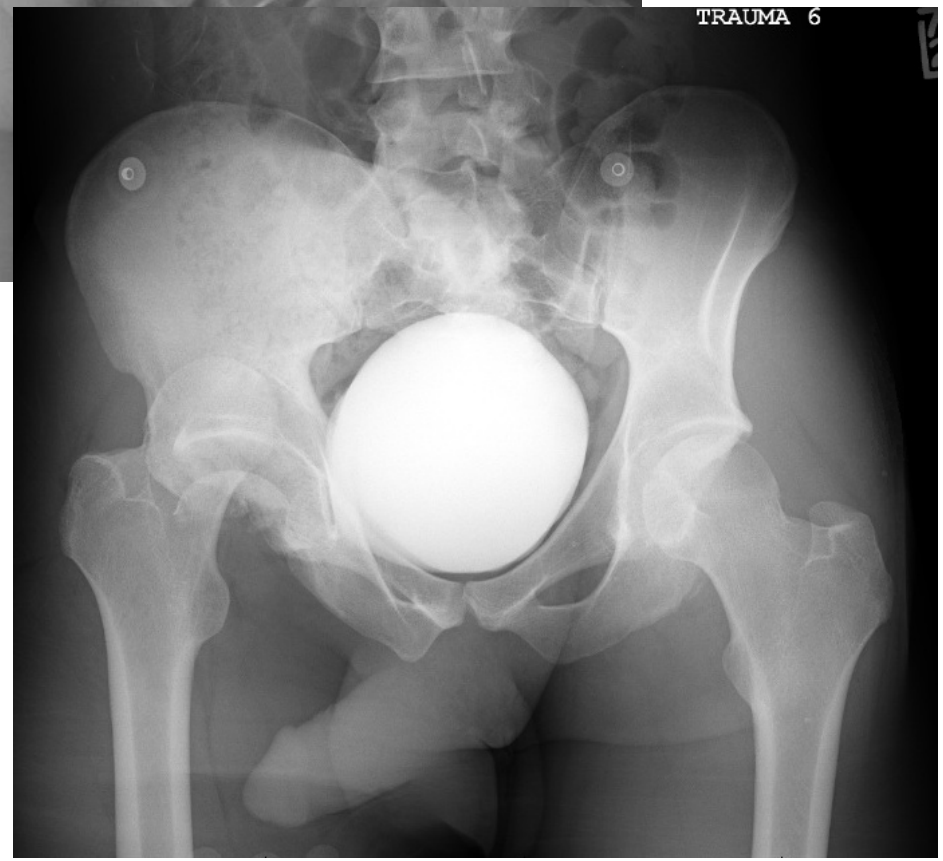
- 24 y/o MVC with posterior hip dislocation
  - Large anterosuperior femoral head fx
  - Small posterior wall acetabular fx

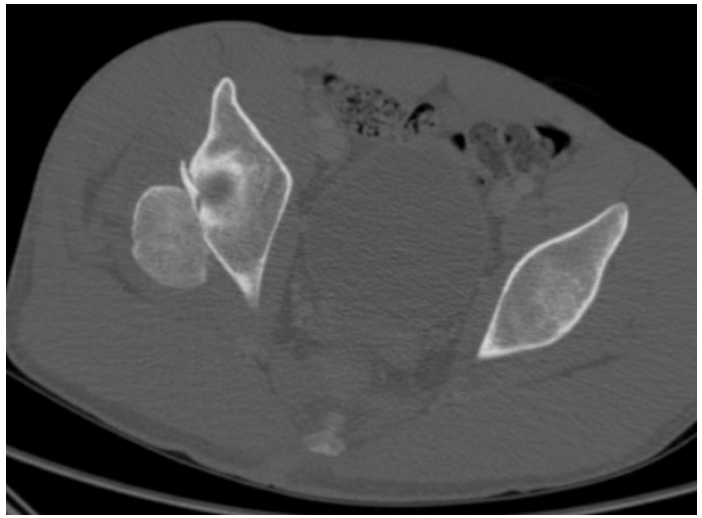


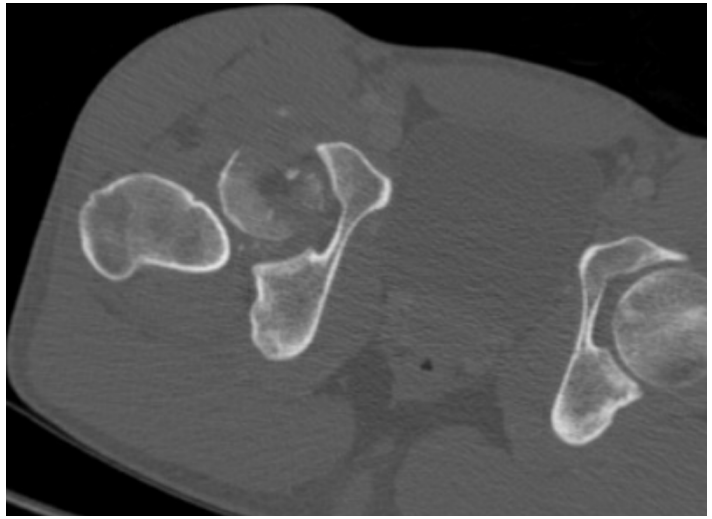
Case Example

- 24 y/o MVC with post hip d/l
  - Large anterosuperior femoral head fx
  - Small posterior wall acetabular fx
- One unsuccessful reduction attempt under conscious sedation



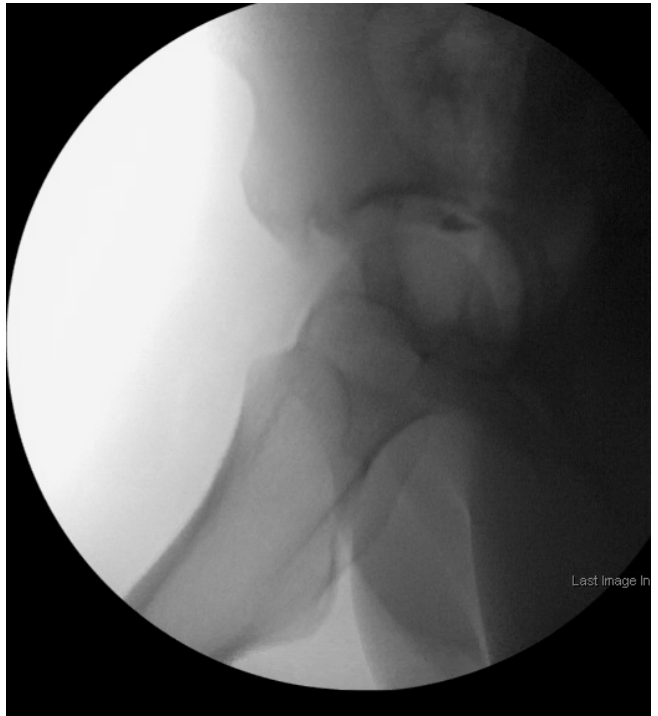






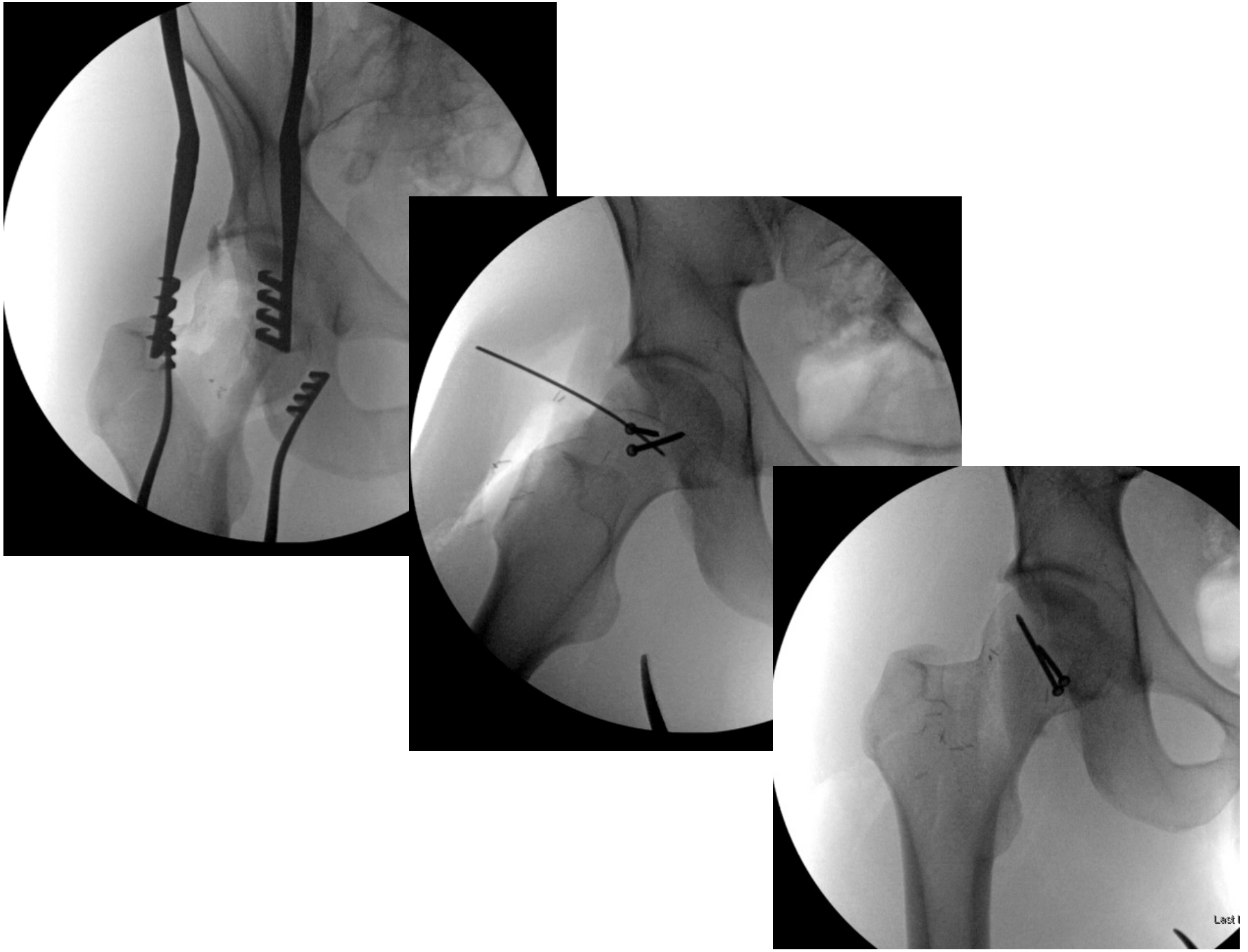
Case Example

- Reduced in the OR
  - Now with incarcerated posterior wall fragment



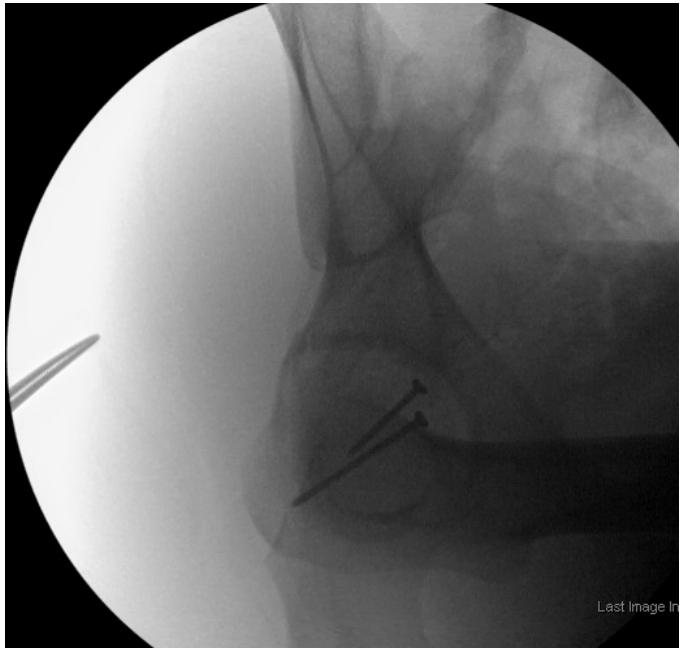
Case Example

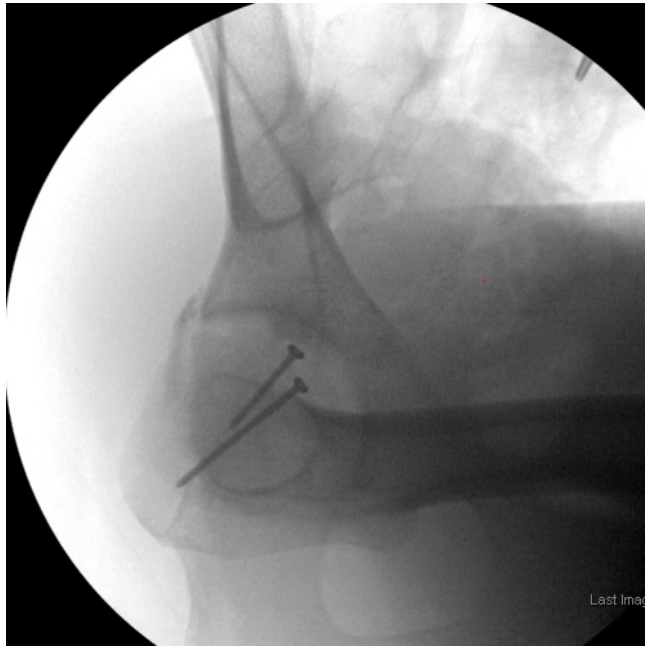
- Smith-Peterson approach
  - Re-dislocated hip and pushed post wall frag posterior
- Reduction and lag screws for large femoral head fx



Case Example

- Smith-Peterson approach
- After femoral head ORIF, dynamic stress exam of post wall/hip joint
  - Stable
- Post wall treated closed

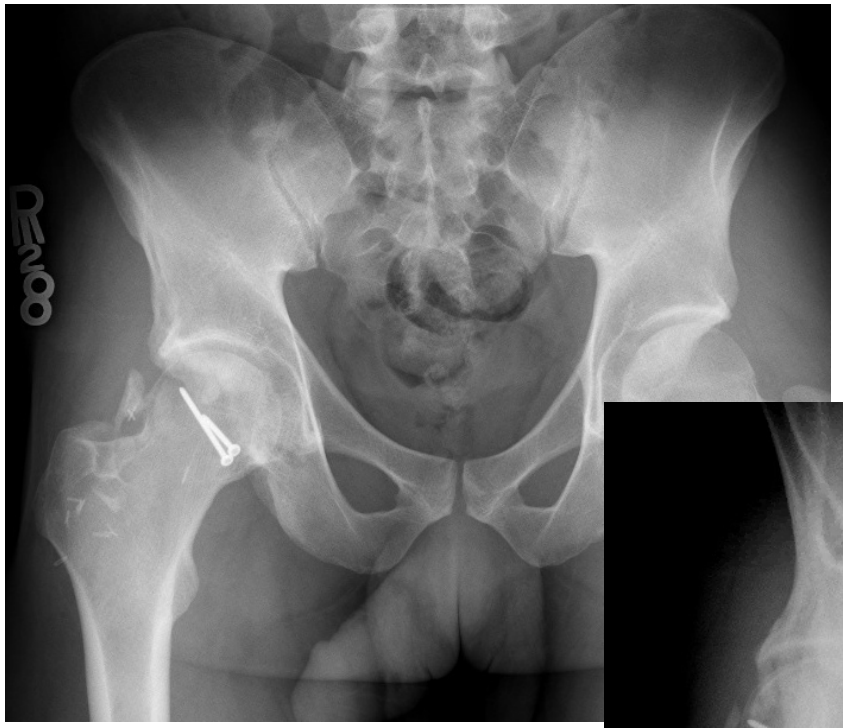


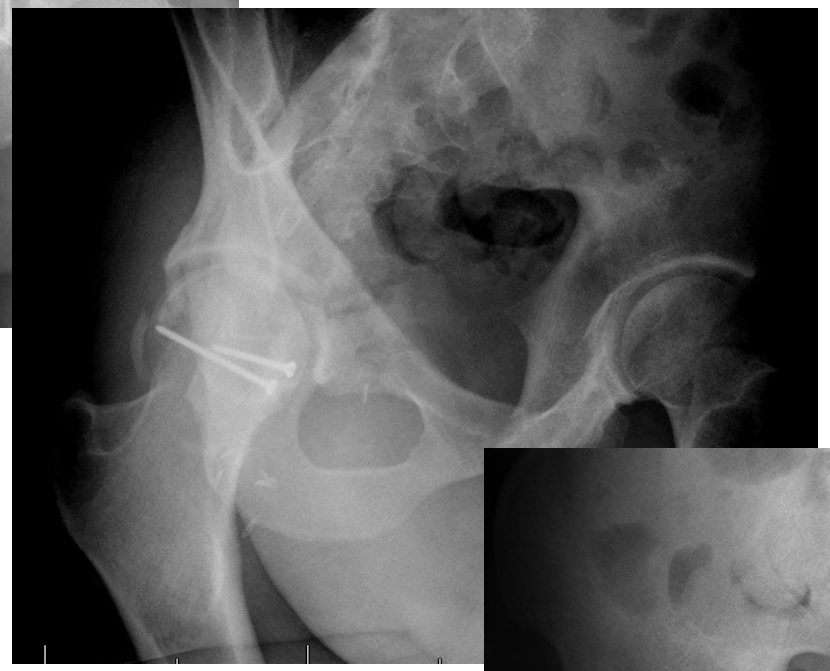


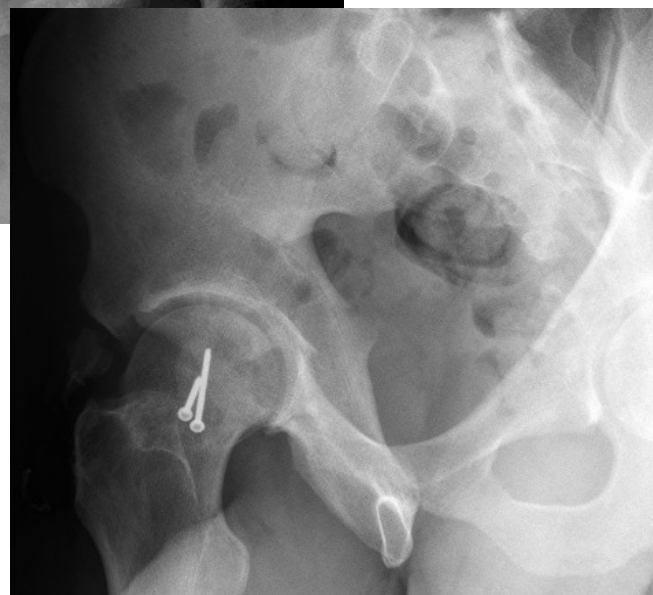
Case Example

- Smith-Peterson approach
- ORIF femoral head
- Closed tx post wall

- 1 year follow-up with asymptomatic non-bridging HO at hip

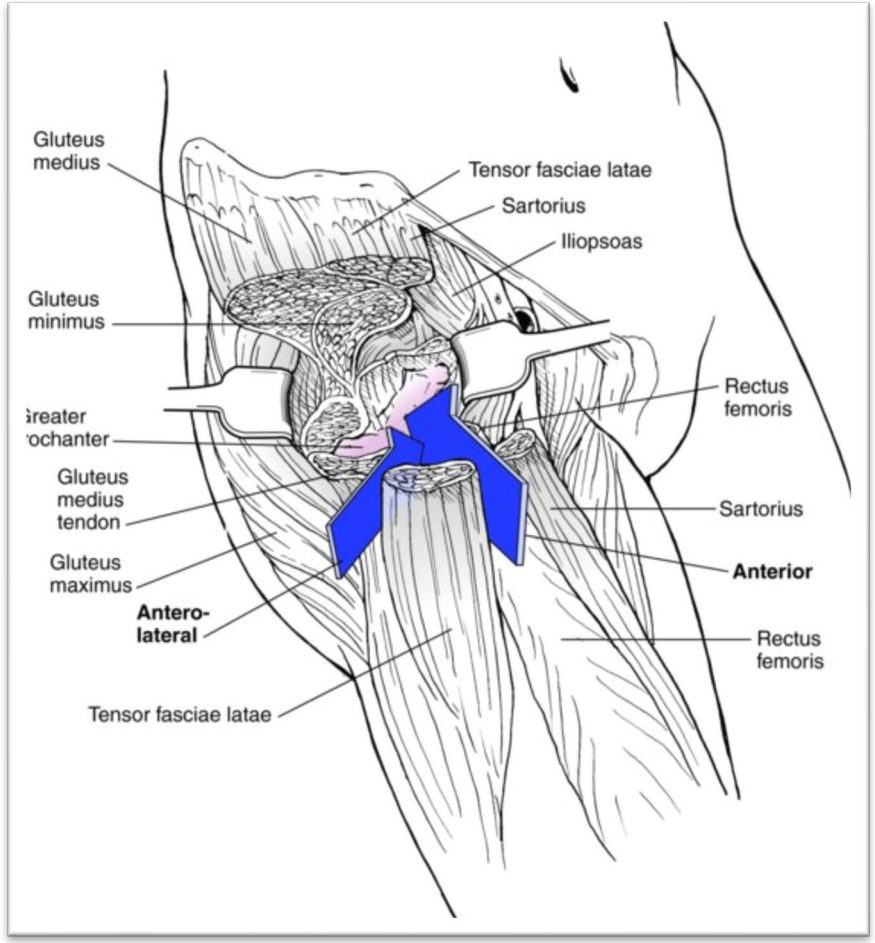






Surgical Approaches

- For anterior hip joint access
  - Smith-Peterson or Heuter interval
  - Watson Jones approach
  - Direct Lateral approach
- Kocher Langenbeck approach
  - Optimal for Pipkin III and Pipkin IV fx in which the acetabular fx would require posterior approach
- Surgical Hip Dislocation
  - As described by Ganz



Kain M and Tornetta P. Hip Dislocations and Femoral Head Fractures. In. Tornetta P, Ricci WM, eds. Rockwood & Greens Fractures in Adults, 9e. Philadelphia, PA. Wolters Kluwer Health, Inc; 2019. Fig 51-30

Surgical Approach

- Anterior Smith Peterson approach
  - Indication:
    - Irreducible anterior hip dislocations
    - Pipkin I fx that is accessible anteriorly, excision vs ORIF
    - ORIF Pipkin II fx that is accessible anteriorly
    - Some Pipkin IV fxs
      - Can be combined with posterior approach for acetabulum
  - Interval between TFL and sartorius
  - Ligate ascending branches of lateral circumflex vessels
  - Medial exposure of hip joint can be difficult
    - Consider direct head rectus femoris tenotomy

Surgical Approach

- Kocher-Langenbeck
  - Indication:
    - Irreducible pure posterior hip dislocations
    - Pipkin IV femoral head/acetabular fractures in which acetabulum is best treated posteriorly and femoral head fx is reduced or inferior/posterior enough to be managed posteriorly
  - Extend hip and flex knee when possible to lessen risk of iatrogenic sciatic nerve injury
  - Use lateral position and be prepared to switch to surgical hip dislocation if needed

Surgical Approach

- Surgical Hip Dislocation
  - Indication:
    - Most useful in the Pipkin IV fx
    - can be used for any Pipkin femoral type
  - Koch/Lang for Pipkin IV and Gibson interval for Pipkin I/II
  - Digastric trochanteric osteotomy
  - Anterior capsulotomy
    - Respects the blood supply to femoral head
  - Anterior hip dislocation to visualize femoral head and articular surface of acetabulum
- Massè et al CORR 2015
  - 17 pts with fem head fx treated with surgical hip dislocation
  - Clinical results similar to historic treatment protocols

Surgical Approach

- Gavascar et al *JOT* 2020
  - Retrospective review 49 patients who had ORIF/excision of Pipkin I or II femoral head fx
    - 27 had posterior based surgical dislocation
    - 22 had anterior approach
  - Shorter operative time, less blood loss, and lower 24-hr VAS pain score with anterior approach
  - No AVN in either group, 1 pt with arthritis in each group
    - Average f/u 38.5 +/- 13 months
  - VAS at discharge, LOS, mod Merle d'Aubigne, Oxford functional scores all similar between groups

Surgical Approach: OTA Video Library

- OTA Video Library

  Femoral Head Via Smith Peterson Approach | Procedures & Techniques | OTA Online Trauma Access

  Surgical Hip Dislocation for Femoral Head ORIF | Procedures & Techniques | OTA Online Trauma Access

Outcomes: AVN and Arthritis

- Kellam *JOT* 2016
  - Meta Analysis of level IV evidence: 13 studies. Thompson and Epstein classification used
  - AVN rate in posterior d/l
    - type I: 10.6%
    - type II: 17.7%
    - type III: 27.2%
    - type V: 43%
  - Post traumatic arthritis in posterior d/l
    - type I: 19.4%
    - type II: 36%
    - type III: 49.5%
    - type V: 55%
  - Anterior Dislocations
    - 8.7% to 15% AVN rate
    - 15.5% to 63.3% post traumatic arthritis
  - Delay in reduction > 12h increases AVN risk by 5.6x

Case Example

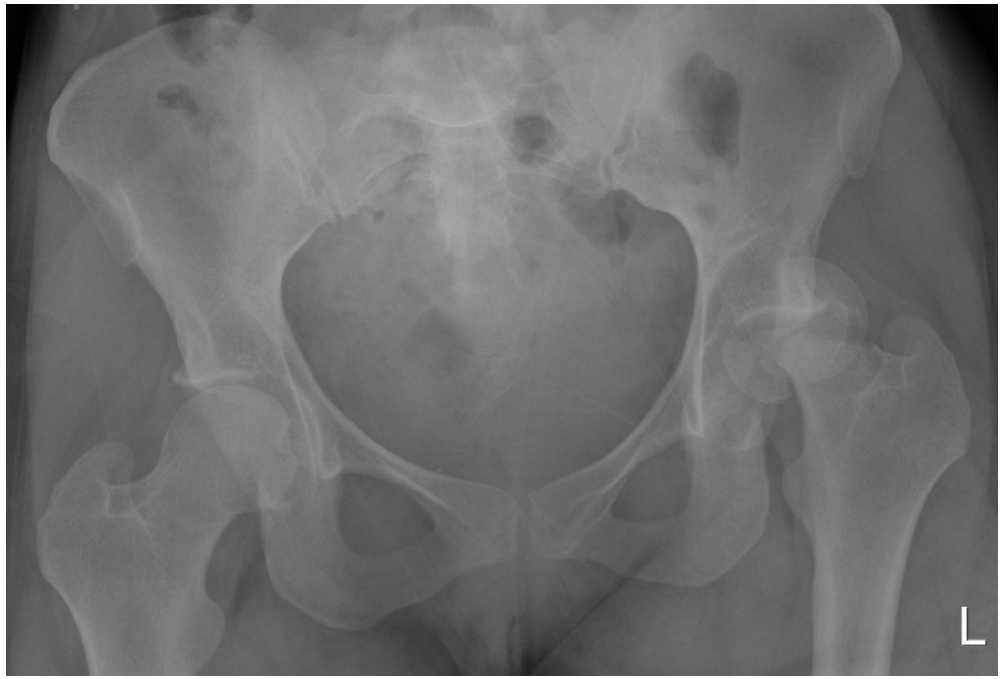
- 29 y/o female passenger in MVC
  - L anterior hip d/l
- Undergoes closed reduction in ER
  - Walker modification of Allis maneuver

Case Example

- 29 y/o female passenger in MVC
  - L anterior hip d/l
- Undergoes closed reduction in ER
  - Walker modification of Allis maneuver
- Treated closed
  - Limited WB for 8 weeks
- 9 month XRs
  - Post traumatic arthritis
    - Prev head impaction

Outcomes

- Giannoudis et al *Injury* 2009
  - Systematic Review, 405 pts, with femoral head fx
    - AVN 11.8%
    - Post traumatic arthritis 20%
    - HO 16.8%
    - Infection 3.2%
- Scolaro et al *J Orthop Traumatol* 2017
  - 147 pts with femoral head fx, retrospective review
    - ORIF in 53%, excision of fragment 25.1%, nonop 19%
    - 89.9% of fx went on to union
    - Complications
      - AVN 8.7%
      - Post traumatic arthritis 10.1%
      - HO 40.6%
      - All Pipkin III had treatment failure



Summary

- Hip dislocation and femoral head fracture commonly occur together
- Posterior hip dislocations are 9x more common compared to anterior
- A delayed time to reduction of hip dislocation is associated with increased risk of AVN
- Treatment of irreducible pure hip dislocation should be approached from the direction of dislocation, anterior or posterior
- Hip fracture dislocations, either femoral head/neck or acetabulum should critically evaluated to determine best treatment.
- Post traumatic arthritis is the most common complication after hip dislocation/femoral head fracture. AVN also occurs to varying degree

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