

Hip Injuries Athletes: Evaluation and Treatment

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Objectives



- ① Understand pertinent anatomy of the hip
- ② Become familiar with history and exam details to aid diagnosis
- ③ Understand which diagnostic tests help confirm diagnosis
- ④ Recognize injury patterns that are specific to athletic activity
- ⑤ Discuss specific injuries and treatment approaches

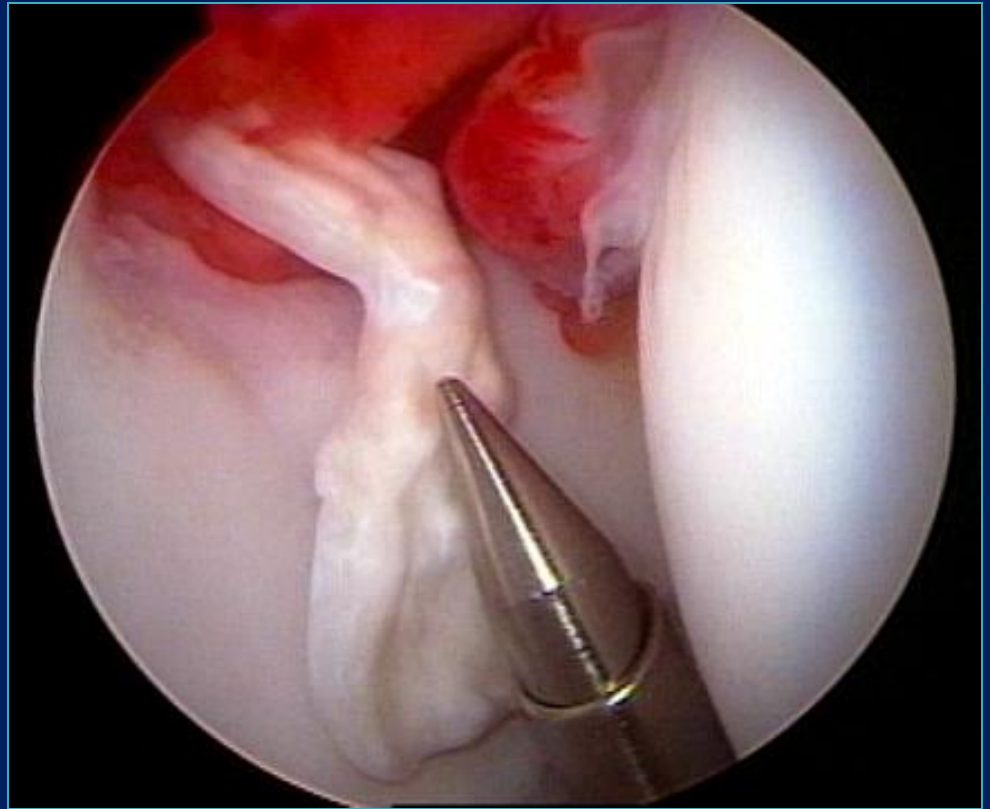
Introduction

- 🕒 Incidence of hip injuries has increased dramatically over the last decade...largely in part due to better recognition with improved imaging and arthroscopy
- 🕒 Incidence of hip injuries in sports has been publicized in the media
- 🕒 Better treatment options with biologics, arthroscopy, and advanced rehabilitation



Arthroscopy has defined numerous sources of disabling hip pain

- Athletes previously resigned to living within constraints of symptoms
- Among athletes 60% of intraarticular disorders initially misdiagnosed as extraarticular problem ("strain")¹
 - Treatment average 7 months for extraarticular diagnosis
- Most common diagnoses: Labral pathology (61%) and Chondral damage (52%)¹

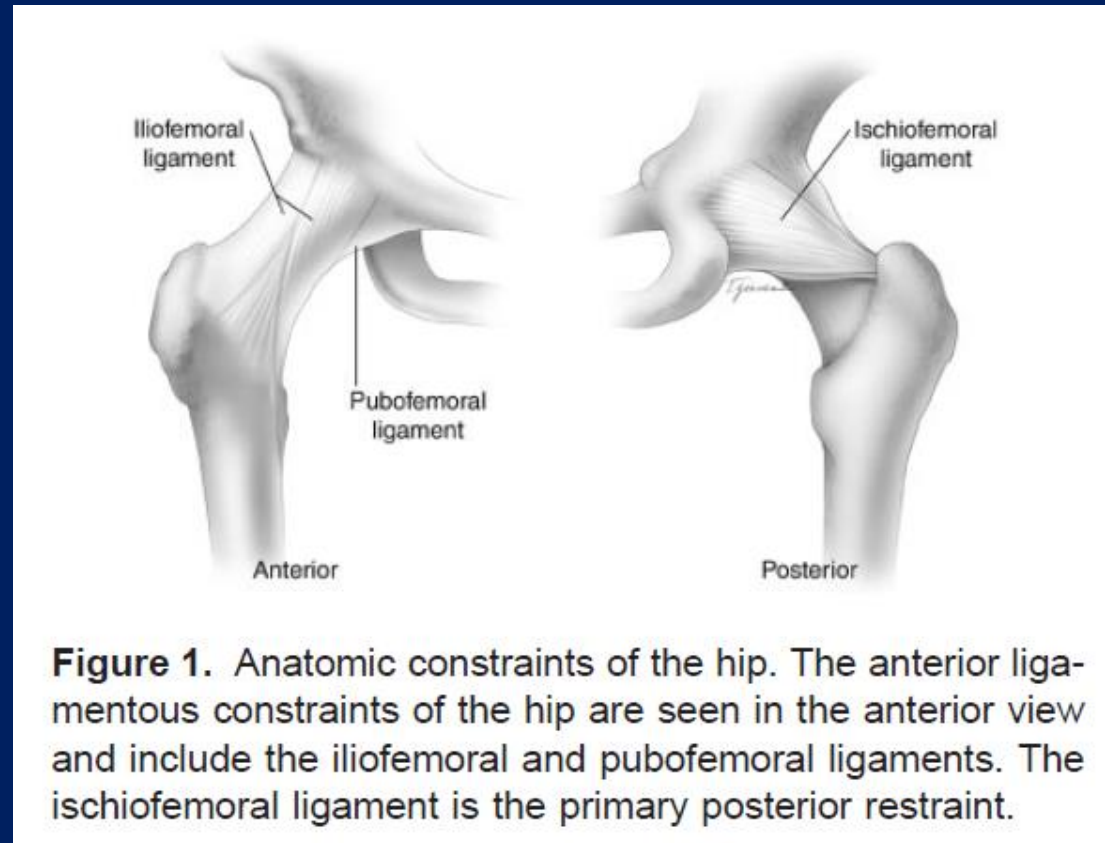


The History of Hip Scopes

- Introduced by Burman in 1931
- Popularized in 1977 by Gross
 - Used in treatment of congenitally dislocated hips
- Remained obscure thru the 1980's
- Late 90's, started gaining popularity

Anatomic Constraints

- Femoral head
 - Deeply recessed in the bony acetabulum
 - Convex in shape (hard to see around)
- Thick fibrocapsular and muscular envelope around the hip
 - Iliofemoral ligament
 - Pubofemoral ligament
 - Decreases amount of hip distension during arthroscopy
- Proximity of neurovascular structures
 - Sciatic nerve
 - Lateral femoral cutaneous nerve
 - Femoral nerve/vessels

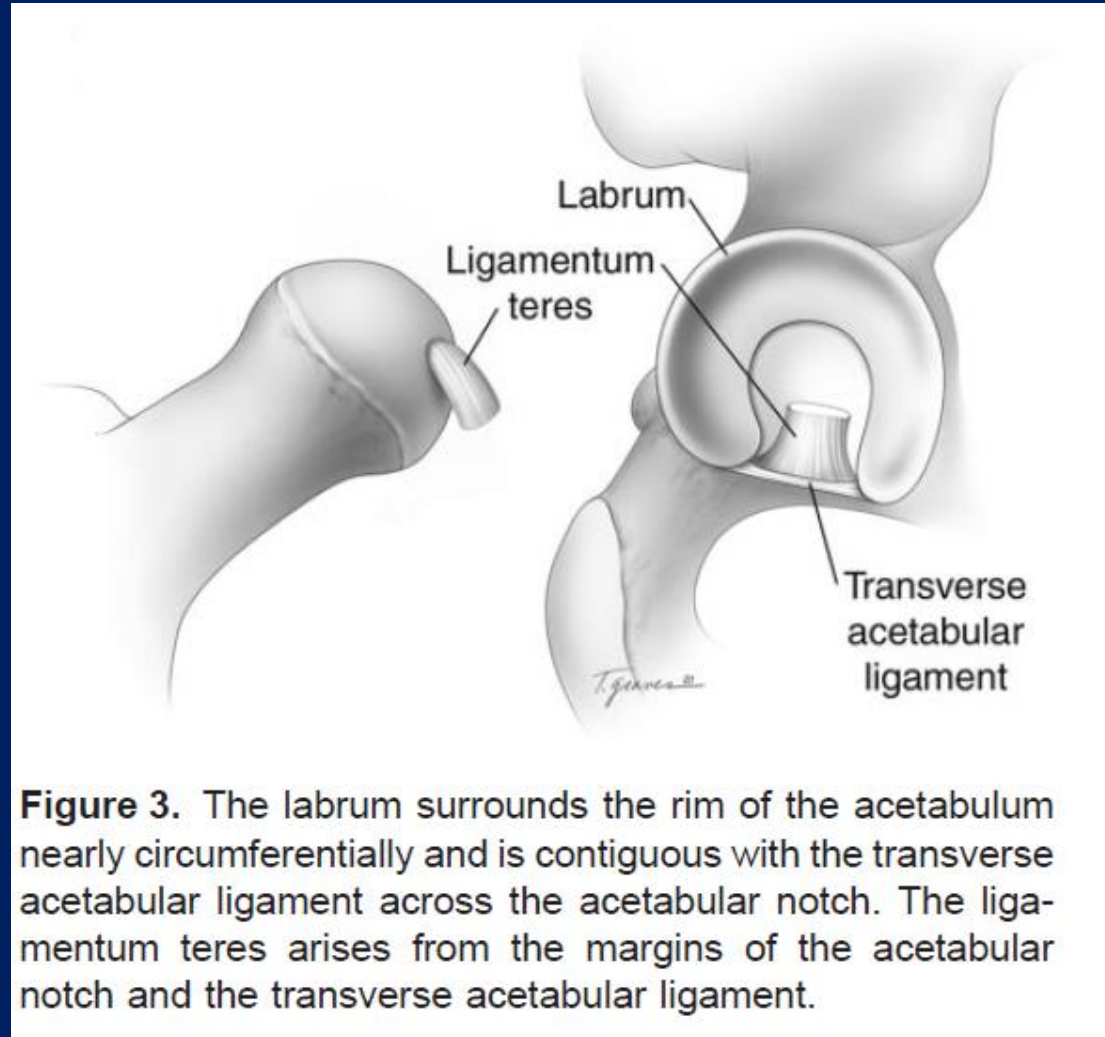


Anatomic Considerations: Bones

- HIP JOINT: Femur + Acetabulum
 - Inherently very stable
 - But, in situations where there is variation in acetabular depth and femoral head geometry, there is more reliance on the surrounding soft tissue
 - Version and inclination of weight bearing surface affect the joint capsule and the ligaments of the hip
- Femoral head
 - Normally forms $\frac{2}{3}$ of a sphere
 - Flattened in the area where the acetabulum supplies its greatest load
 - In neutral anatomic position, the anterior part of the head is not engaged in the acetabulum
 - The labrum augments femoral head coverage by its extension from the bony acetabulum

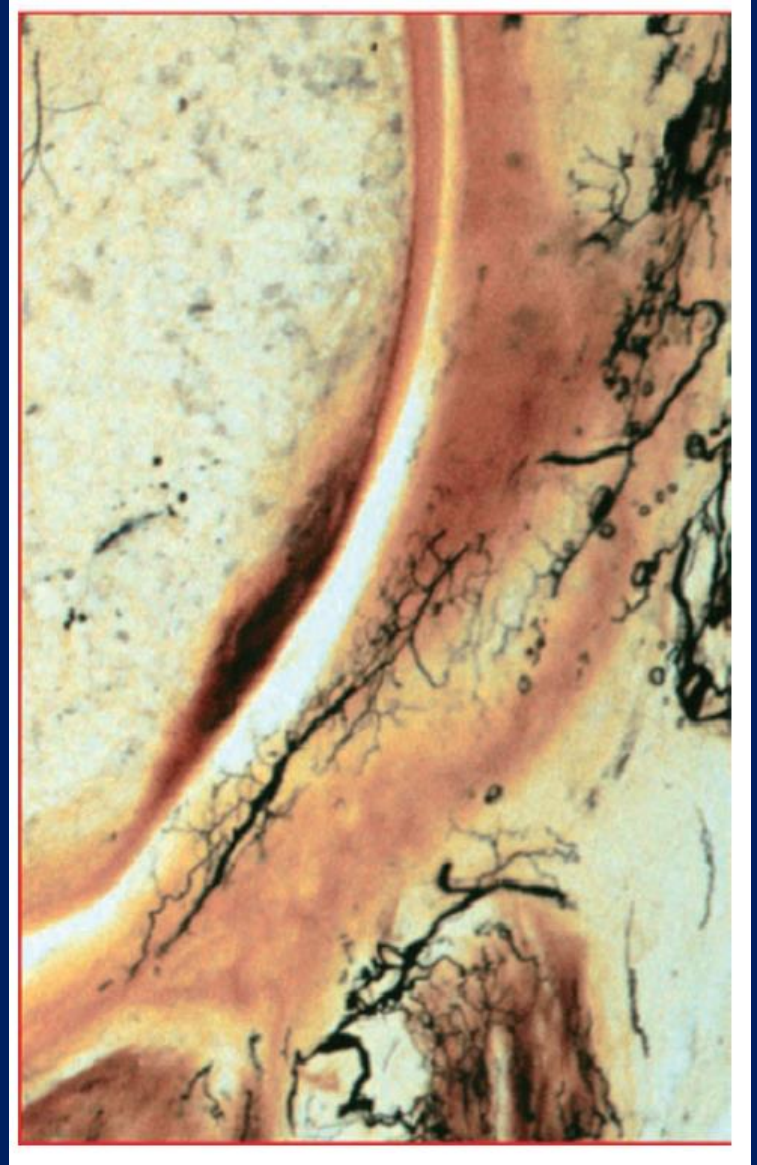
Anatomic Considerations: Labrum

- Runs circumferentially around the acetabular perimeter to the base of the fovea
- Becomes attached to the transverse acetabular ligament posteriorly and anteriorly
- Contains proprioceptors and pain receptors
- Low healing potential because of decreased vascularity



Labrum Blood Supply

- Labrum has low healing potential because of decreased vascularity
- Vessels that penetrate labrum only found on outermost layer of the capsule (most of labrum is avascular)
- Fibrocartilage
- May enhance stability by maintaining negative intraarticular pressure

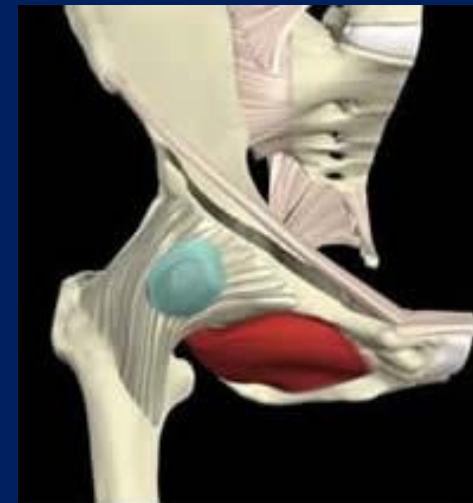
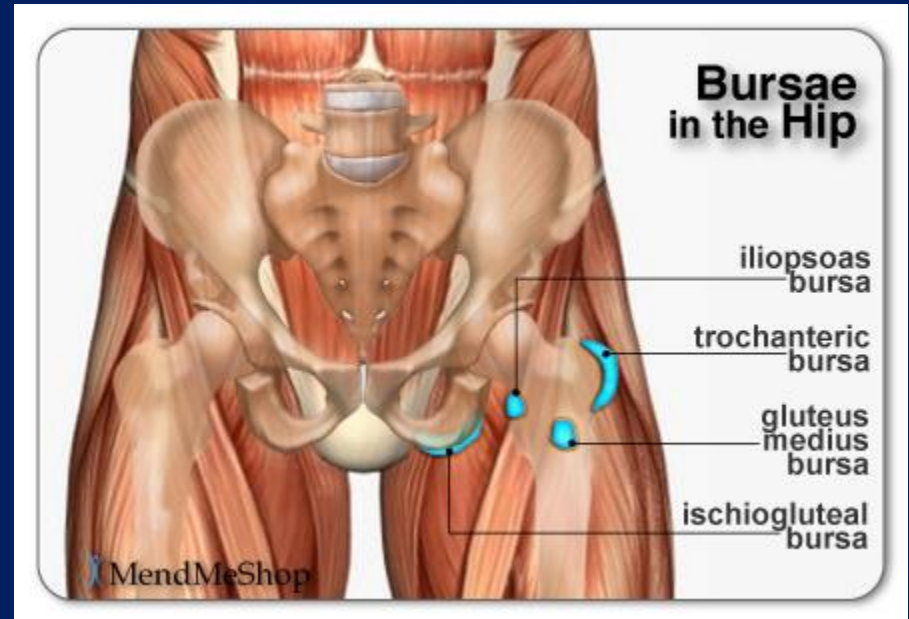


Labrum Biomechanics

- Fergusen et al. (*J Biomech* 2003)
 - Absence of labrum significantly increases cartilage surface consolidation, **contact pressure** of hip joint
 - Labrum has an important **sealing function**
 - Limits fluid expression from the joint space
 - Protects cartilage layers
 - Provides structural resistance to lateral motion of the femoral head within the acetabulum
 - Enhances joint **stability**
 - Preserves joint **congruity**
- Philippon et al. (*Clin Sports Med* 2001)
 - Labral capsular complex
 - **Rotational instability** of the hip associated with deficient labral tissue
 - Instability may be caused by redundant capsular tissue, which creates a potential abnormal load distribution from a transient incongruous joint resulting from subtle subluxation

Other Anatomic Considerations

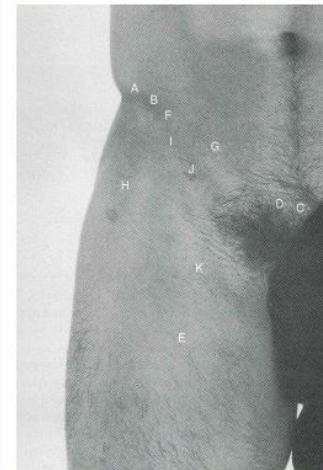
- Ligamentum teres
 - Extracapsular structure
 - May have some stabilizing effect on the hip joint with a deficient labrum
 - Rao et al. *Clin Sports Med* 2001
- Psoas tendon
 - Protects the anterior intermediate portion of the capsule
 - By virtue of its anatomic location, can be subjected to increased load in athletic activities
 - Psoas bursa communicates with the hip joint in the adult in approximately 20% of the population (Byrd. *Clin Sports Med* 2001)



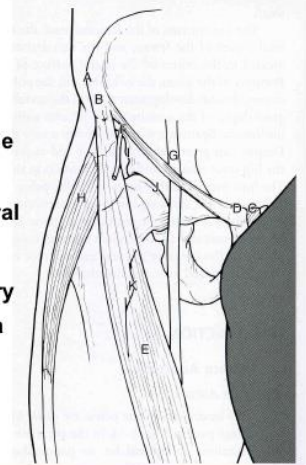
Anatomy

- Surface anatomy
- Muscular anatomy
- Joint anatomy
- Overlapping anatomy

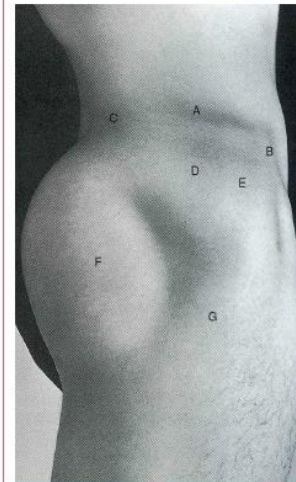
Surface anatomy - hip



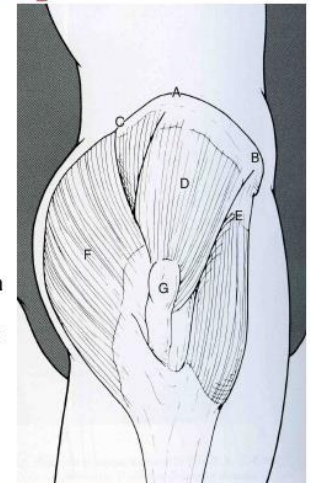
- A. Iliac crest
- B. ASIS
- C. Pubic symphysis
- D. Pubic tubercle
- E. Sartorius
- F. Lateral femoral cutaneous nerve
- G. Femoral artery
- H. Tensor fascia lata
- I. AIIS
- J. Hip joint
- K. Lesser trochanter



Surface anatomy – hip

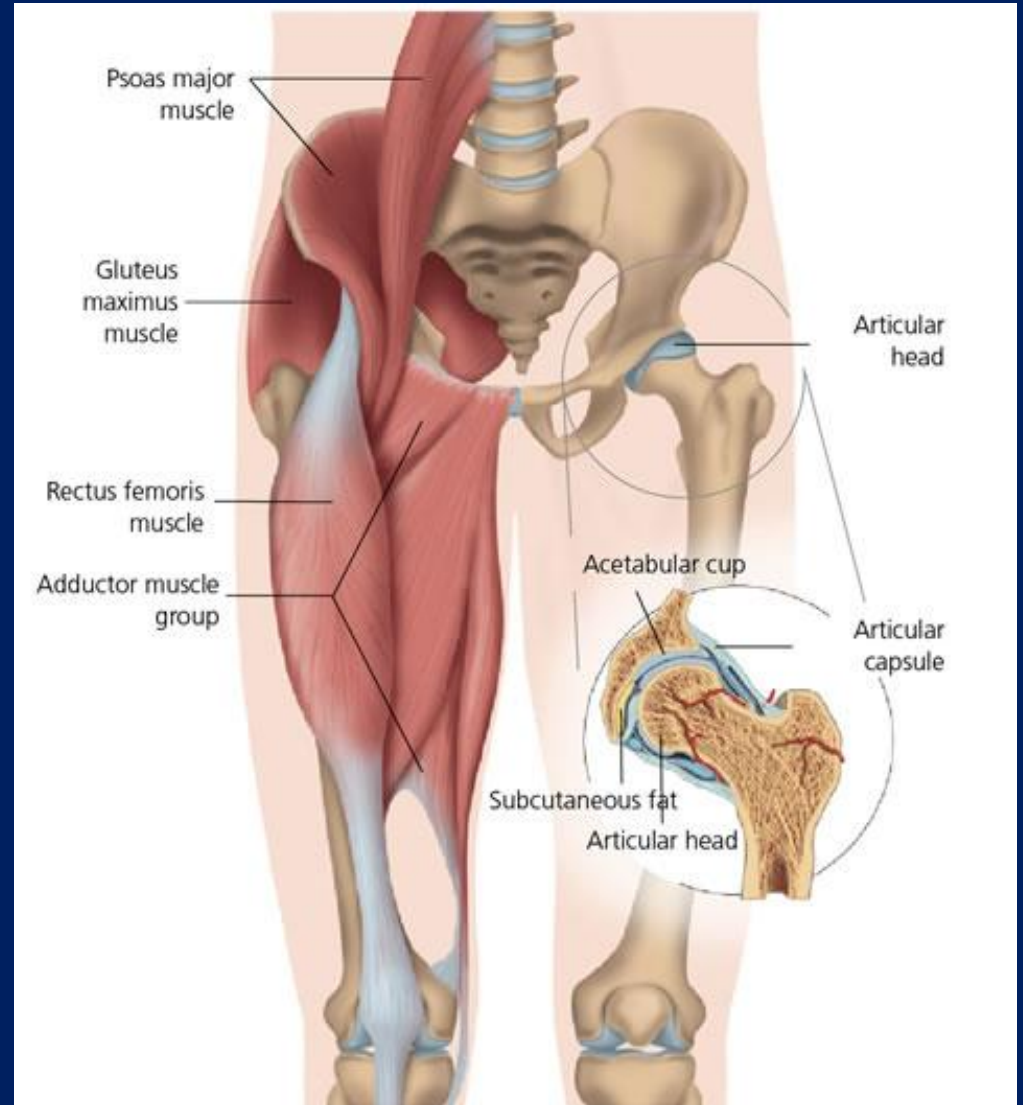


- A. Iliac crest
- B. ASIS
- C. PSIS
- D. Gluteus medius
- E. Tensor fascia lata
- F. Gluteus maxims
- G. Greater trochanter



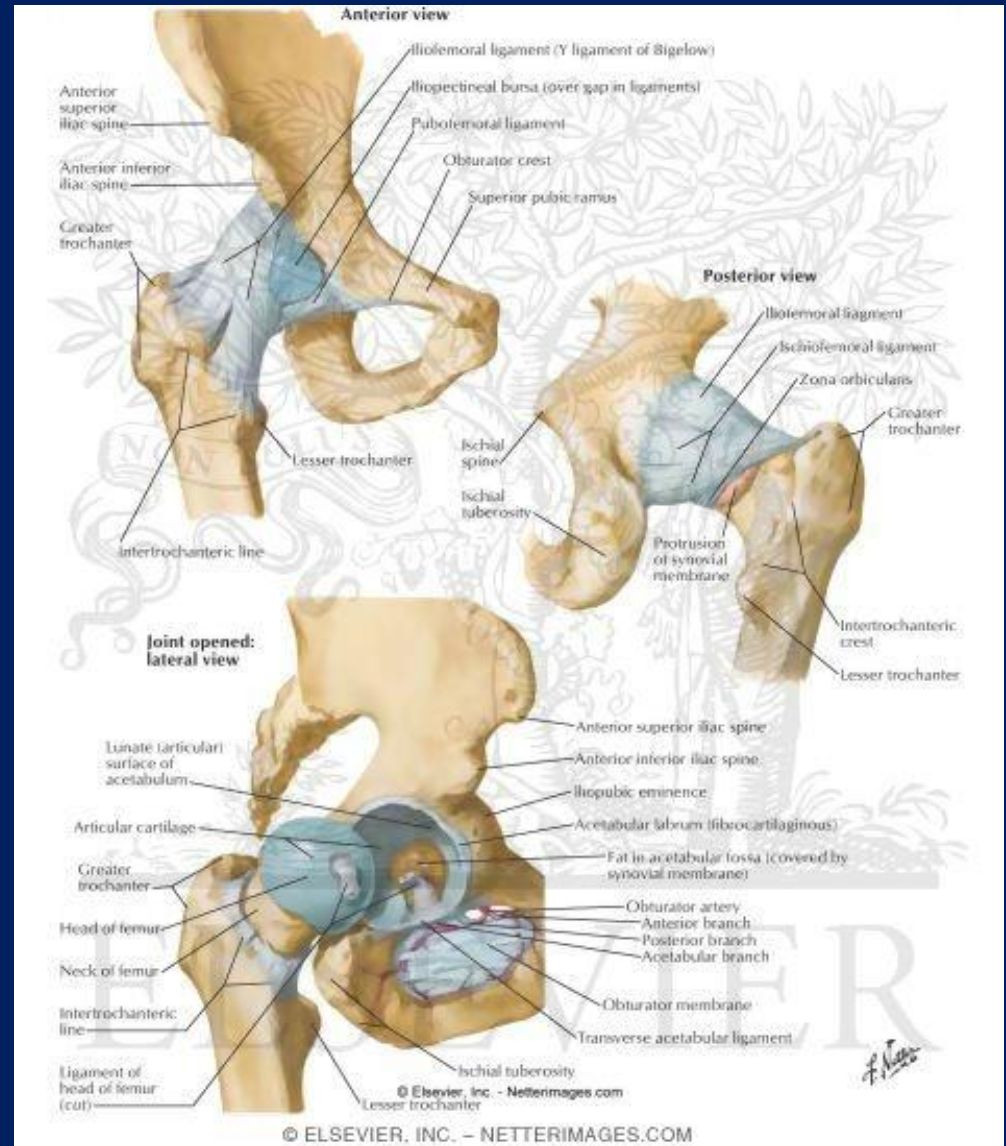
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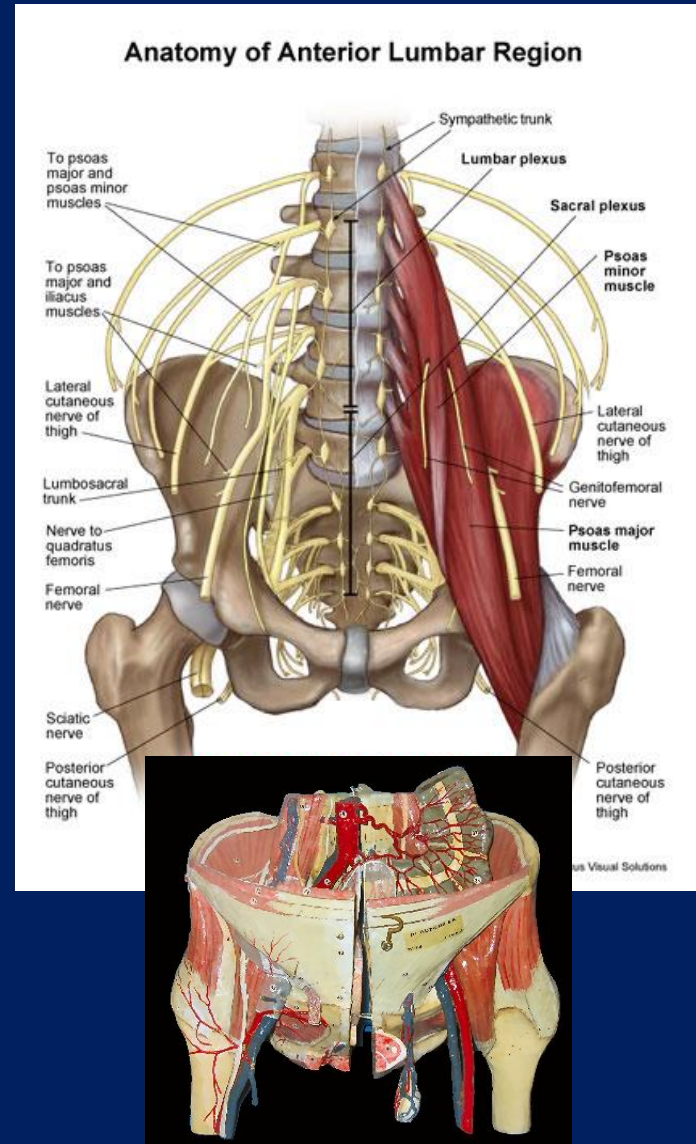
Anatomy

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Anatomy

- Surface anatomy
- Muscular anatomy
- Joint anatomy
- Overlapping anatomy



Assessment of Hip Disorders

- Goal is to first determine intra-articular versus extra-articular
- Hip joint pathology may co-exist with extraarticular snapping hip, athletic pubalgia, lumbar spine disease, etc.
- Chronic hip joint symptoms will secondarily lead to compensatory extraarticular findings (i.e. gluteal pain, abductor symptoms, bursitis, etc.)

Presentation

- History of trauma variable...acute vs. chronic
 - Specific significant traumatic event favorable prognostic indicator²
- Mechanical symptoms: Sharp stabbing pain, catching, locking, giving way
 - Better prognostic indicator³
- Characteristic exacerbating features
 - Straight plane activities relatively well tolerated
 - Torsional/twisting activities more problematic
 - Prolonged hip flexion (sitting) uncomfortable
 - Rising from seated position often painful (catching)
 - Inclines more difficult than level surfaces
 - Symptoms with entering/exiting automobile
 - Difficulty with shoes, socks, hose, etc.

Localization of Symptoms

- ❖ Classically anterior groin radiating to medial thigh
 - ❖ Principal innervation is L₃
- ❖ "C-sign"⁵
 - ❖ Very characteristic of hip joint pathology
 - ❖ Hand cupped above greater trochanter with thumb over posterior aspect of trochanter and fingers gripping into groin
- ❖ Posterior pain
 - ❖ Rarely characteristic of hip joint pathology
 - ❖ Even posterior intraarticular pathology usually refers symptoms anteriorly or anterolateral
 - ❖ Can occur (substantiated by relief with intraarticular injection)



Physical Exam

- ❖ Log rolling

- ❖ Most specific for intraarticular pathology (less sensitive)⁵
- ❖ Rotates only the femoral head in relation to the acetabulum and capsule

- ❖ Pain elicited with flexion/internal rotation ("Impingement" test) or abduction/internal rotation

- ❖ More sensitive and typically should produce anterior groin or deep anterolateral symptoms⁵
- ❖ Compare to uninvolved hip as normally may produce mild discomfort
- ❖ Should reproduce patient's symptoms (sharp pain, sense of catching, etc.)
- ❖ May produce a "click" (i.e. McMurray's)



Imaging

- AP Pelvis
 - Lateral center edge angle
 - Pistol grip deformity (CAM type FAI)
 - Cross-over sign (pincer type FAI)
- Lateral of involved hip
 - Measure alpha angle (CAM type FAI)
 - 50 degrees is a threshold for CAM
- False Profile view
 - If concerned for acetabular dysplasia
 - To assess anterior acetabular coverage

AP Pelvis – crossover sign (Pincer)

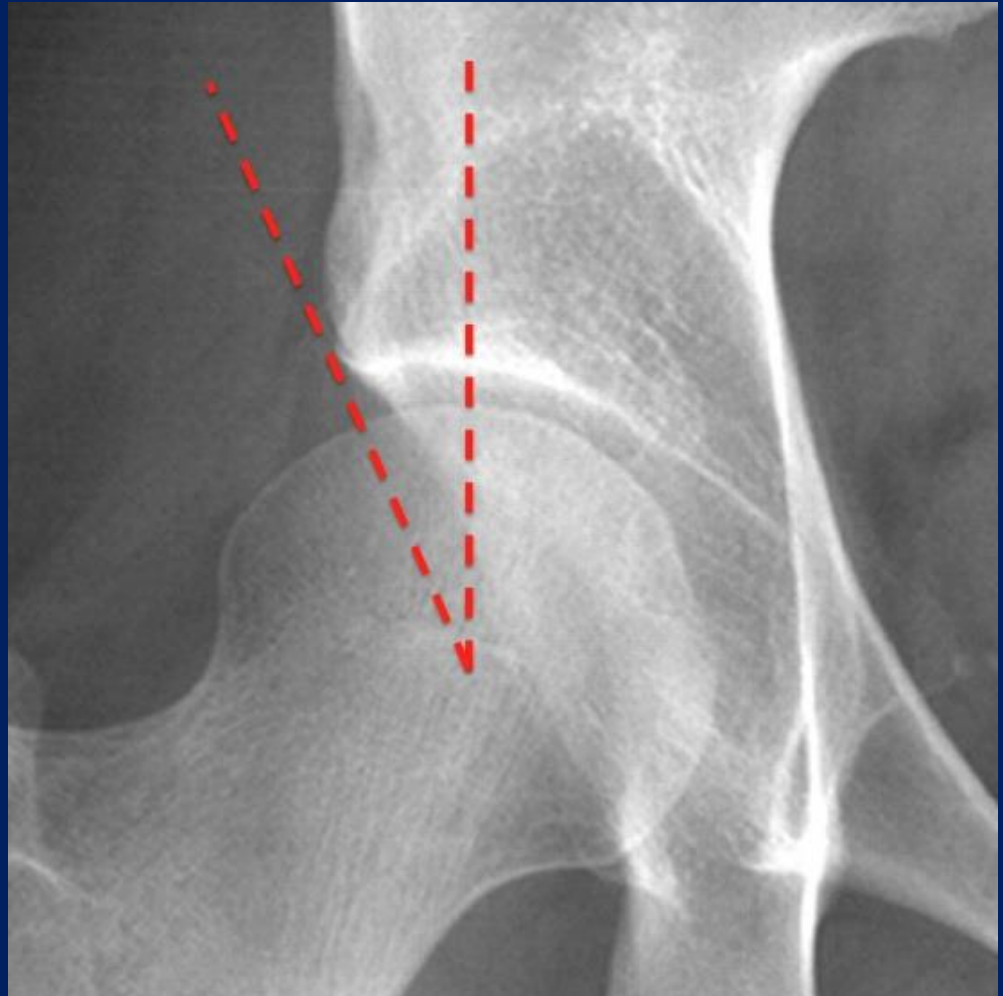


AP Pelvis – Pistol Grip (CAM)

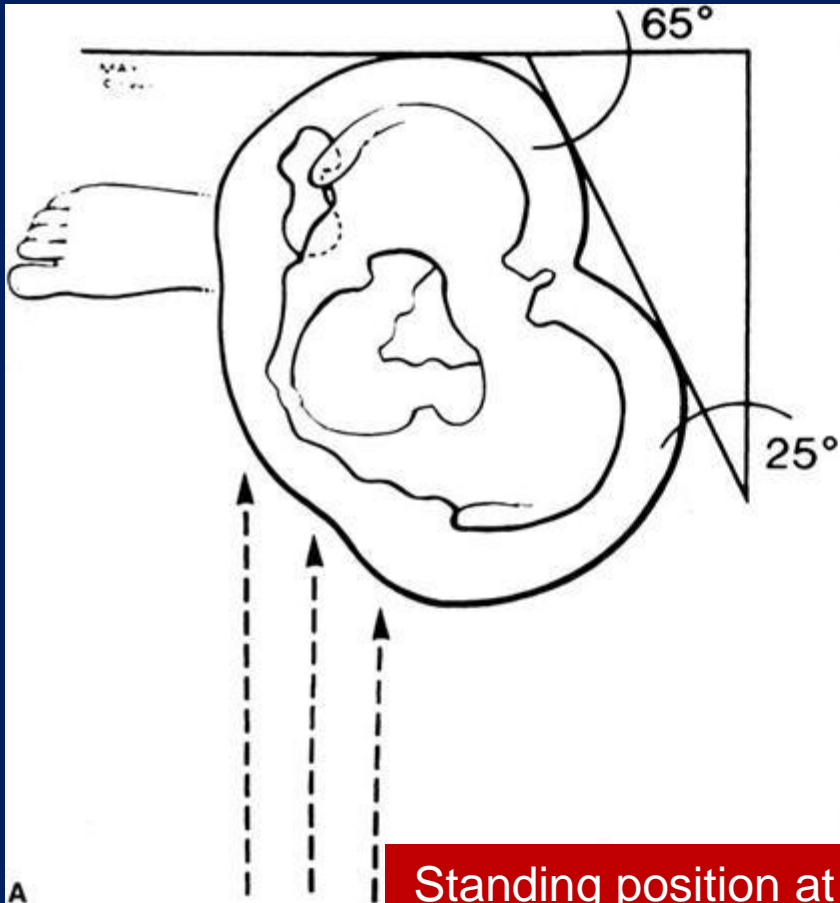


Lateral Center Edge Angle

Lateral CEA < 20 associated
with hip dysplasia



False Profile View

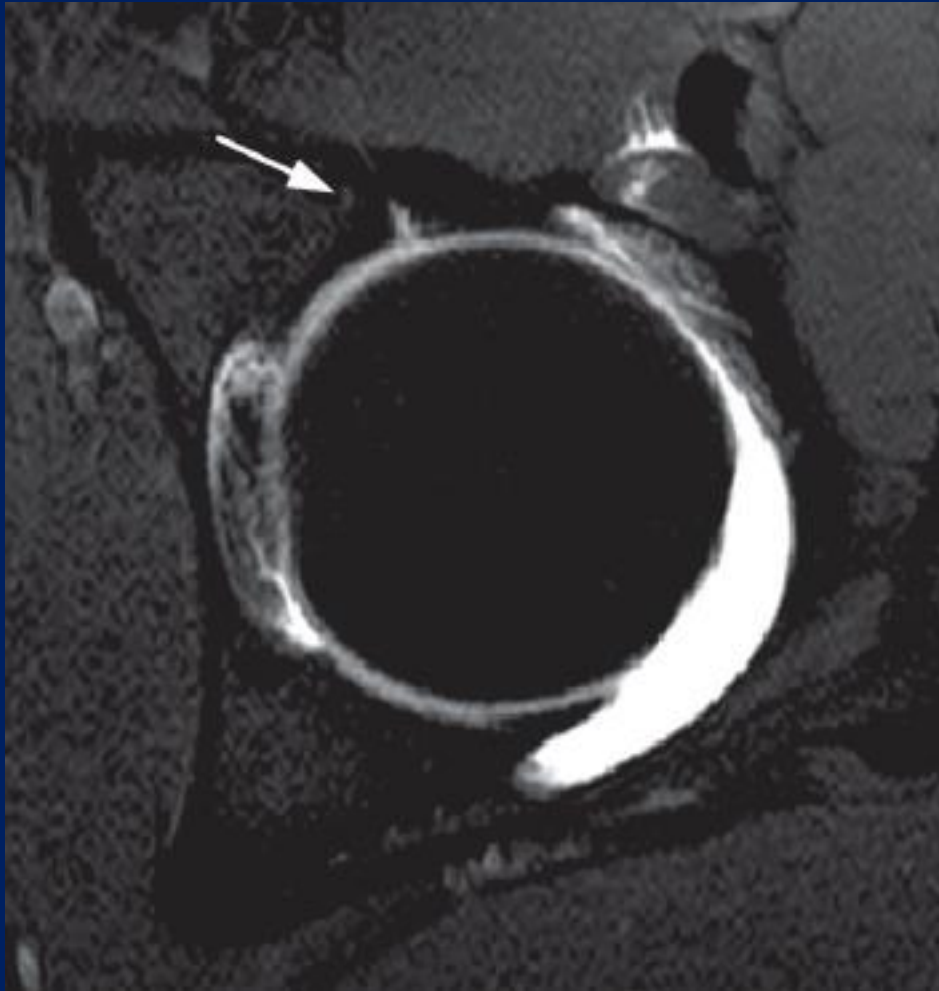


Standing position at an angle 65 degrees between the pelvis and the film.
Assess anterior coverage of femoral head.

Lateral of Hip – Measure Alpha Angle

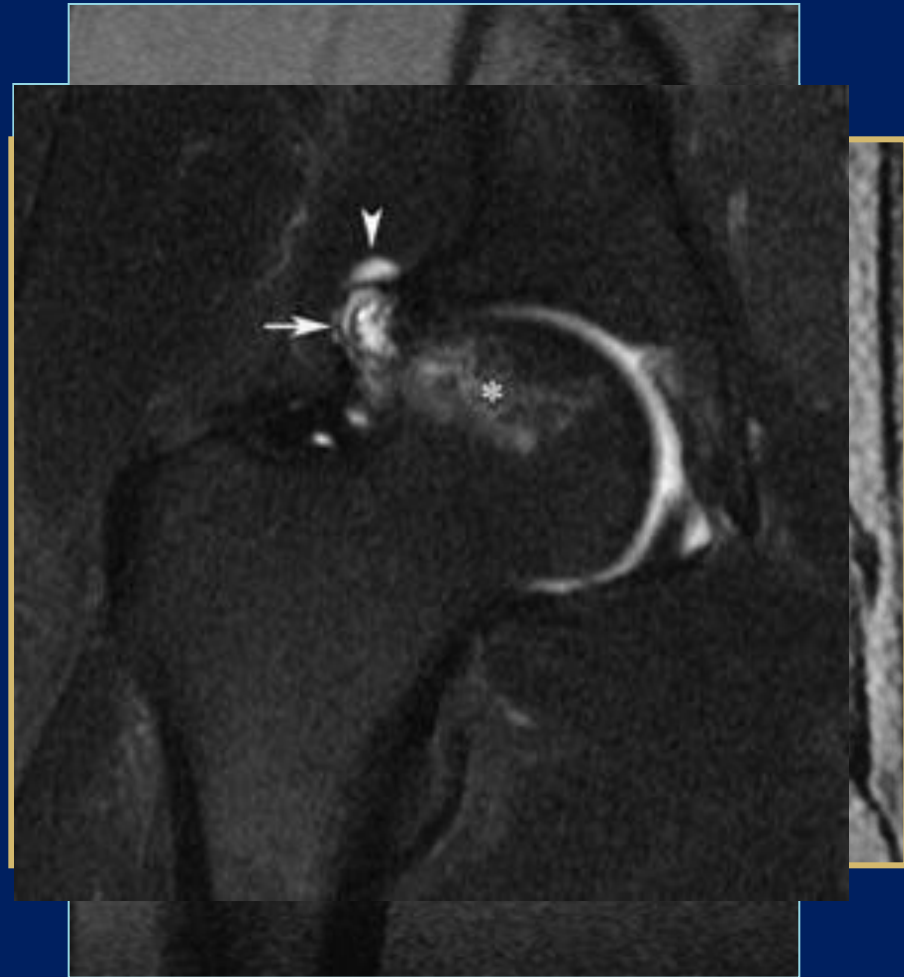


MRI



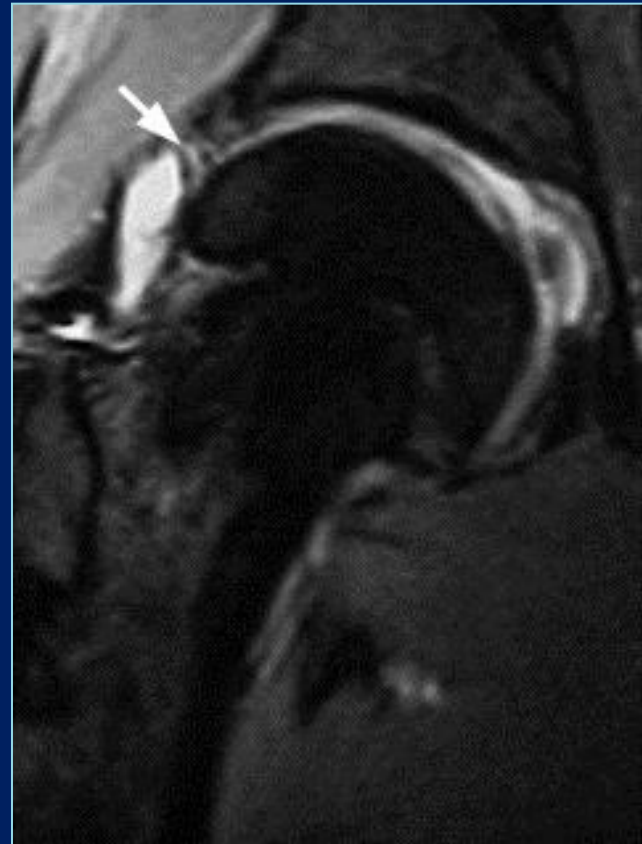
MRI

- ❖ MR **arthrogram** more sensitive⁷
 - ❖ Always include anesthetic
 - ❖ Response is 90% reliable indicator of joint pathology
- ❖ Indirect evidence most reliable finding
 - ❖ Effusion – specific for intraarticular process
 - ❖ Paralabral cyst – pathognomonic of labral pathology
 - ❖ Subchondral cyst – indicative of articular damage



What to do with positive evidence of labral damage

- ❖ Is it significant?
 - ❖ False positives exist (20%)
 - ❖ Some become asymptomatic
- ❖ Keep the athlete informed
 - ❖ Not all need surgery
 - ❖ Injection may resolve
- ❖ Active rest
 - ❖ 2 weeks, reassess
- ❖ If symptoms manageable, go
 - ❖ If persistent, consider timing
- ❖ No evidence to support early intervention being better
 - ❖ Down side, may be unnecessary
 - ❖ Up side, earlier recovery
- ❖ How long to wait?
 - ❖ If acute pain resolves & mechanical symptoms persist...
 - Arthroscopy



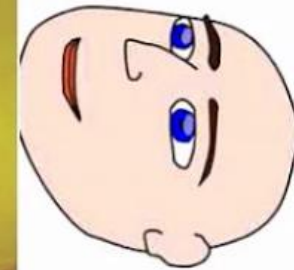
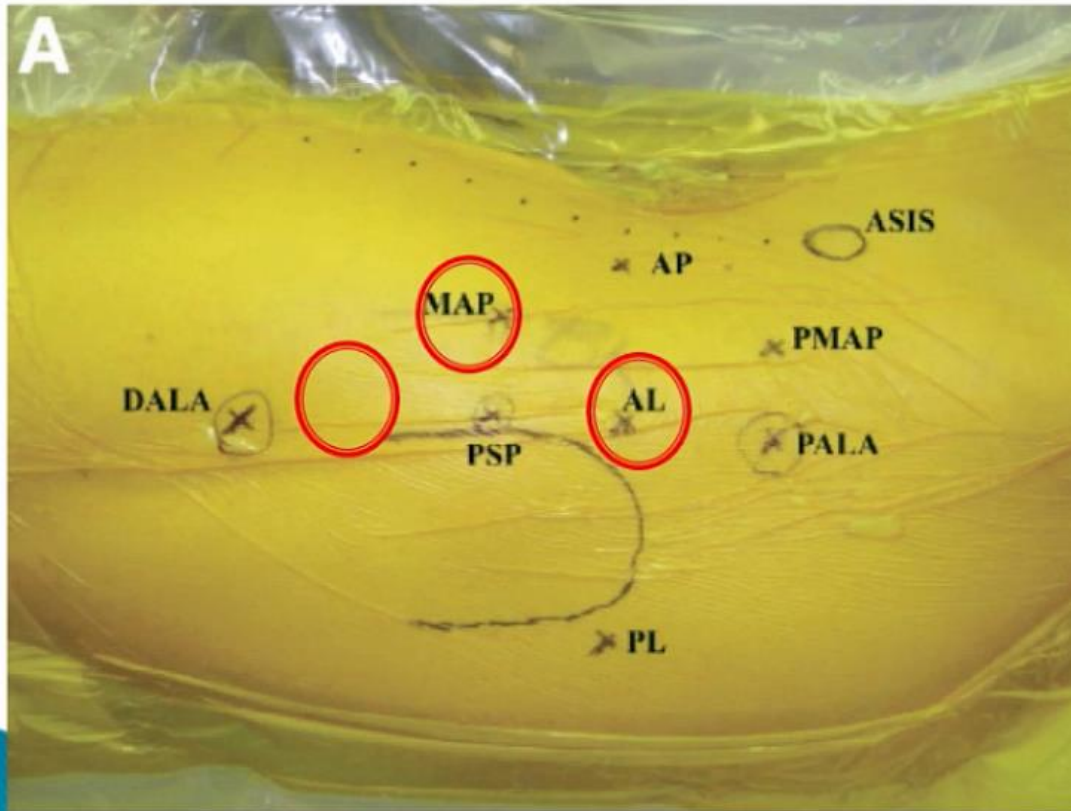
My Setup





Portals

Access Joint



Nerve Issues

- Pudendal nerve
 - Most common neurovascular complication
 - Due to perineal post in groin for traction
 - Neuropraxia or compression injury
- Peroneal nerve
 - Traction neuropraxia
- Superior gluteal nerve
 - Risk with anterolateral portal
- Sciatic Nerve
 - Risk with posterolateral portal
 - Increased risk with external rotation on the hip
- Lateral femoral cutaneous nerve
 - Risk with anterior portal

Air Arthrogram



Insufflate the joint with fluid

Joint is tight, so the fluid should flow back and hit Anna in the face.

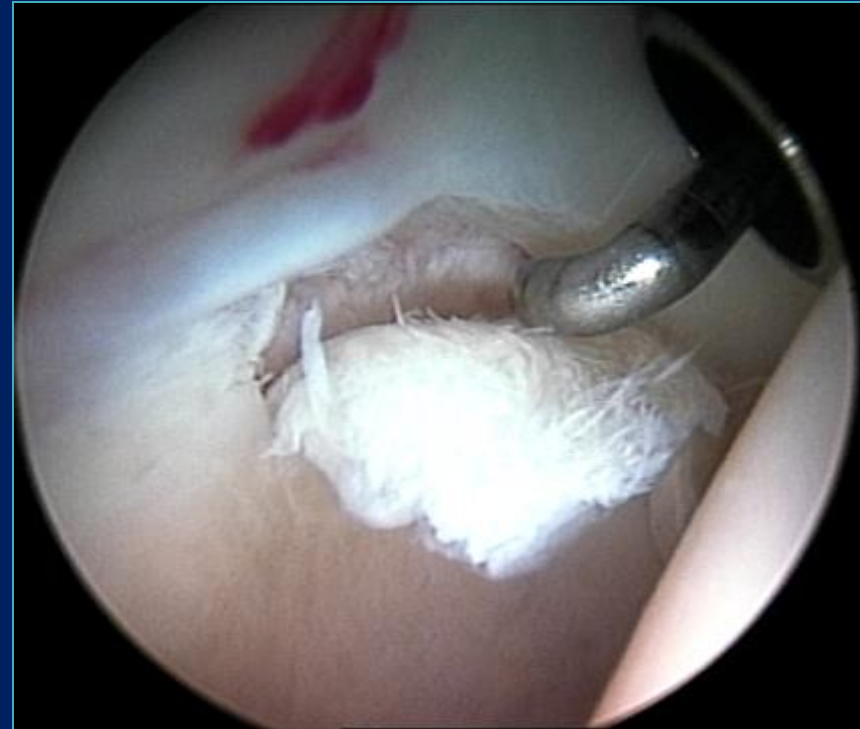






Select Injuries

- Impingement and labral tears
- Articular trauma & loose bodies
- Internal snapping hip
- External snapping hip
- Proximal hamstring avulsion
- Sports hernia / athletic pubalgia



Labral Pathology

- ❖ Etiology
 - ❖ Twisting injury⁸
 - ❖ Macrotrauma (subluxation)
 - ❖ Microtrauma (FAI)
- ❖ Present in 61% of athletes undergoing arthroscopy¹
- ❖ Lesion most likely detected on MRI⁷
- ❖ Natural history uncertain...
 - ❖ Some become quiescent⁹
- ❖ Management
 - ❖ Debridement, create stable zone
 - ❖ Leave as much stable tissue as possible
 - ❖ 82% success (nonarthritic)
 - ❖ **79% THR (arthritic)** @ 10 yr f/u¹⁰
 - ❖ Repair



Labral Debridement



Labral Repair



Hip Arthroscopy for Labral Tears

Review of Clinical Outcomes With 4.8-Year Mean Follow-Up

Atul F. Kamath,* MD, Roger Comptonov,† MD, Keith Baldwin,* MD, MPH, MSPT,
Craig L. Israelite,† MD, and Charles L. Nelson,†† MD

Vol. 37, No. 9, 2009

- Level 4 case series, 52 patients, 4.8 year follow up
- Mean age 42
- 7.7% transient nerve palsies
- 1 guide wire broke
- 5.8% conversion to THA
- Better outcomes if: higher preop activity level, symptoms over 18 months
- Negative outcomes if: smoking, secondary gain
- Chondromalacia and osteoarthritis were not predictive of negative outcome
- 84% return to sport or equivalent level of preop activity

Does Primary Hip Arthroscopy Result in Improved Clinical Outcomes?

2-Year Clinical Follow-up on a Mixed Group of 738 Consecutive Primary Hip Arthroscopies Performed at a High-Volume Referral Center

Asheesh Gupta,* MD, John M. Redmond,* MD, Christine E. Stake,* DHA, Kevin F. Dunne,* BS, and Benjamin G. Domb,*^{†‡§} MD

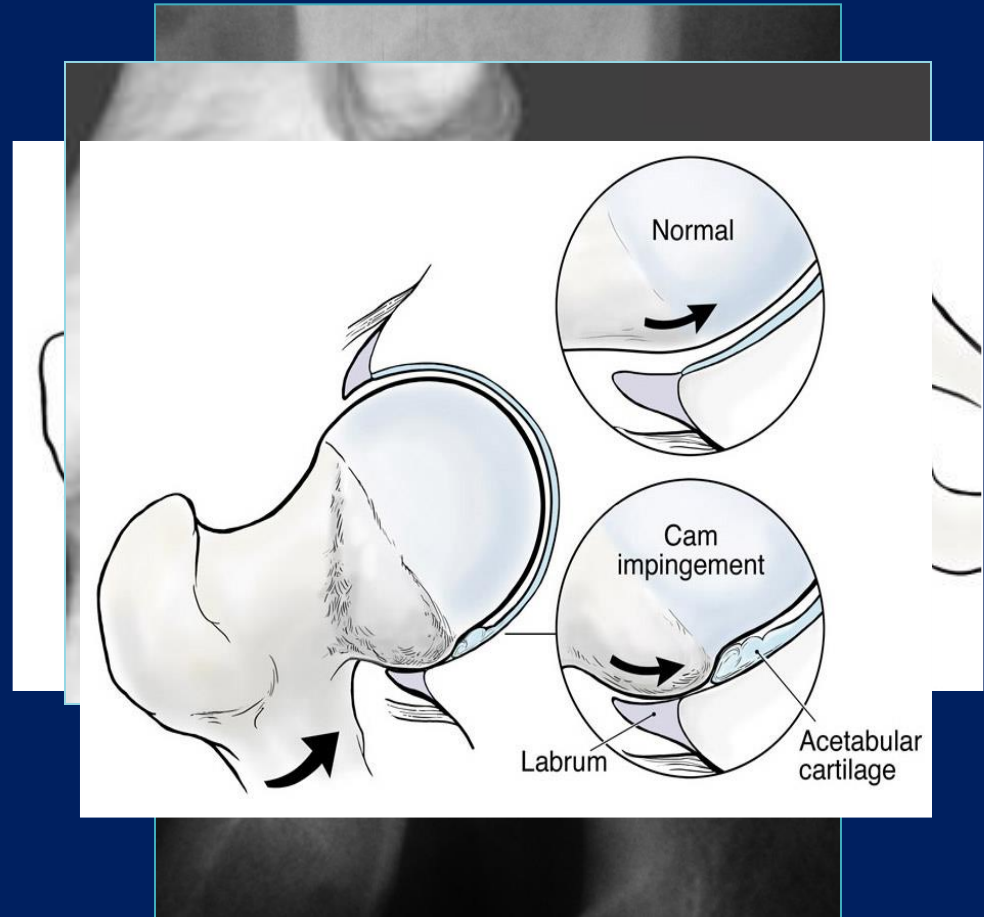
Investigation performed at the American Hip Institute, Westmont, Illinois, USA

AJSM Vol. 44, No. 1, 2016

- Level 4 case series, 595 patients, 2 year follow up
- Statistically significant increases in mHHS, Non-arthritic Hip Score, HOS-ADL score, HOS-Sport Specific Subscale
- 7.7% underwent revision arthroscopy
- 9.1% underwent THA
- Increased age
 - Risk factor for THA conversion, revision arthroscopy, change in NAHS < 10 points
- 2 of 3 modes if failure if...
 - Acute injury, acetabuloplasty, iliopsoas release, patient gender

Femoroacetabular Impingement

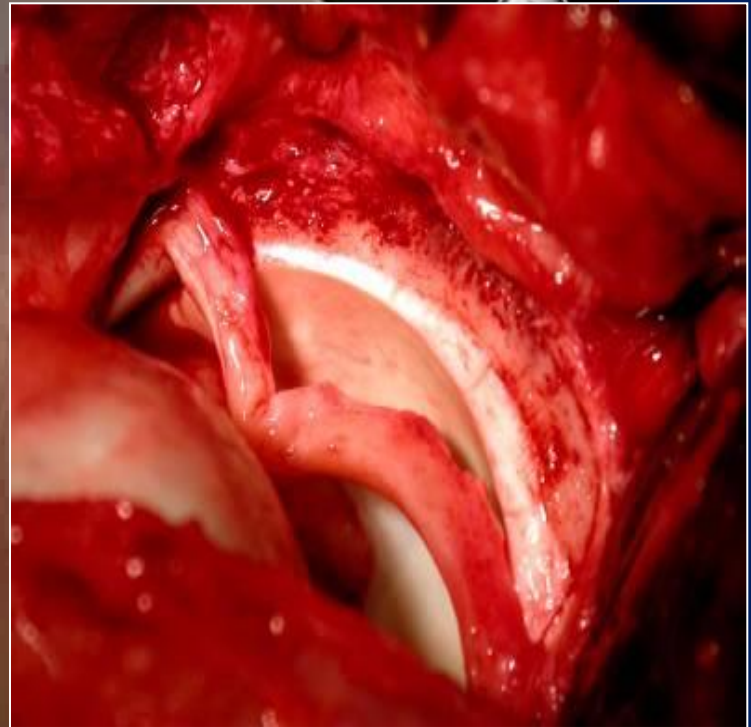
- Etiology/Morphology¹¹
 - **Pincer** – rim impingement
 - **Cam** – bony bump at head-neck junction
- ROM constraints with end-range pain, LATE
- **X-ray** best for pincer
- **CT** best for cam
- Arthroscopic findings¹²
 - Pincer: labral pathology
 - Cam: articular delamination
 - Femoroplasty, “remove the bump”



Cam Impingement

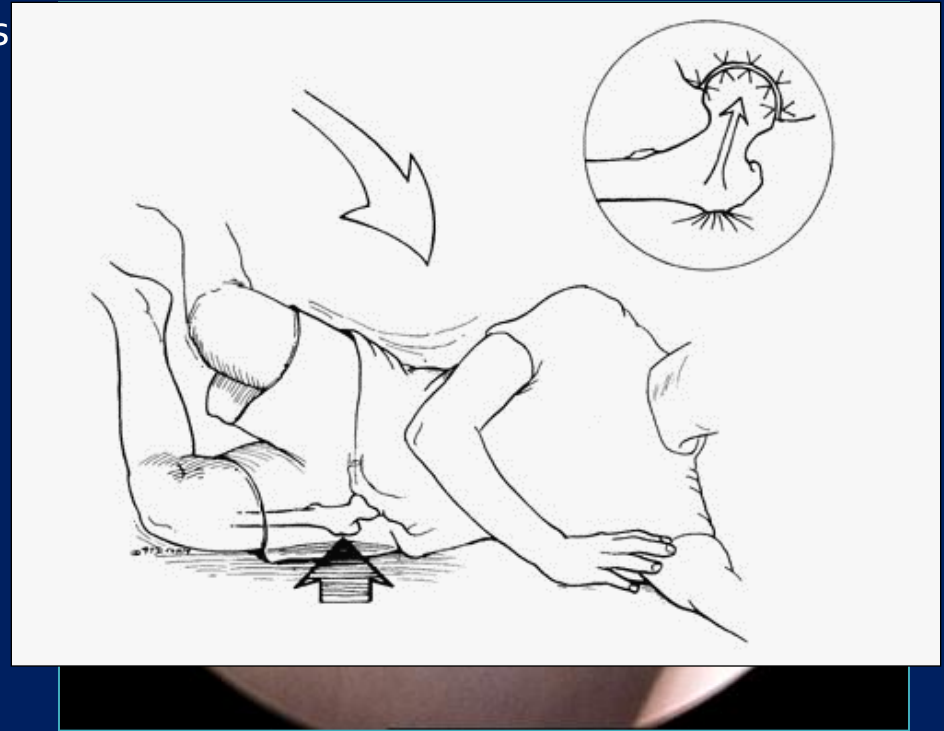


Pincer Impingement



Articular Trauma

- Etiology
 - Acute: shear vs. impaction
 - The “Lateral Impact Injury”
 - Young, fit males
 - Direct blow
 - High bone density of this region allows impact on this area to transfer energy and load to the joint surface → chondral injuries
 - Chronic degenerative
- MRI has low sensitivity⁷
 - Have strong suspicion!
- Nagging, persistent groin pain
- Good results with debridement of unstable fragments
 - +/- microfracture
- Often associated with loose bodies



Articular Trauma



Loose Bodies

- ❖ Clearest indication for surgery¹⁵
- ❖ Etiology
 - ❖ Post-traumatic
 - ❖ Synovial chondromatosis
- ❖ CT scan highly sensitive
- ❖ MRI may not see them
 - ❖ Potter et al. *AJR* 1994



Loose Body Removal



Snapping Hip: Internal vs. External

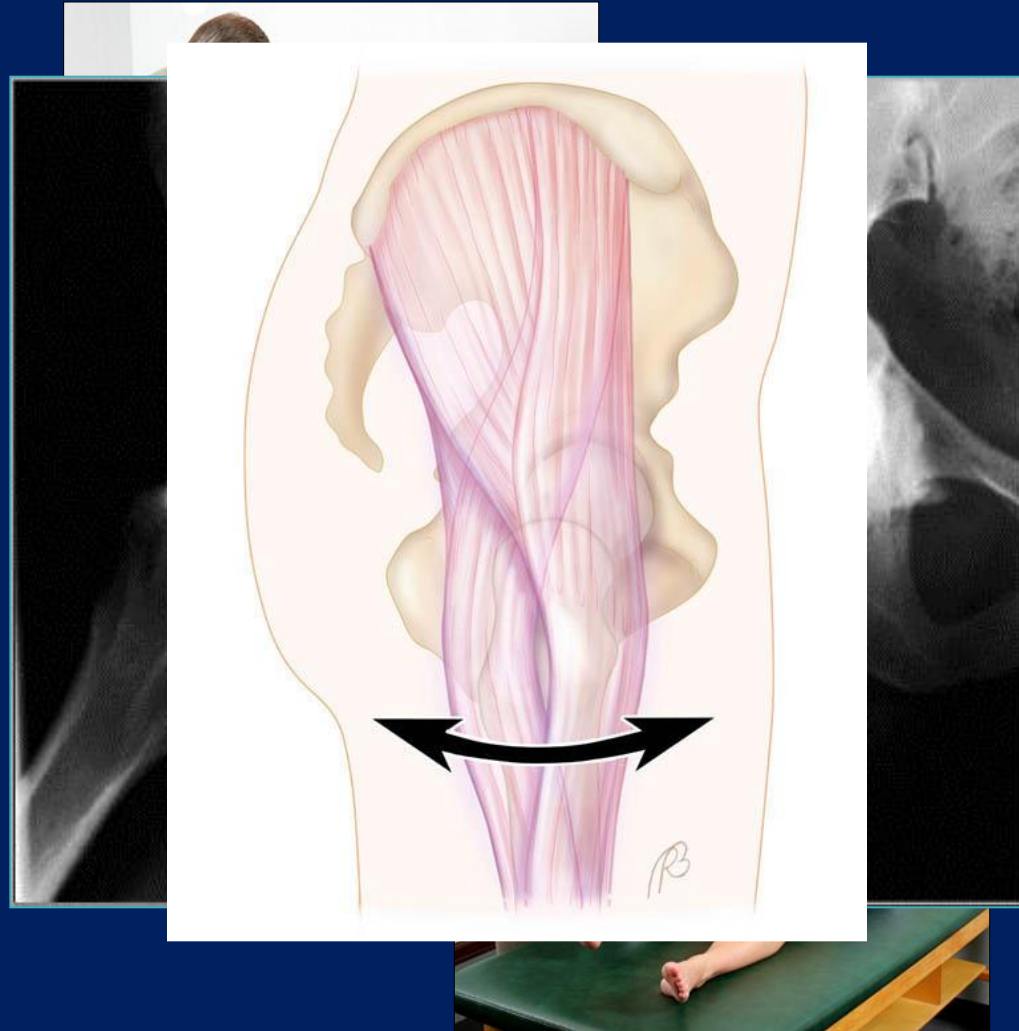
❖ Iliopsoas tendon (internal)

- ❖ Characteristic audible clunk when bringing hip from **flexion/ER** to **extension/IR**
 - ❖ Displaces the iliopsoas over the iliopectineal eminence or over the femoral head
- ❖ Pain in deep anterior groin
- ❖ Confirmed with bursography
 - ❖ Marcaine/Dexamethasone

❖ IT Band (external)

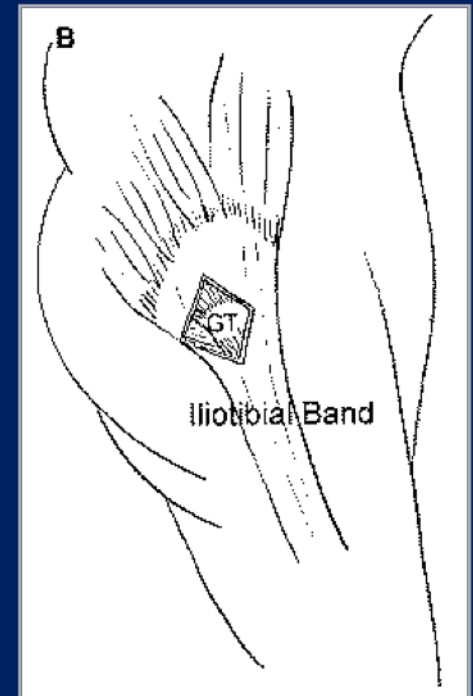
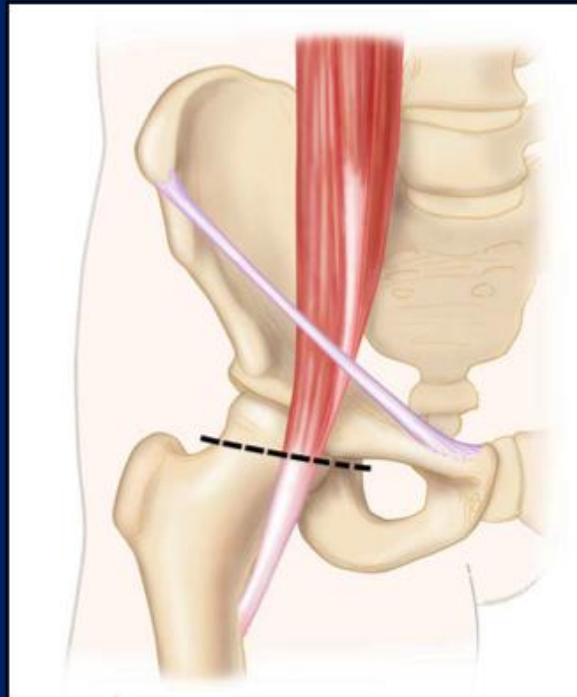
- ❖ Visible and palpable snap
- ❖ "pseudosubluxation"
- ❖ Hip extension to flexion
- ❖ Pain laterally

- ❖ Both usually voluntarily reproducible

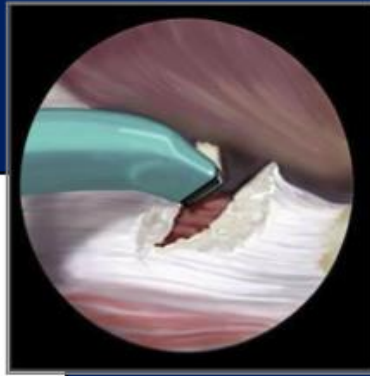


Snapping Hip

- ❖ Treat like bursitis/tendonitis
 - ❖ Activity modification
 - ❖ Stretching
 - ❖ NSAIDS
 - ❖ Cortisone injections into the psoas sheath
- ❖ Recalcitrant cases sometimes require surgery
 - ❖ Arthroscopic IP release
 - ❖ Sub-psoas decompression
 - ❖ Endoscopic ITB windowing



Iliopsoas Release



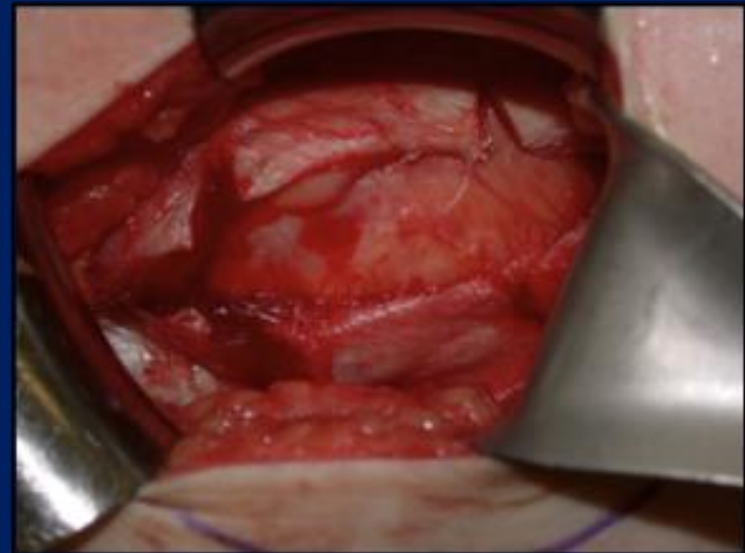
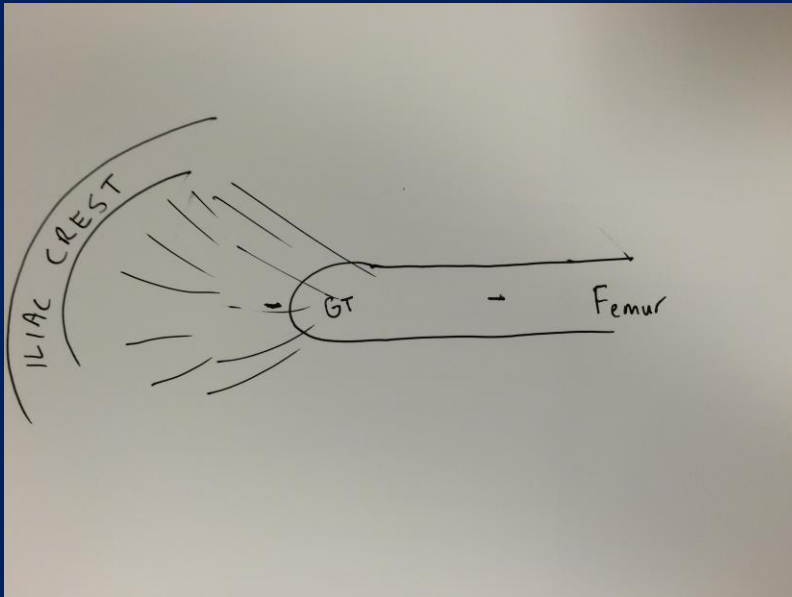
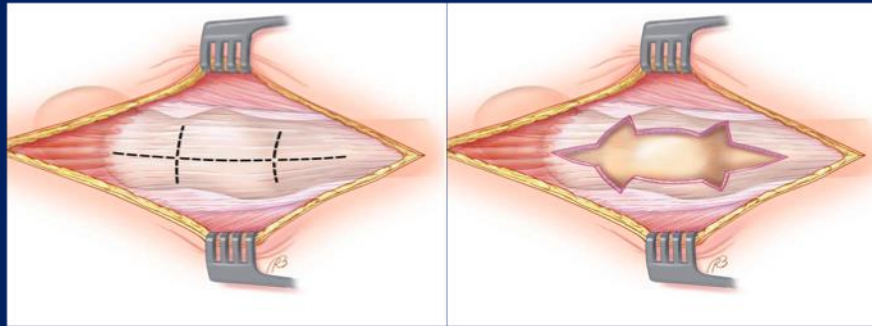
Original endoscopic technique complicated with heterotopic ossification and subsequent pain



Arthroscopic Iliopsoas Release



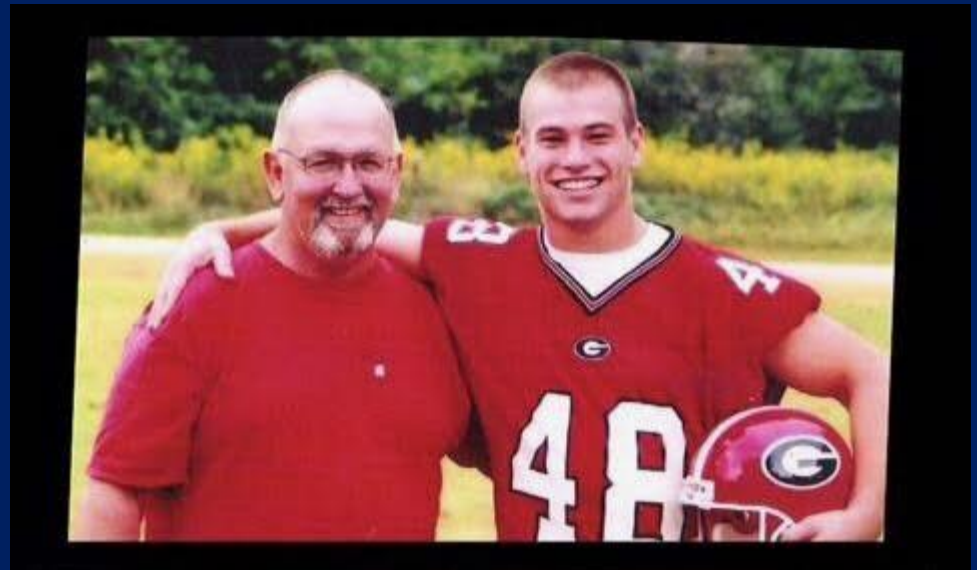
IT Band Release: Open vs. Endoscopic

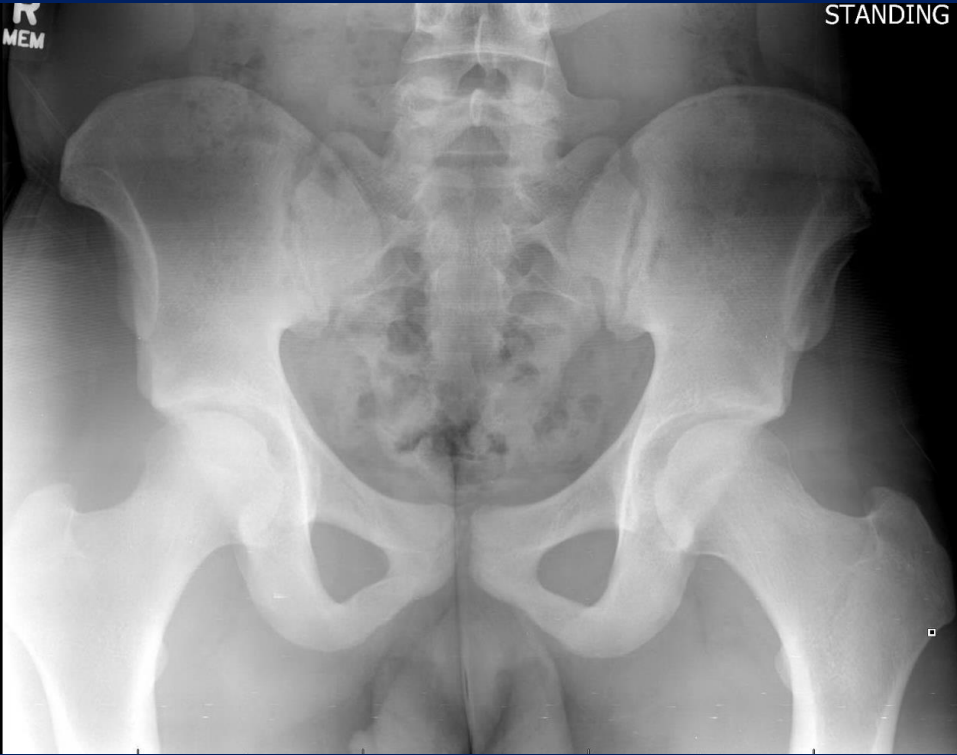


Case Examples

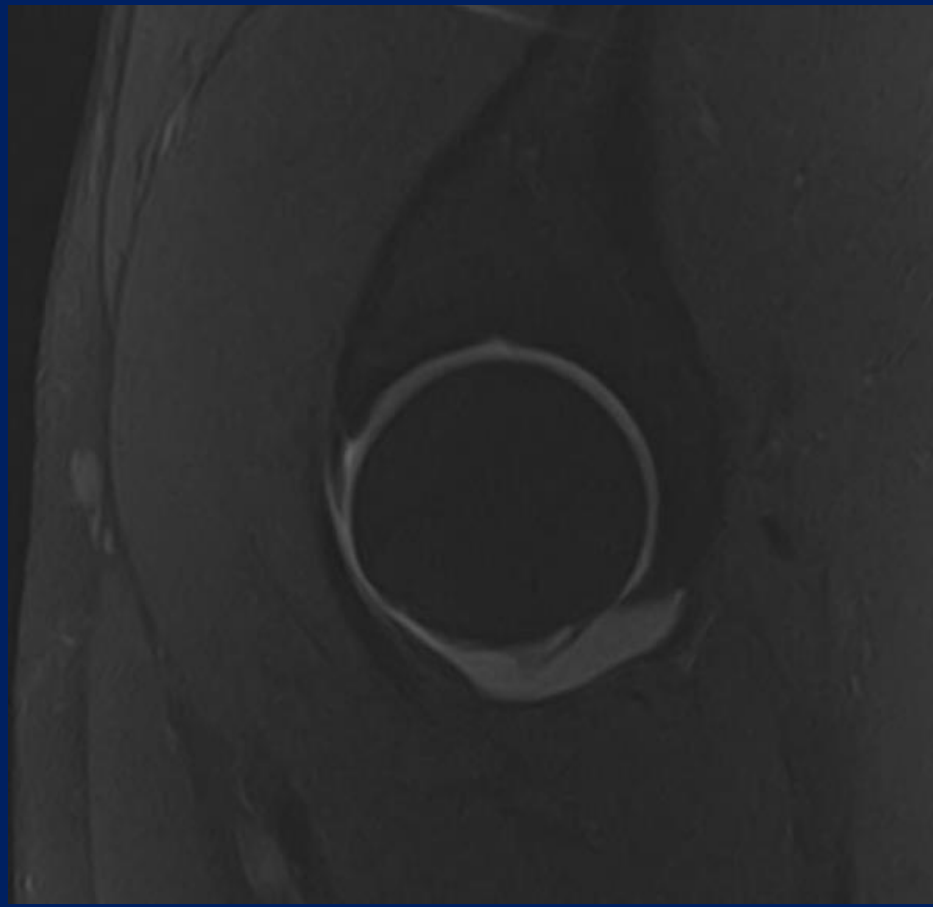
Case 1

- Division I football linebacker
- True freshman
- 4 star recruit
- Complains of snapping along his anterior hip, deep in groin
 - Associated with pain
 - Reproducible on exam
 - Can't get into his stance
 - Hurts with cutting
 - "Doc, I can't go"





M



Case 1

- Underwent psoas sheath injection with corticosteroid
- Immediate relief
- Very happy
- Played the rest of the season...
- Until week 4, when he tore his ACL



Case 2

- ❖ Division 3 power forward
- ❖ Senior year
- ❖ Increasing hip pain over last 6 months, localized to groin, exacerbated with going into defensive stance and pushing off
- ❖ Recent mechanical symptoms and locking
- ❖ Can no longer pivot or cut

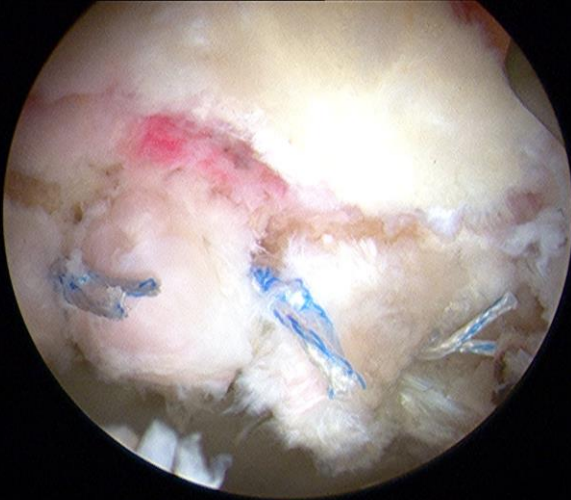
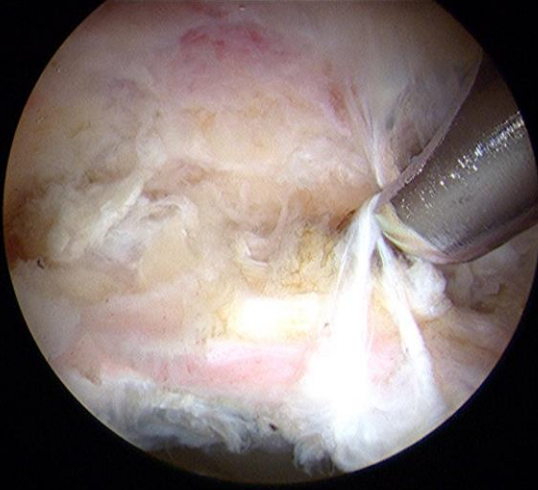


Case 2

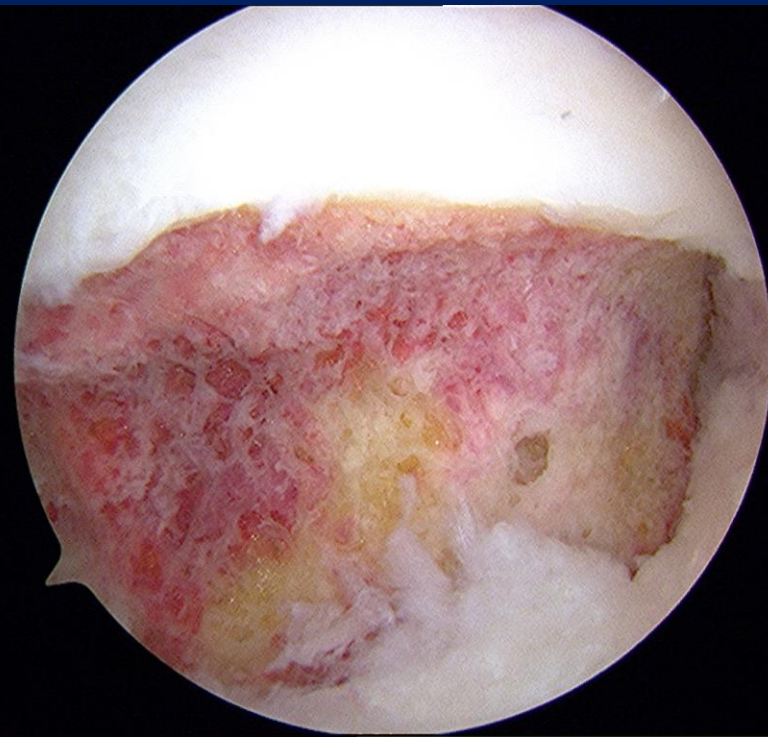
- ❖ Xrays show significant CAM deformity
- ❖ MRI demonstrates large flap type labral tear with chondral delamination
- ❖ IA injection provides 1 week of relief
- ❖ Able to play in following game, but next game unable to go into stance



Case 2

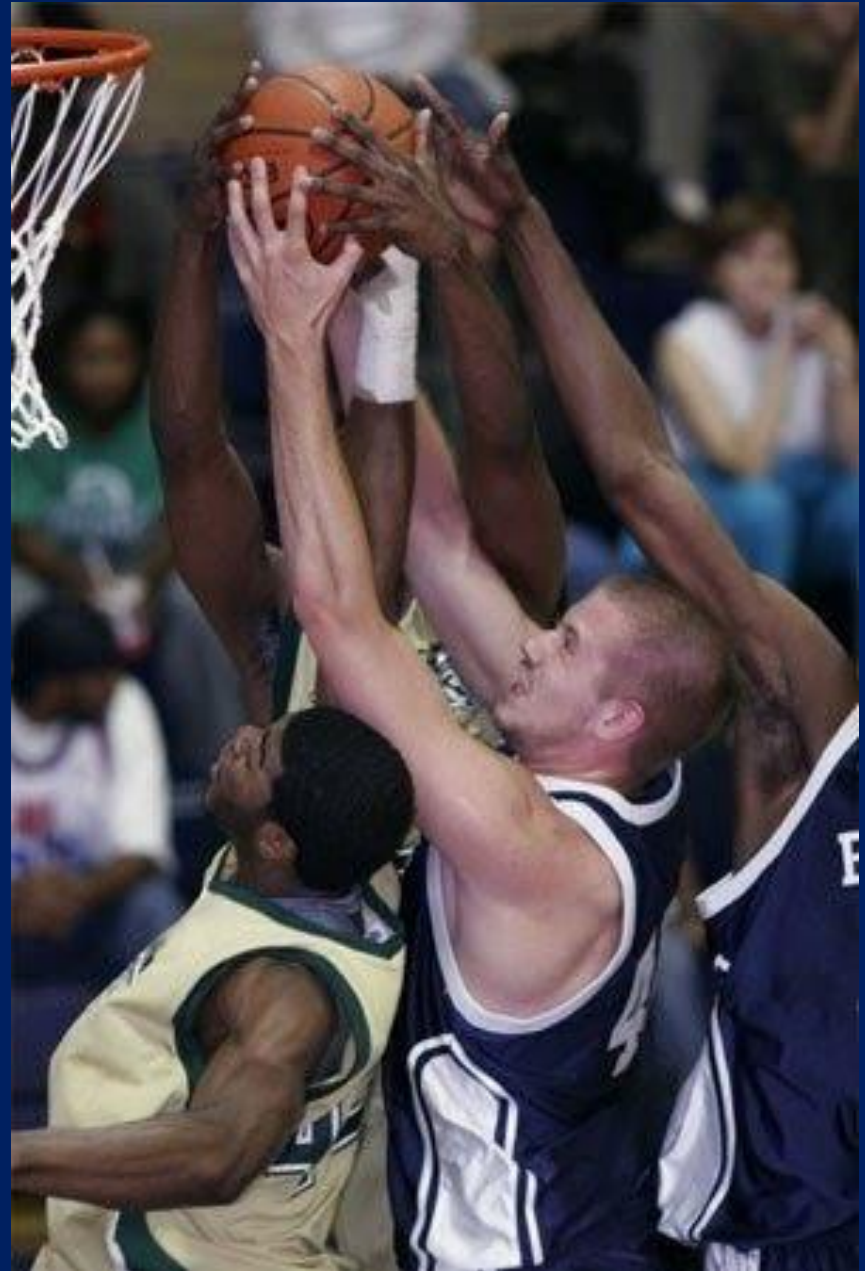


Case 2



Case 2

- Was dunking on people the following season
- Sort of...



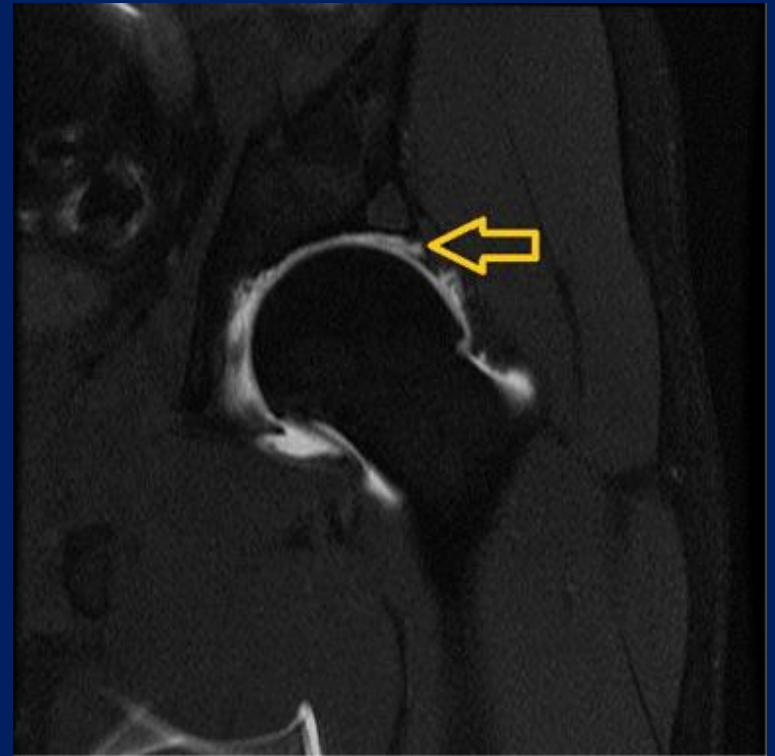
Case 3

- ❖ Division 1 Backup Placekicker at University of Alabama
- ❖ 1.5 Star Recruit on Rivals.com
- ❖ Transfer from Sanford University
- ❖ Junior year
- ❖ Very Serious
- ❖ Prior core muscle repair
- ❖ Increasing hip pain over last 3 months, localized to groin, exacerbated with backpedaling and cutting to involved side
- ❖ No mechanical symptoms
- ❖ After IA injection asymptomatic for weeks

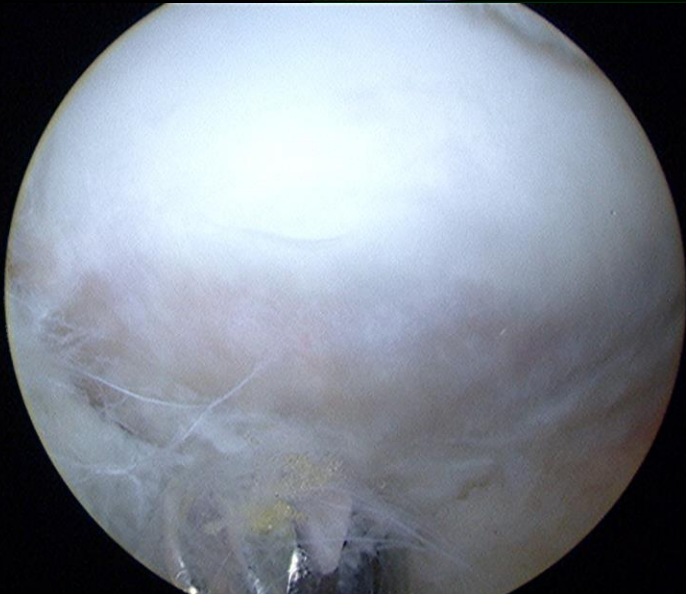
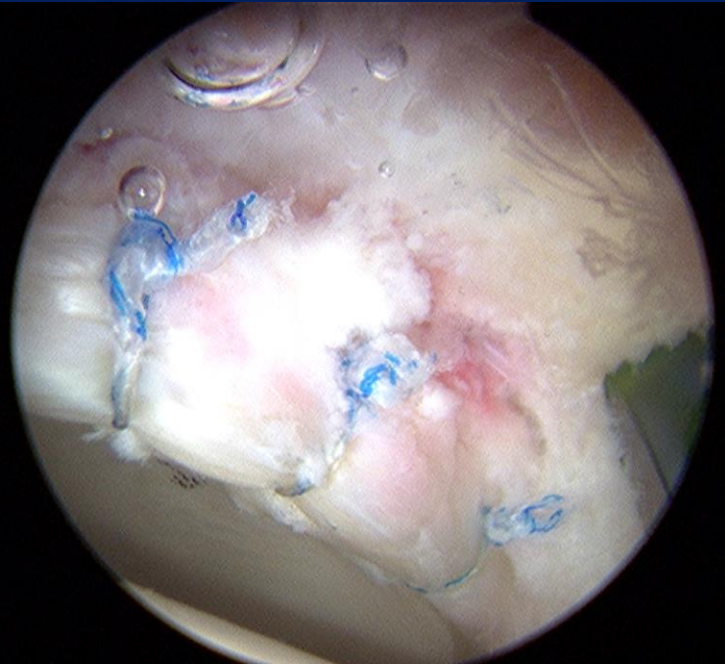
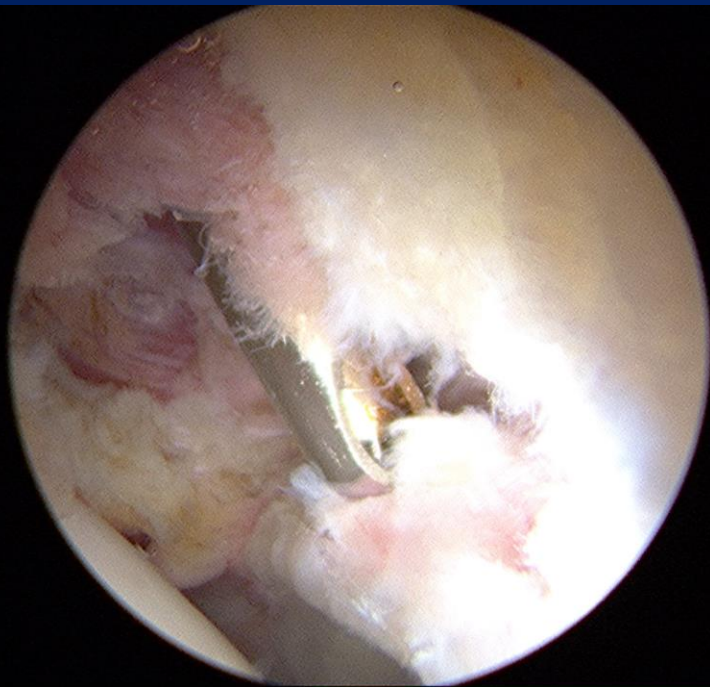


Case 3

- ❖ Able to get through entire junior season with rehab, weight training modification, and 2 spaced IA injections
- ❖ Avoided deeps squats, high hip flexion, and high steps
- ❖ Limited reps in appropriate game time situations
- ❖ Proceeded with surgical repair at season's end



Case 2



Post-operative care

- ❖ All are WBAT with crutches for 2 weeks
- ❖ Hip Brace for first 3 weeks
 - ❖ Limitations
 - ❖ 60 degrees flexion
 - ❖ 30 degrees extension
 - ❖ Neutral abduction
- ❖ Begin ROM, hip/core strengthening immediately
- ❖ Advance as tolerated with non-repair cases
 - ❖ (generally over 6 to 16 weeks)
- ❖ More protective with repair/bony cases
 - ❖ (generally 16 to 24 weeks)
- ❖ Specific protocols for specific cases



Case 4

- 57 yo M, cycling enthusiast
- Anterior groin pain when sitting for long periods, getting up from seated position
- PT – provided minimal benefit
- Sent for IA injection, last 3 hours





Outcomes of Hip Arthroscopy in the Older Adult

A Systematic Review of the Literature

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Investigation performed at Walter Reed National Military Medical Center, Bethesda, Maryland, USA

AJSM Vol. XX, No. X, XXXX

- 8 studies, 401 patients, > 40 years old
- Hip arthroscopy for labral tears or FAI
- 7 of 8 studies
 - Favorable subjective outcomes
 - Significant postoperative improvement with moderate to large effect size
 - Trend towards better improvement with repair over debridement
 - Overall reoperation rate 20.8% (comparable to previous reports in younger patients)
 - Conversion to hip arthroplasty ranged from 0 to 30%
 - Overall conversion rate 18.5% at 17 months postop
 - MC risk factor for conversion: low preop PRO, advanced arthritis
- Conclusions
 - Safe and efficacious in older patients without significant underlying arthritis

Are Short-term Outcomes of Hip Arthroscopy in Patients 55 Years and Older Inferior to Those in Younger Patients?

Andrew J. Bryan,* MD, Aaron J. Krych,* MD, Ayoosh Pareek,* BS, Patrick J. Reardon,* BS, Rebecca Berardelli,* BS, and Bruce A. Levy,*[†] MD

Investigation performed at the Mayo Clinic, Rochester, Minnesota, USA

AJSM Vol. 44, No. 10, 2016

- Level 3 cohort study, 201 patients with FAI and no arthritis
 - 2 year follow up, patients stratified by age relative to 55
 - Assessed modified Harris Hip Score (mHHS) and Hip Outcome Score (HOS)
- Modified Harris Hip Score improved in both groups significantly from baseline, without significant differences at 1 year or 2 years
- > 55 group
 - Labral debridement more frequently
 - More likely to have full thickness cartilage defects
- < 55 group
 - Superior outcomes on the ADL subscale for HOS, ADL rating, Sport score, and sport rating
- Both groups had significant improvement in subjective scores from baseline at 2 years

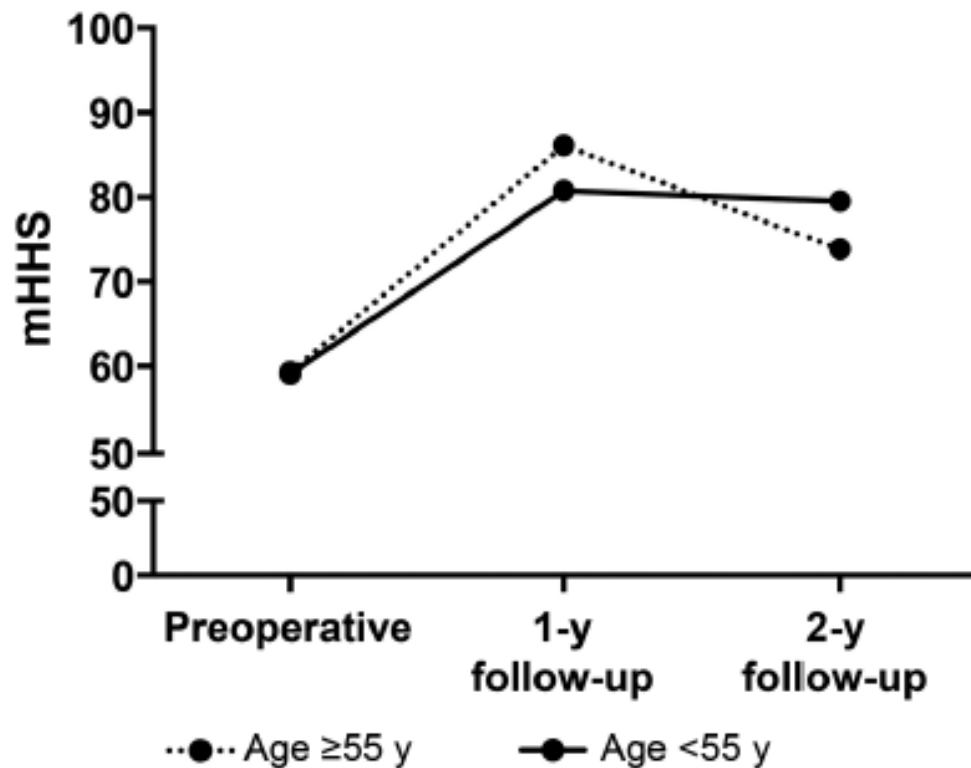


Figure 1. Modified Harris Hip Score (mHHS) after hip arthroscopy in patients < 55 years and those ≥ 55 years.

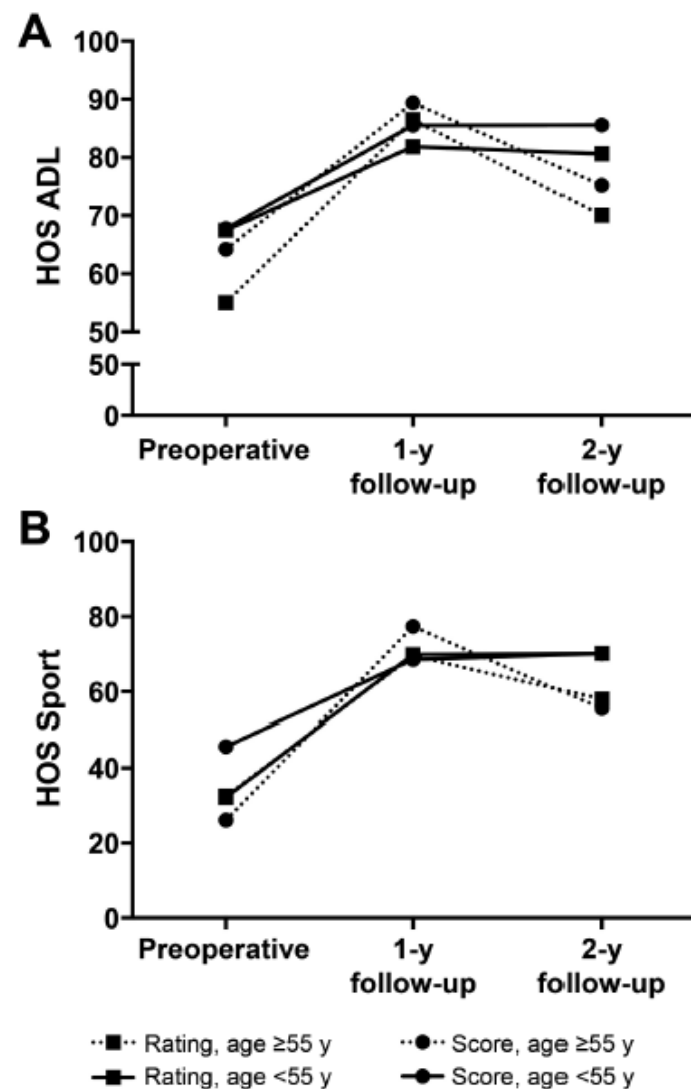


Figure 2. Hip Outcome Score (HOS) results after hip arthroscopy in patients < 55 years and those ≥ 55 years: (A) Activities of Daily Living (ADL) subscore and (B) Sport subscore. Preoperative and 1-year Sport subscore and rating for ≥ 55 and < 55 years are superimposed because of similar scores; 2-year Sport subscore and rating for < 55 years are also superimposed.

Proximal Hamstring Injuries

- These injuries represent a **continuum**
 - Strain at the myotendinous junction (MTJ)
 - Partial tear of the tendon
 - Complete avulsion of the hamstring muscle complex from the ischial tuberosity



Incidence

- Injury of the proximal hamstring is common among athletes
- Majority of these injuries are **strains of the BF muscle at the MTJ**
 - Treated nonoperatively with good success
- Strains typically result from an eccentric muscle contraction



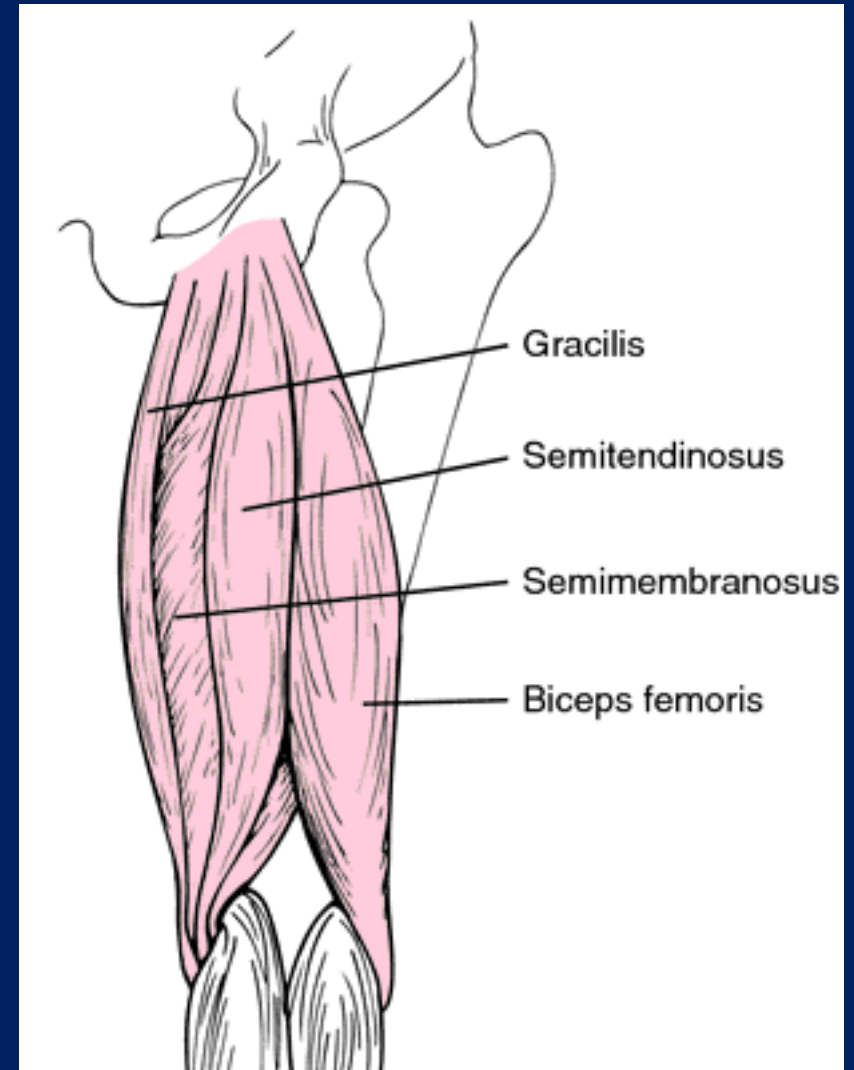
Proximal Hamstring Avulsion

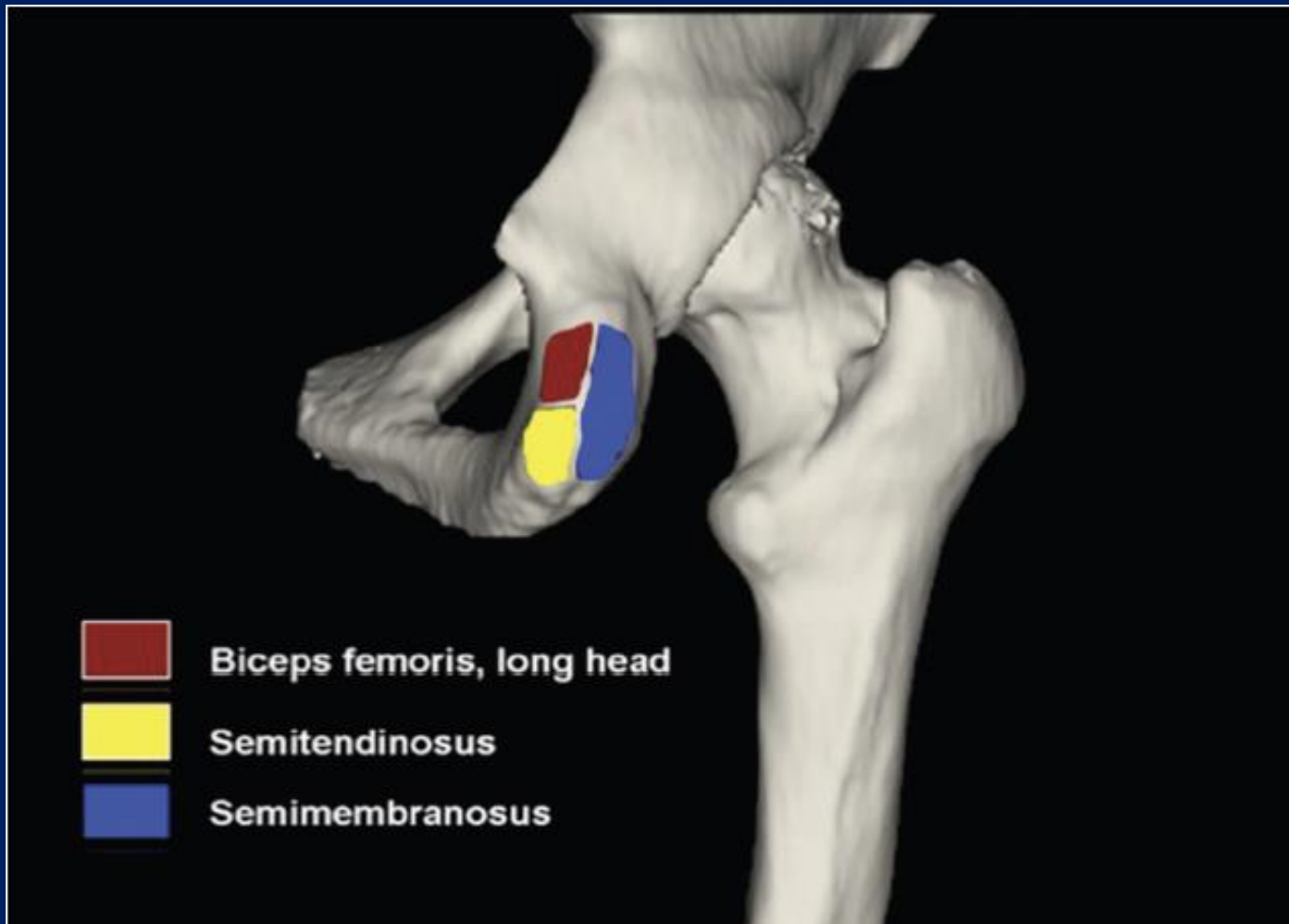
- A different animal
- Much less common than strains
- Difficulty in the differentiation of avulsions from muscle strains
- MRI helpful



Anatomic Considerations

- Hamstring muscle group
 - Biceps femoris (short and long heads)
 - Semitendinosus
 - Semi-membranosus





- All except the short head of biceps originate from ischial tuberosity as a common tendon
 - They then separate 5-10 cm distal to the ischium
 - SM first to become distinct

Mechanism of Injury (acute)

- Violent hyperflexion of the hip
 - Hip hyperflexion + knee extension
 - “the water skier injury”



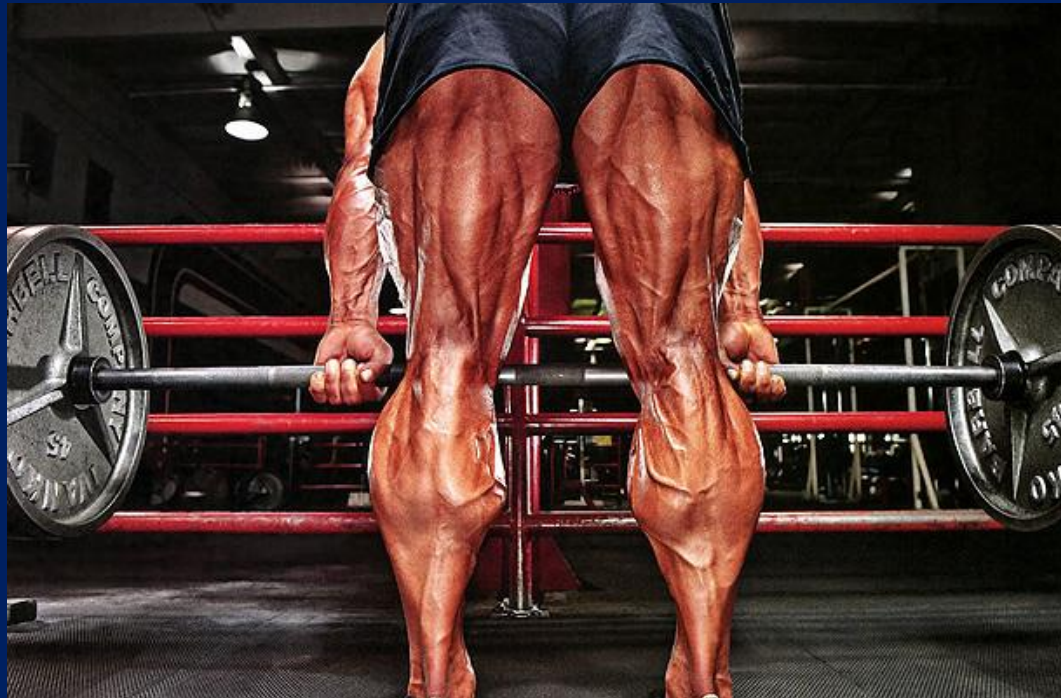
Figure 1. Sudden knee extension and increase in hip flexion avulses the hamstring origin.

TABLE I Frequency of Hamstring Injury by Precipitating Activity

Cause of Injury	Number of Injuries
Waterskiing	21
Splits (dancing/ballet)	11
Fall	11
Soccer	4
Rugby	4
Skiing	3
Surfing	3
Martial arts	3
Other sports	12

History

- Acute
 - Sudden **pop in posterior thigh** with sudden hip flexion and knee extension
 - Running, jumping, kicking sports
- Chronic
 - Insidious onset of progressive HS tightness
 - **Discomfort with sitting**
 - Difficulty in walking smoothly



Physical Exam

- **Stiff-legged gait**
 - Avoid simultaneous hip flexion and knee extension
- Ecchymosis
- Palpable defect
- TTP at ischium



Classification – David G. Wood

- Type 1: Apophyseal injuries in skeletally immature patients



Wood Type 2

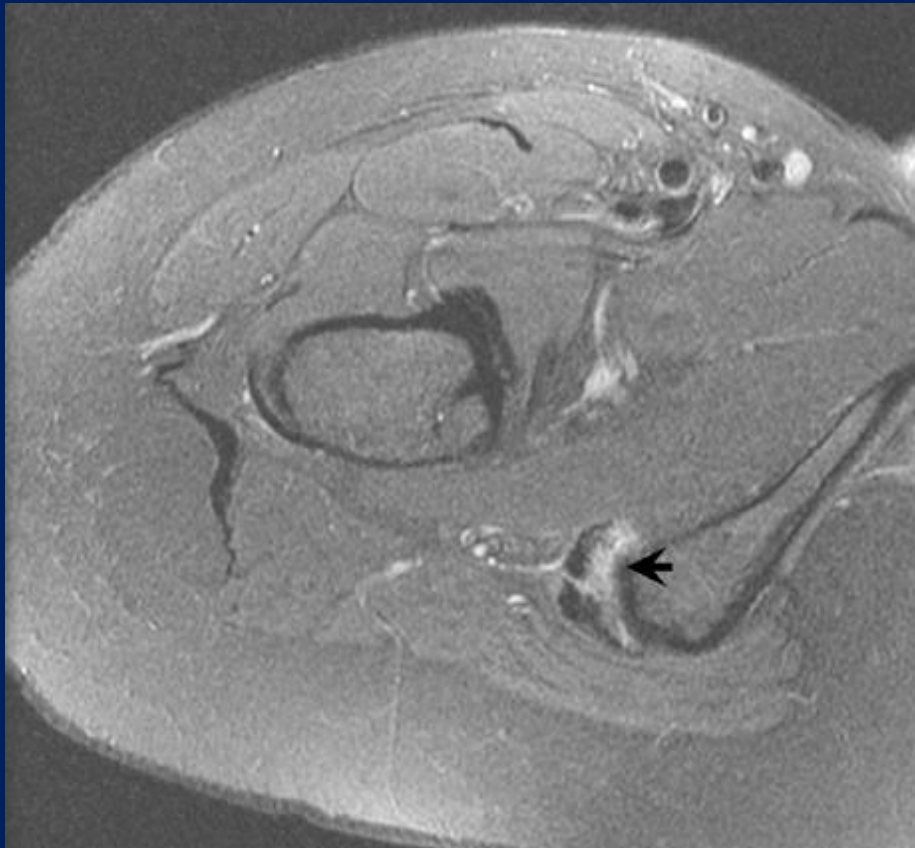
- Avulsions at the MTJ

Retracted tear at the
BF proximal MTJ



Wood Type 3

- Incomplete tendon avulsions from the bone



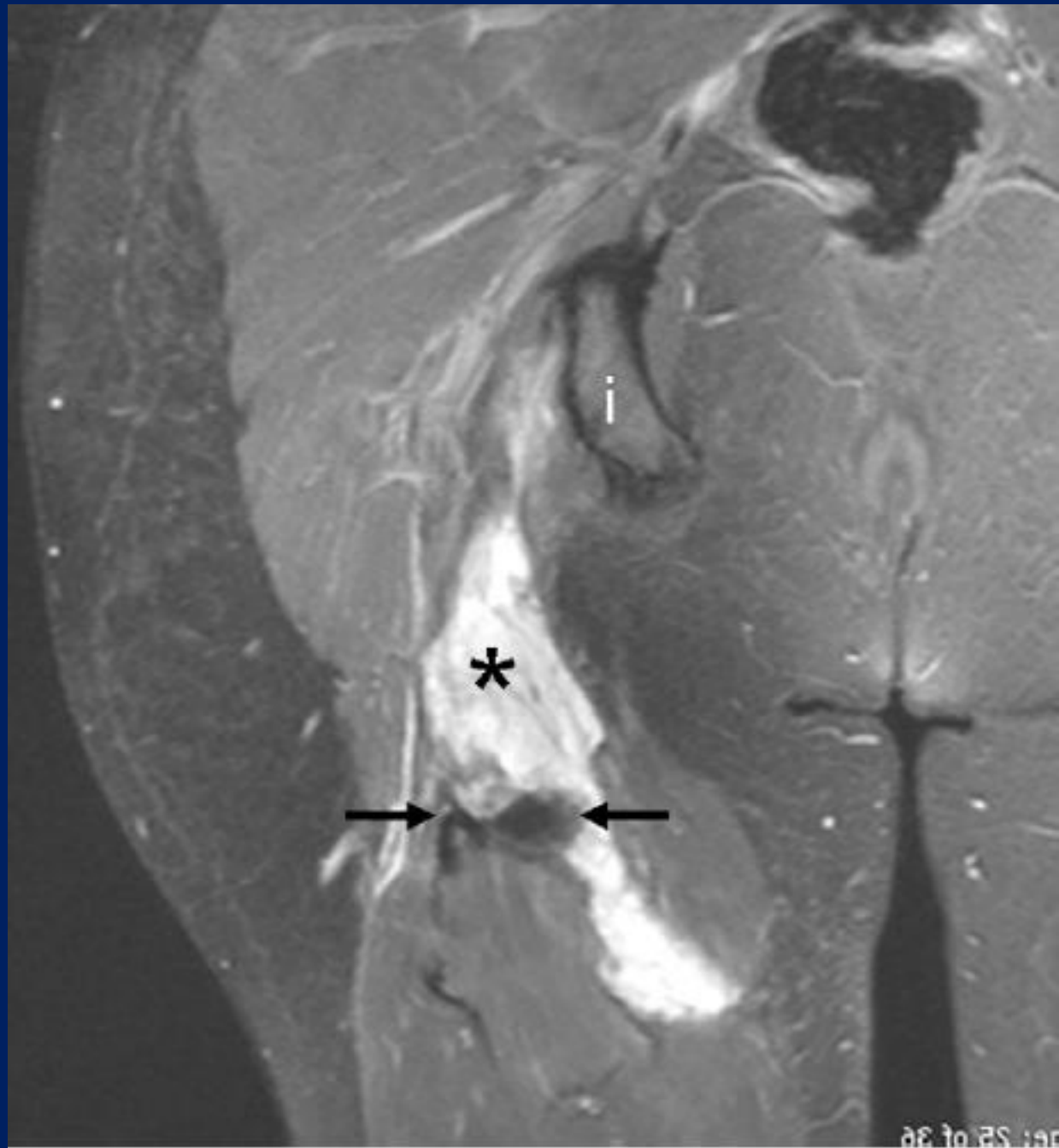
Wood Type 4

- Non-retracted, complete tear of HS origin
- Controversial Rx



Wood Type 5

- Retracted,
complete tear of
HS origin



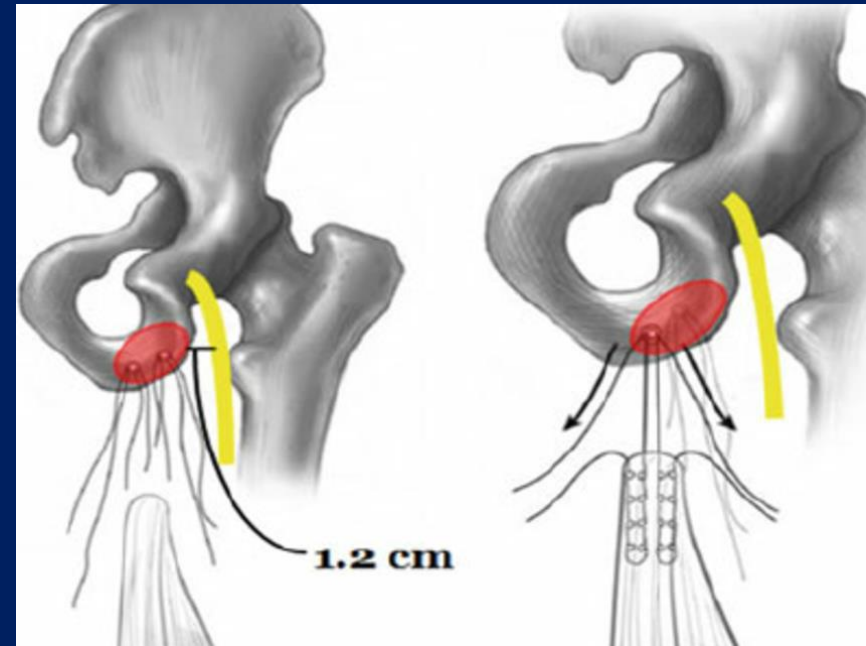
Non-surgical Treatment

- Preferred historically
 - Mild to moderate strains respond well to non-surgical treatments
- Majority of tears will heal
 - However, some will not!



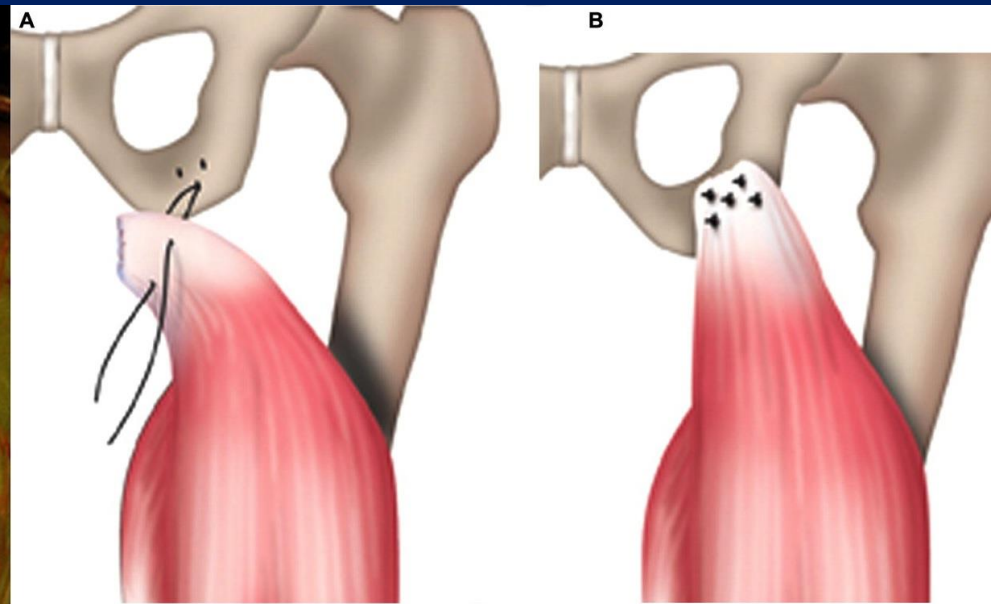
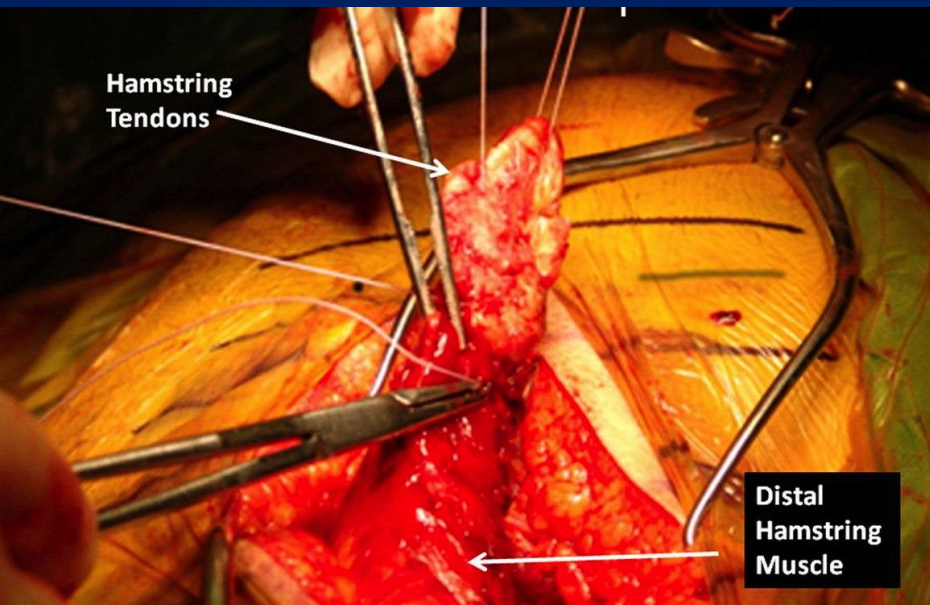
Sequelae of Non-surgical Treatment

- Sciatic nerve adhesions → **radiculopathy**, neuritis
- Tendon retraction → weakness
- Pain with activities → **athletic dysfunction, cramping**
- Chronic disability → too late for surgery
- Conservative treatment – **60% return to sports**
 - Sallay et al, AJSM 1996



Indications for Surgery

- Complete tear of ≥ 2 tendons
- Retraction of ≥ 2 cm
- Type 1 (bony avulsions) with retraction of 2 cm
- All type 5 injuries (complete, retracted)
- Type 3 injuries (incomplete tears) unresponsive to conservative treatment
- Type 4 controversial (depends on age and functional demands)



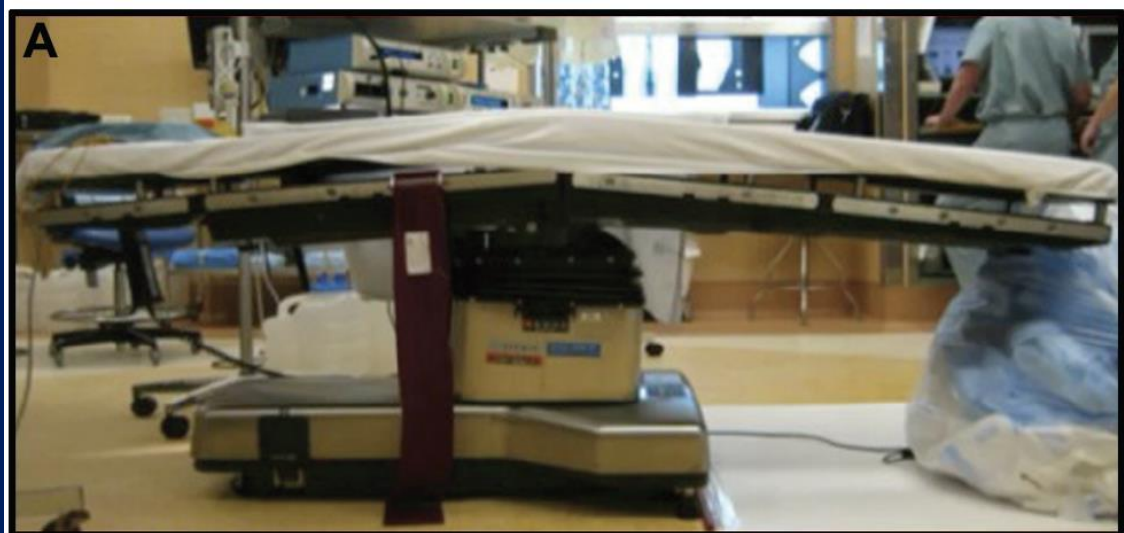
Timing of Surgery

- Early surgical repair better
- Delayed surgery
 - Technically challenging
 - Reduction in strength and endurance
 - Scar tissue and muscle atrophy
 - Sciatic nerve
 - Surrounded in scar



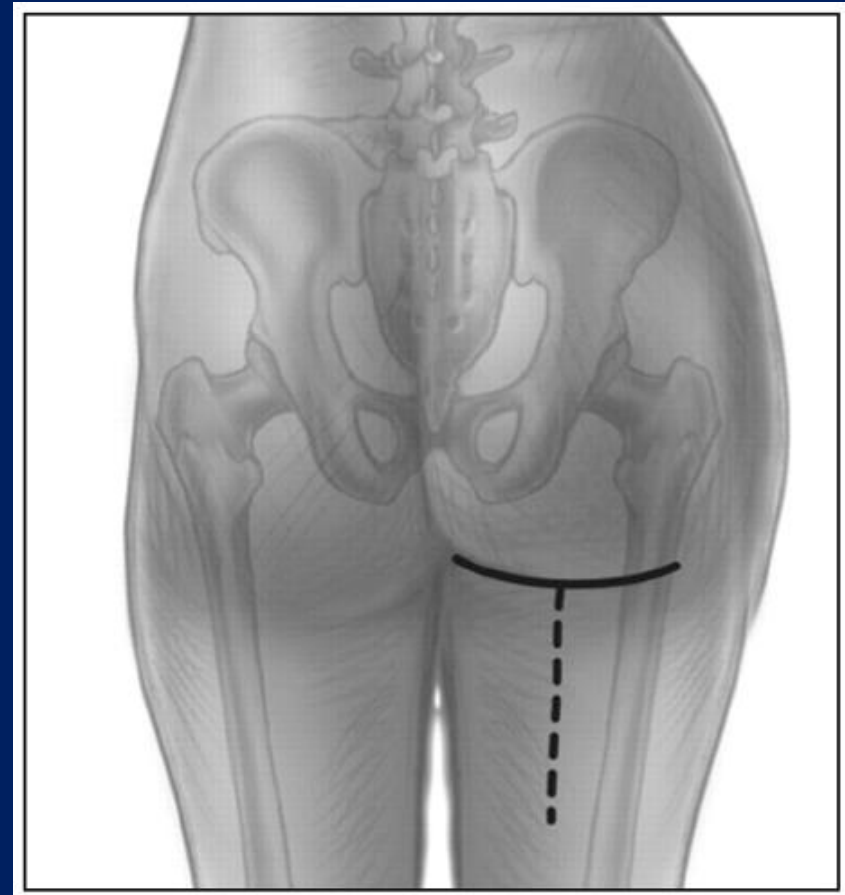
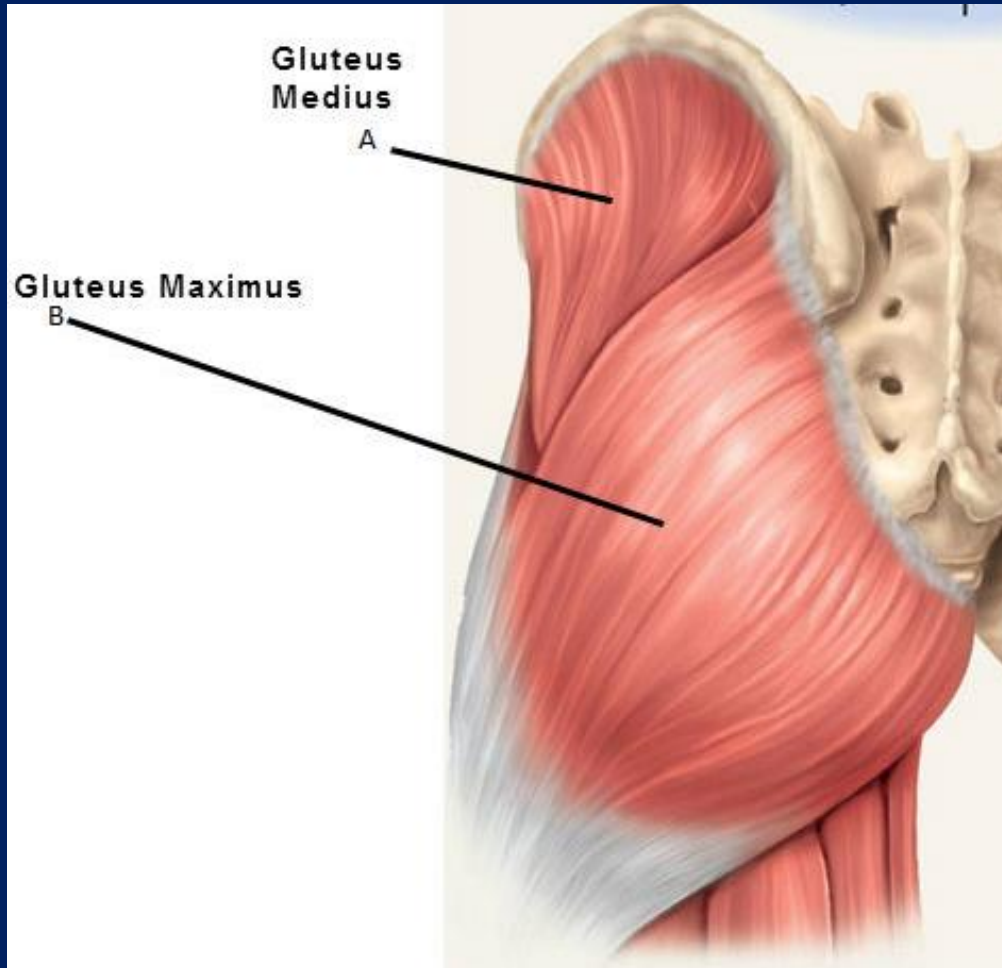
Open Treatment

- Prone position
- Palpate bony anatomy
 - Focus on ischial tub
- Draw Landmarks
- Incision in gluteal crease
- Headlamp



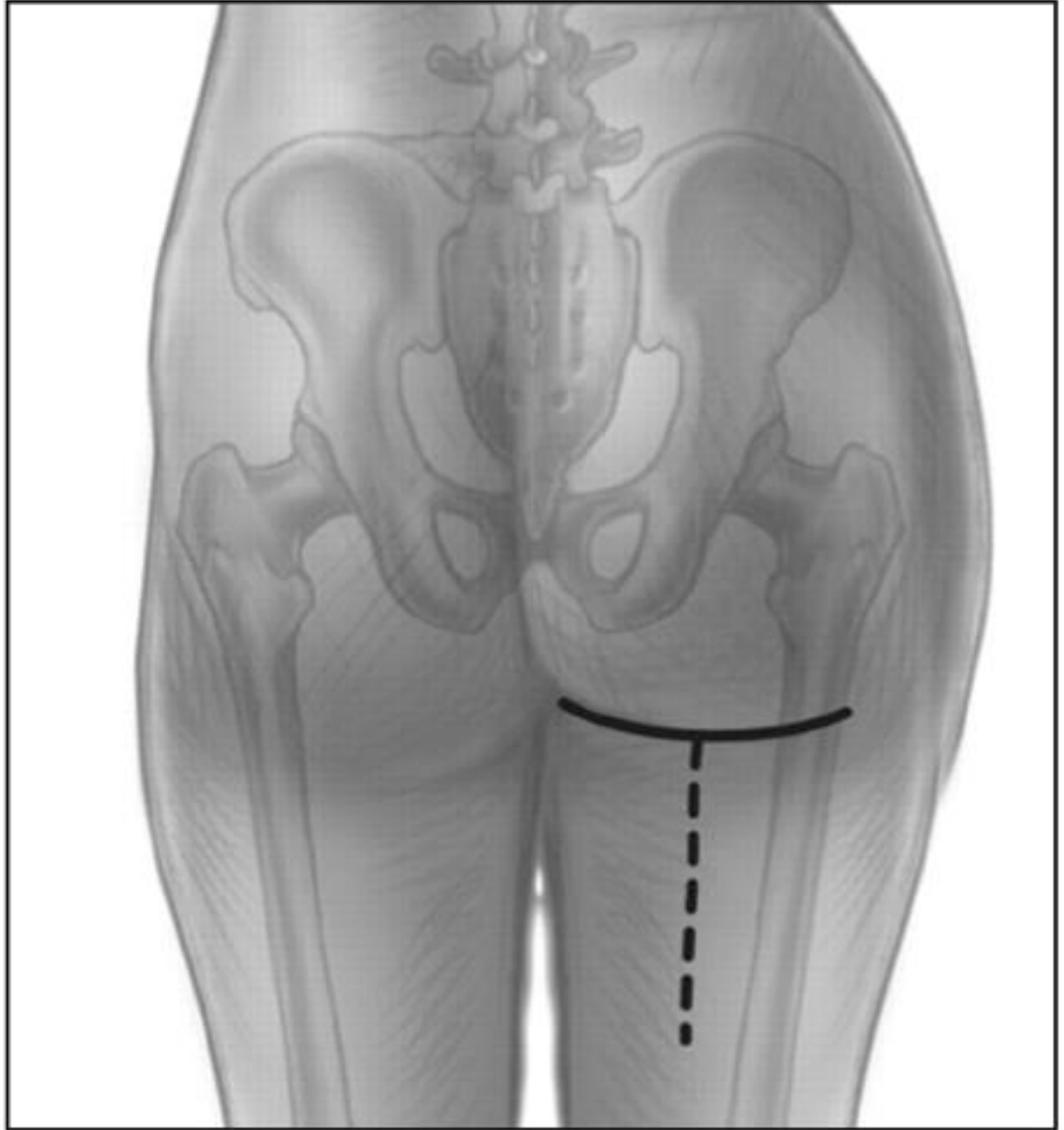
Anatomic Considerations

Gluteus maximus covers the origin of the hamstrings



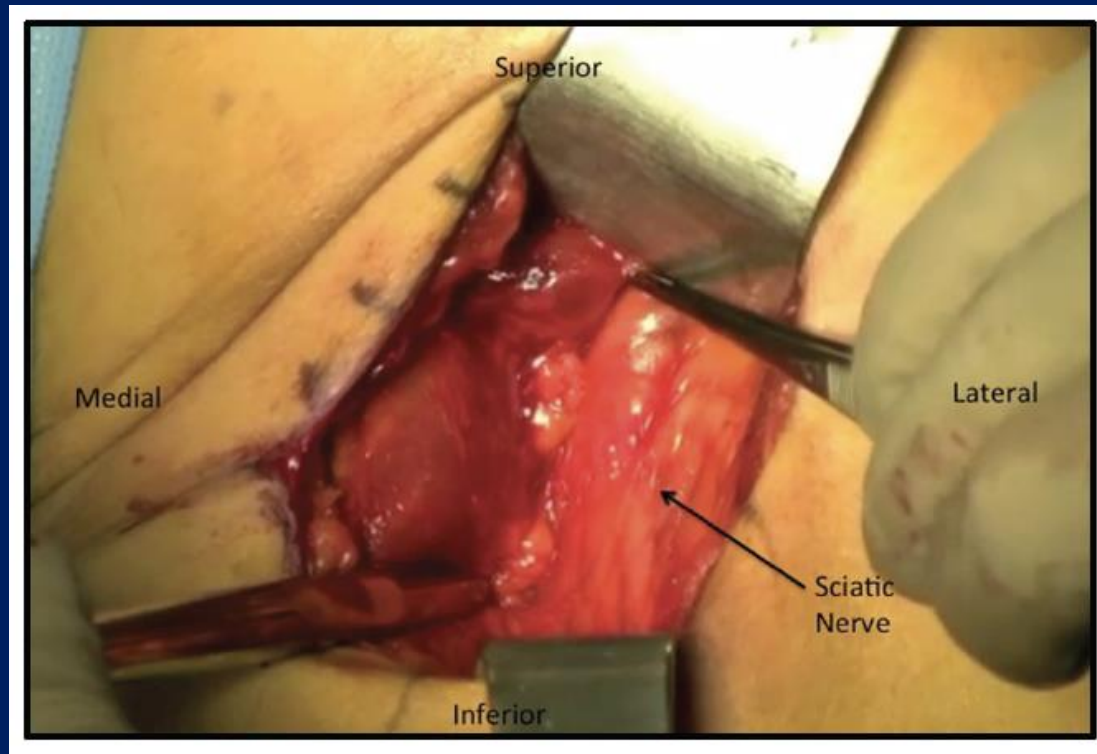
Open Treatment

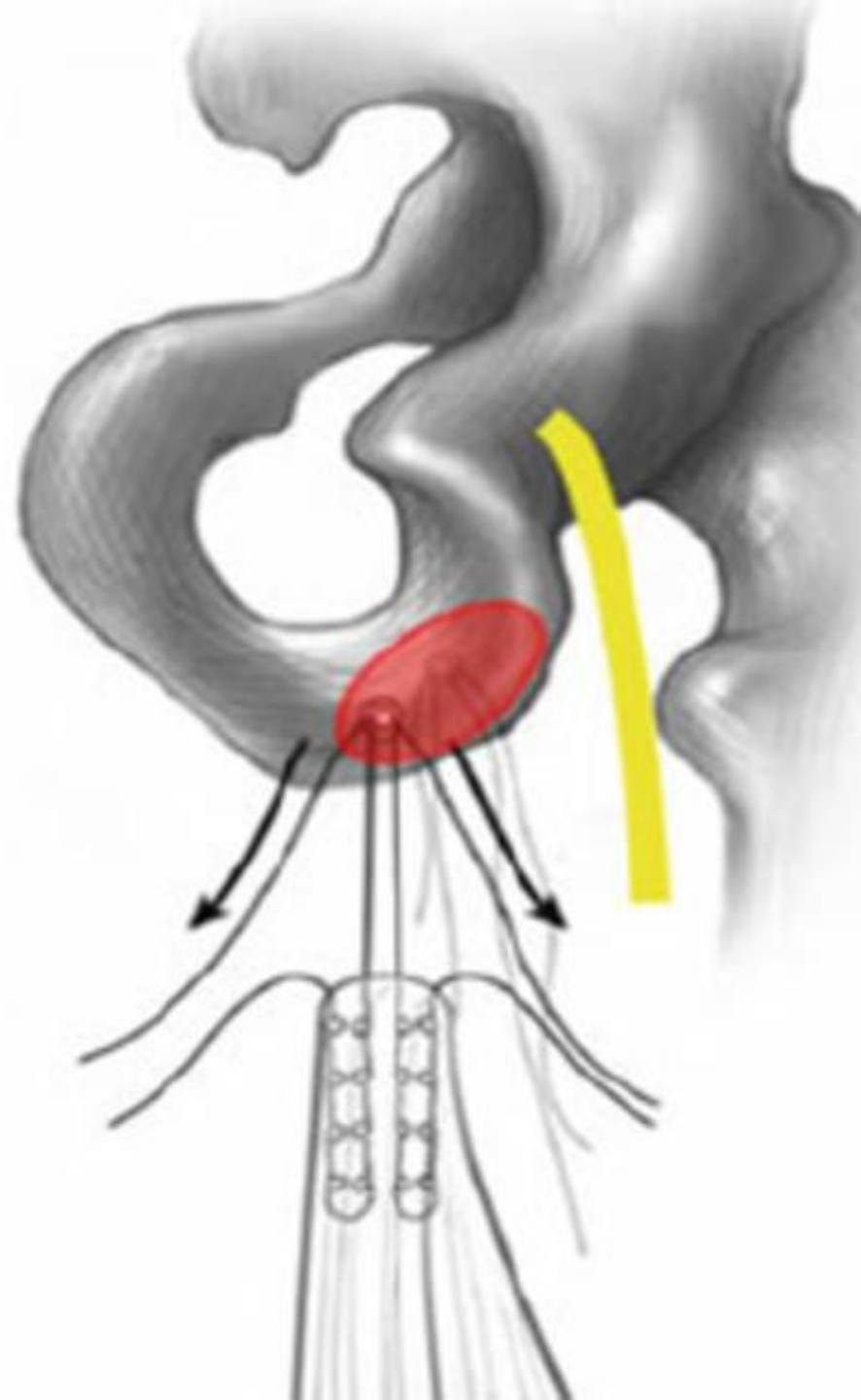
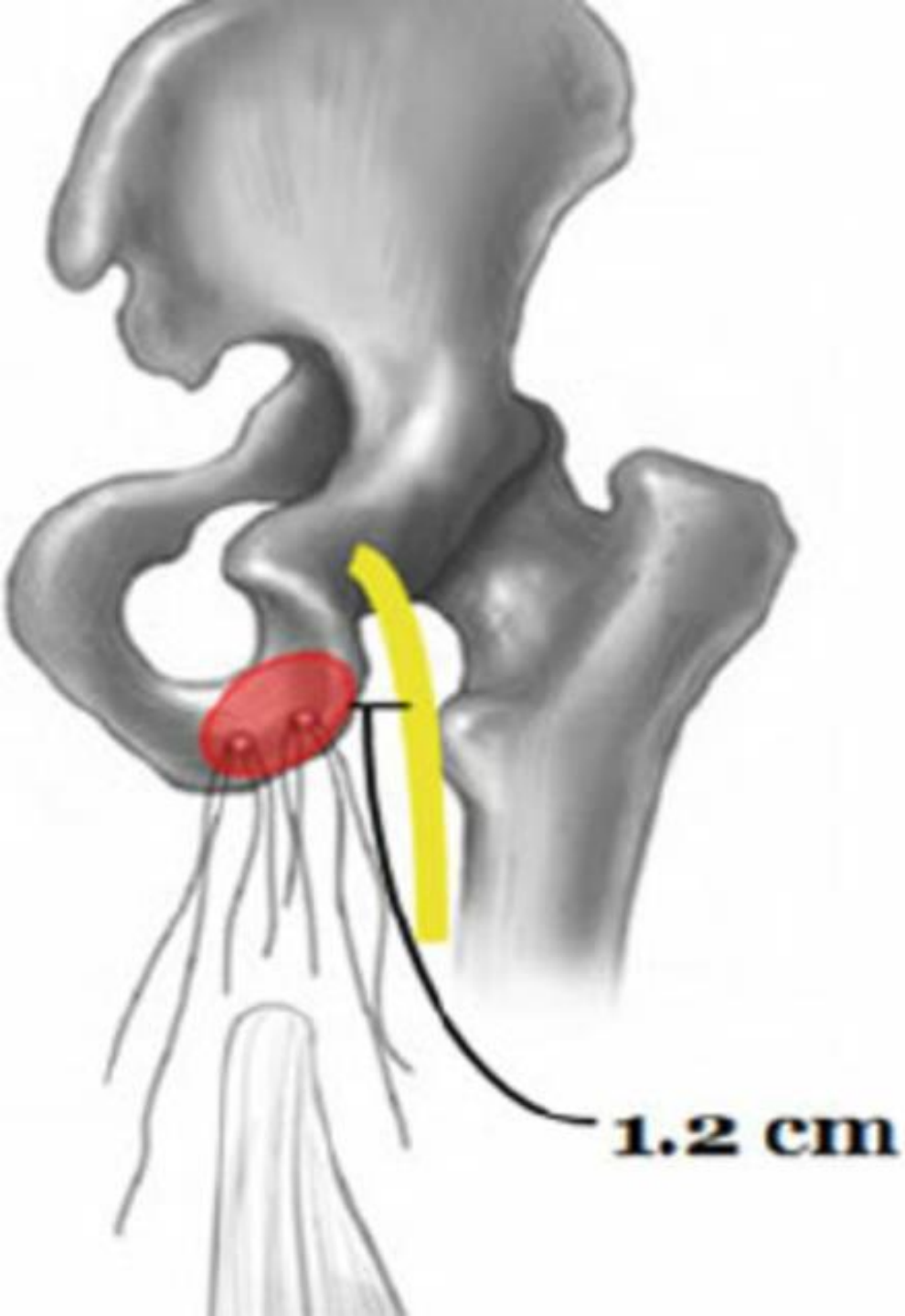
- Divide G-max fascia
- Find inferior border of G-max
- Retract G-max with deep retractor



Open Treatment

- Palpate sciatic n
- If scar formation, dissect nerve free of hamstring fascia
- Avoid retractor placement onto nerve
- Palpate “stump”
- Evacuate hematoma/seroma
- Free MT adhesions distally
- Confirm tendon excursion





Outcomes After Operative and Nonoperative Treatment of Proximal Hamstring Avulsions

A Systematic Review and Meta-analysis

Bodendorfer et al

The American Journal of Sports Medicine, Vol. XX, No. X

TABLE 2
Outcomes for Operatively and Nonoperatively Treated Proximal Hamstring Avulsions^a

	Operative	No.	Nonoperative	No.	P Value
Patient satisfaction, %	90.81 ± 9.72	300	52.94	17	<.001
Return to sport or preinjury activity level, %	79.75	553	70.59	17	.363
Strength testing, %	85.01 ± 6.3	376	63.95	10	<.001
Single-legged hop test, cm	119.1 ± 14.12	14	56.62 ± 15.92	21	<.001
LEFS score	72.77 ± 6.55	58	69.53 ± 4.04	28	<.001
SF-12 score	53.15	72	53.3	17	NC

^aData are presented as mean ± SD unless otherwise indicated. No. indicates the sample size of patients reported for the specific outcome analyzed. LEFS, Lower Extremity Functional Scale; NC, not calculable; SF-12, 12-Item Short Form Survey.

- AJSM 2017
 - Superior outcomes in surgical management
 - Complication rate 23.17%

TABLE 3
Complications for Operatively Treated Proximal Hamstring Avulsions^a

	Incidence, %	No.
Rerupture	2.17	16
Reoperation	2.57	19
Infection/wound complications	3.25	24
Neurologic complications	7.99	59
Peri-incisional numbness	5.42	40
DVT/PE	0.68	5
Miscellaneous	1.08	8
Total	23.17	171

Question: Can endoscopic repair
reduce complication risk?



People will put scopes in anything...



Endoscopic Hamstring Repair

- Indications

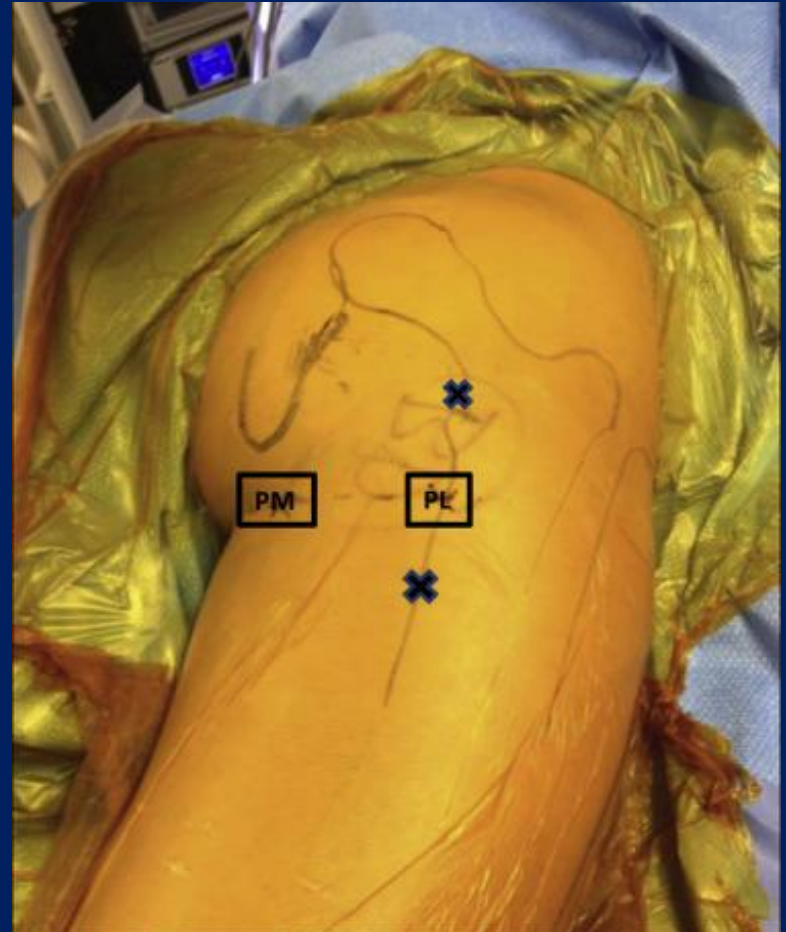
- Partial thickness (type 3) that failed conservative Rx
- Minimally retracted tears (type 4) in young/active
 - May solve controversy of type 4 injuries
- Chronic tendinopathy
- Chronic Ischial Bursitis



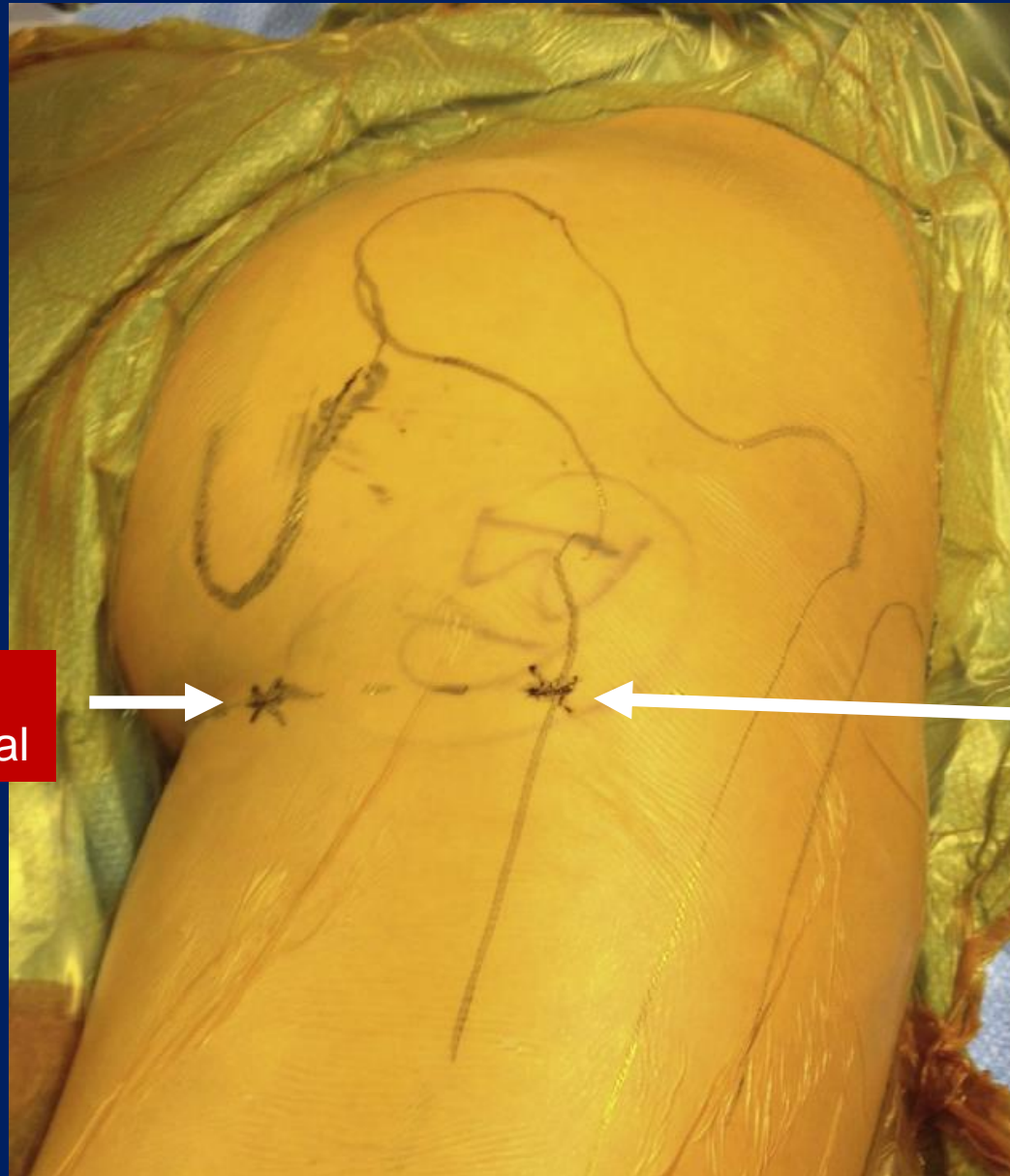
Endoscopic Hamstring Repair

- Concepts

- Exploit space between HS fascia and G-max
- Identify ischial bursa – recommend intraop fluoro
- Identify sciatic nerve – neurolysis if indicated
- Address tendinopathy/tearing



Endoscopic Setup



First Portal
Viewing portal

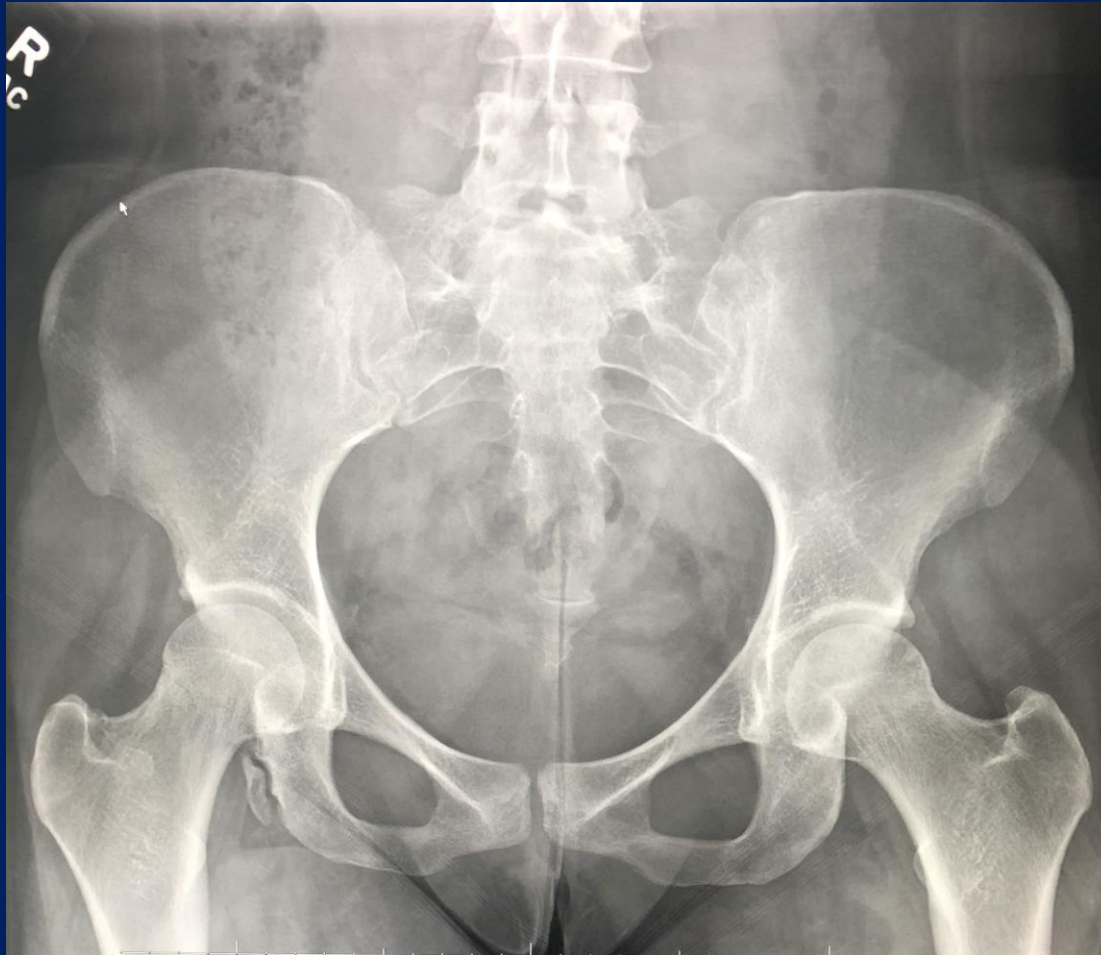
Second Portal
Working portal

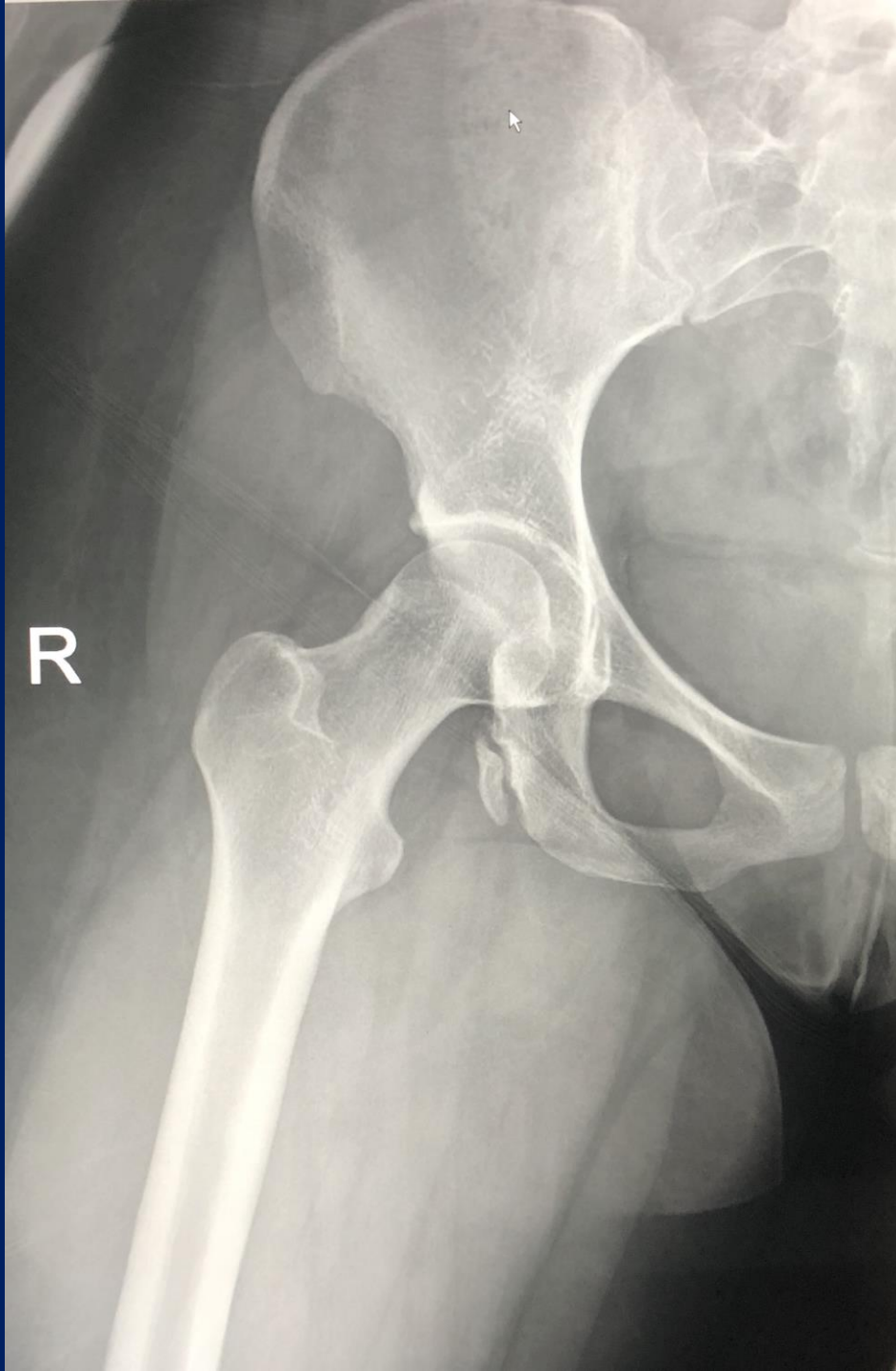
Case Example

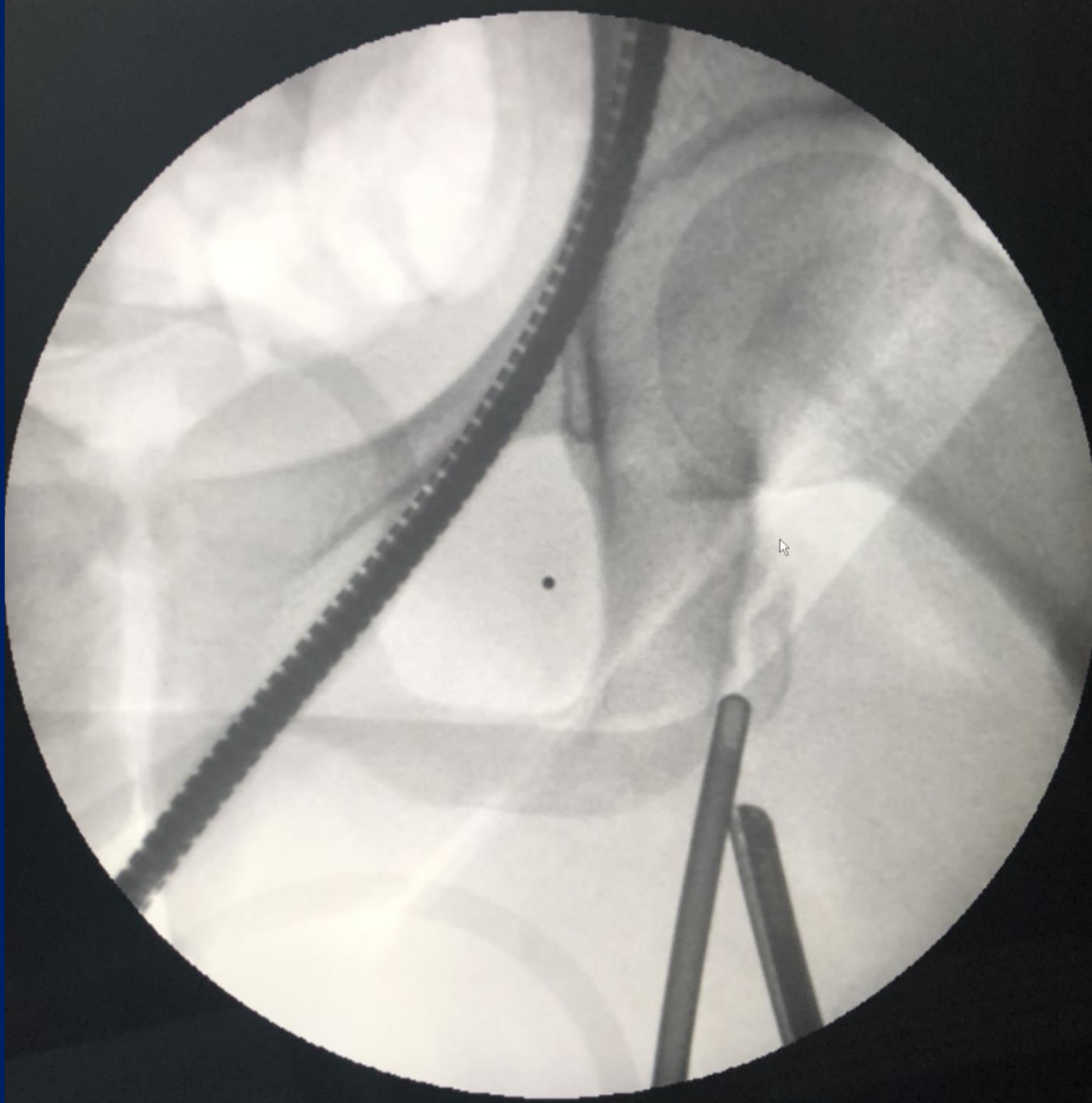
22 yr old female with 2 years of right buttock pain

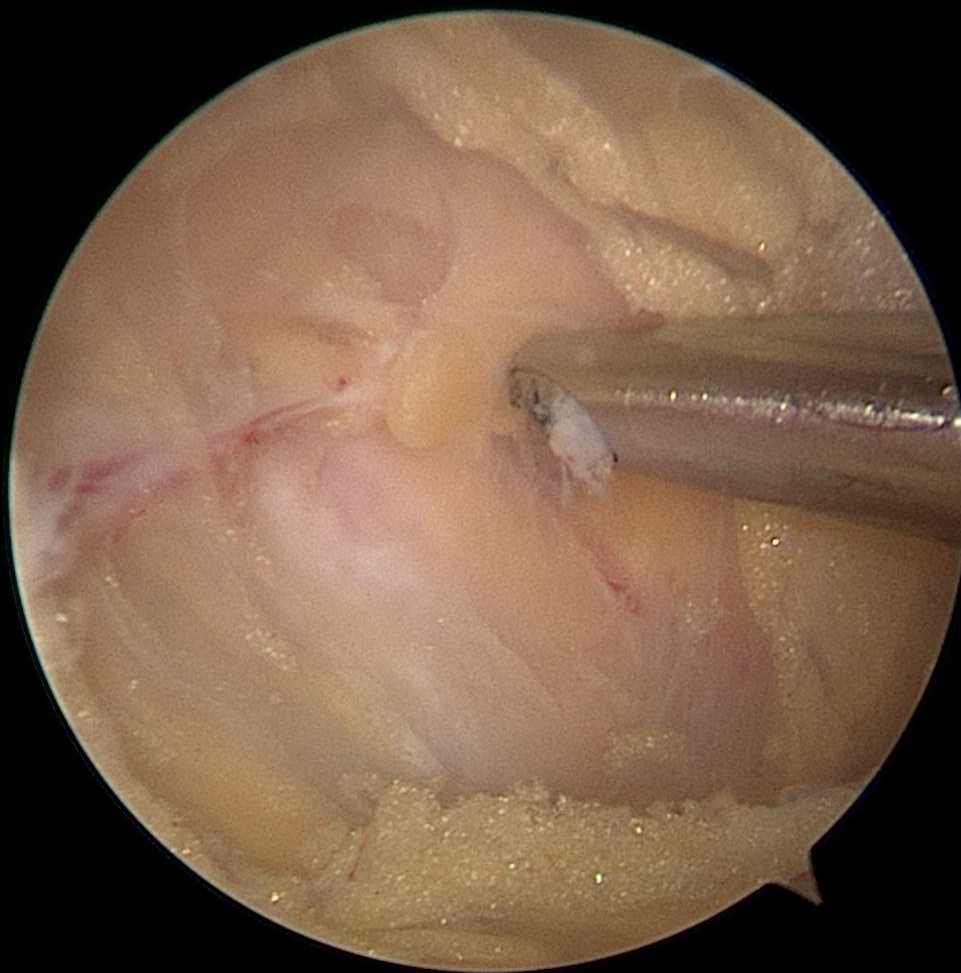
Pain with sitting

Fatigue and cramping with athletic activity









IMAGE¹
HD[®]
KARL STORZ — ENDOSKOPE

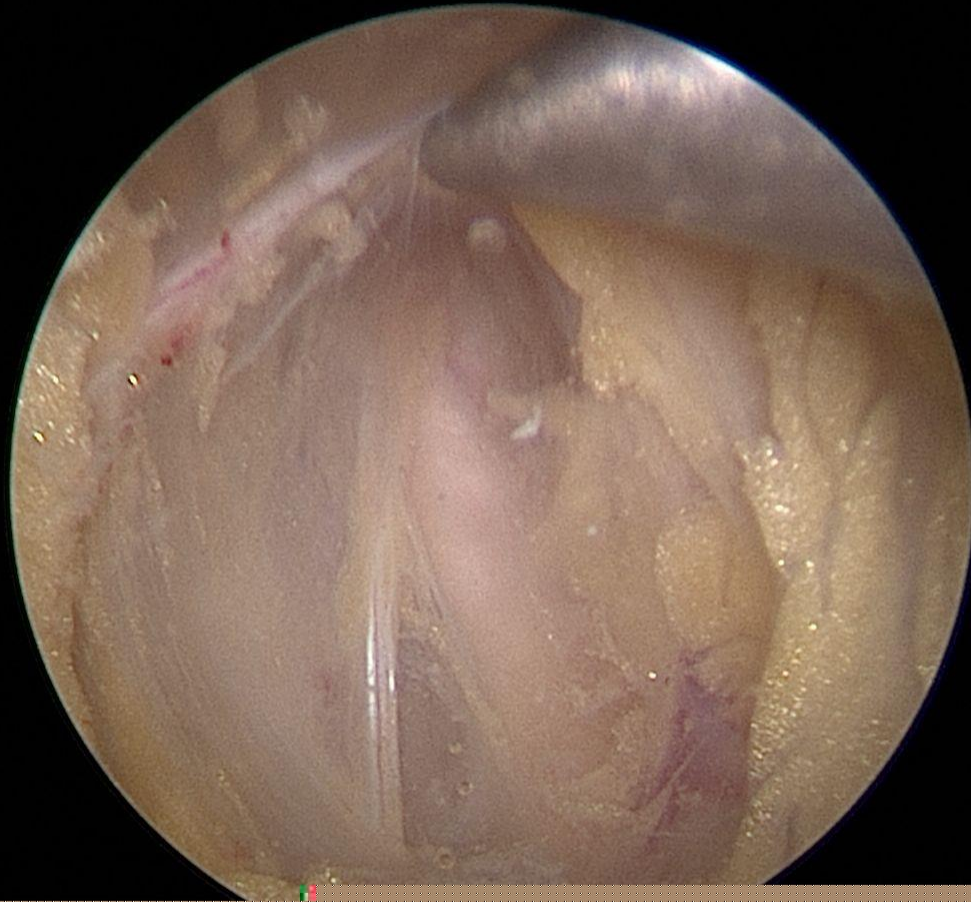
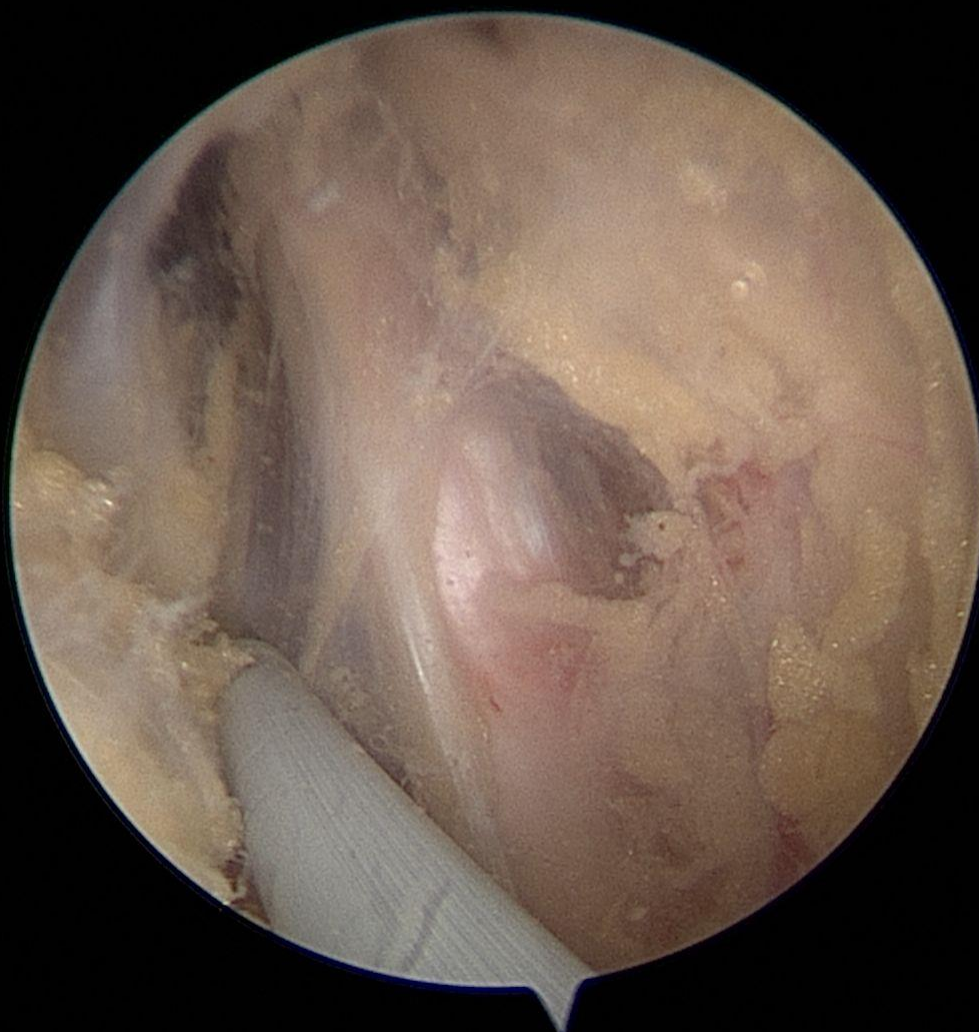


IMAGE 1





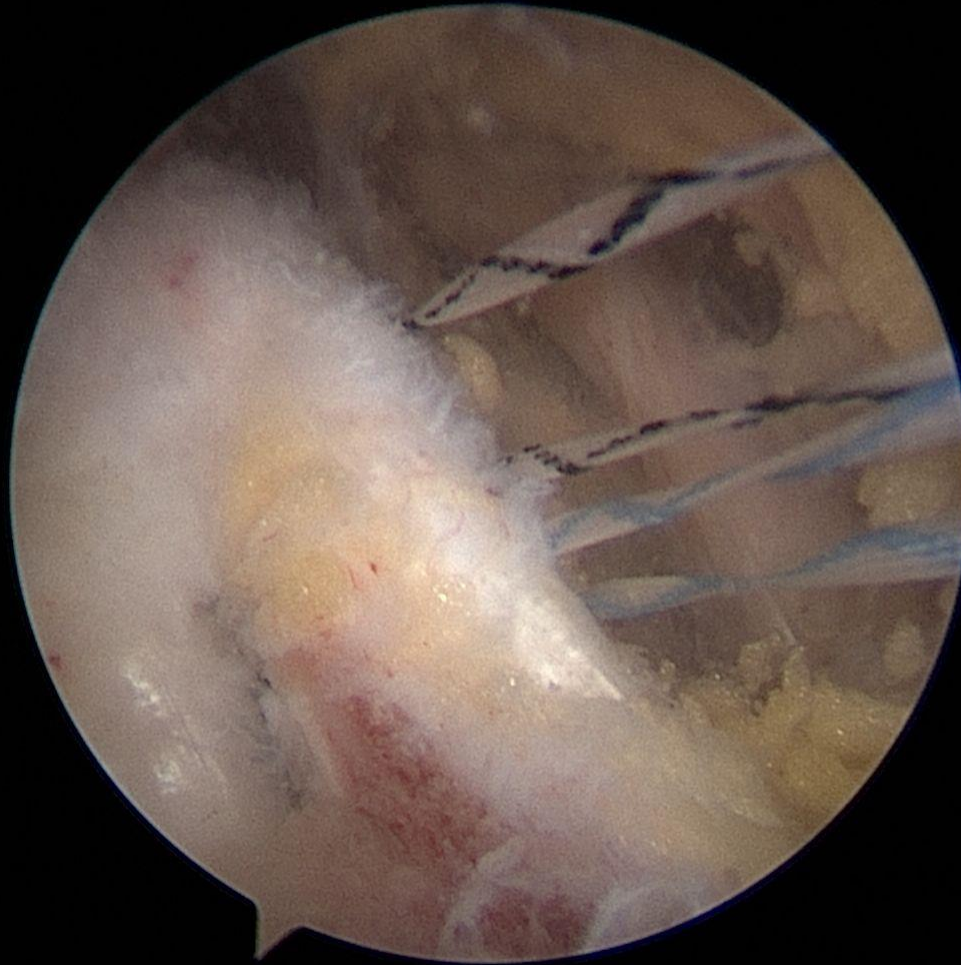
IMAGE¹
HD[®]
KARL STORZ — ENDOSKOPE







IMAGE¹
HD[®]
KARL STORZ — ENDOSKOPE



IMAGE¹
HD[®]
KARL STORZ — ENDOSKOPE



IMAGE¹
HD[®]
KARL STORZ — ENDOSKOPE

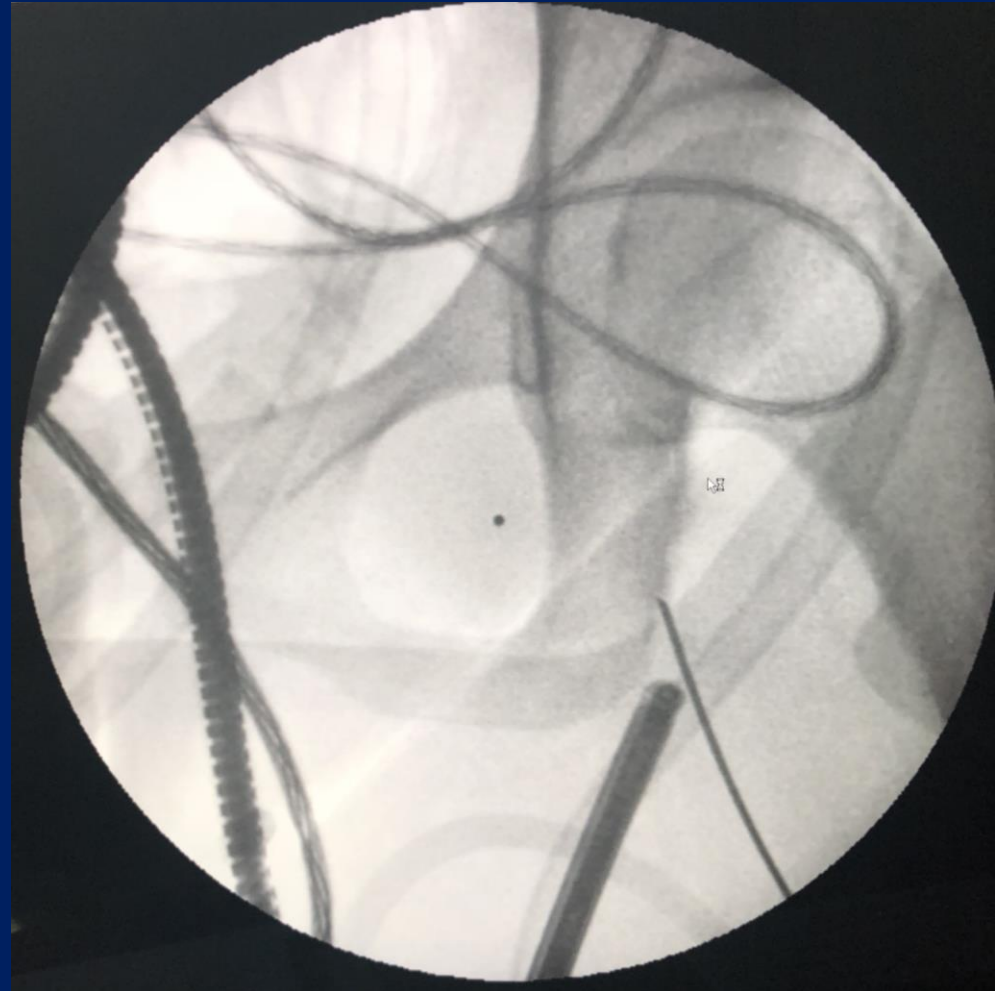
Postoperative Care

- Limit hip flexion to less than 40 degrees
- ASA 325 daily x 4 weeks
- TTWB x 2 weeks
- Progressive increase in WB during first 6 weeks
- Start dynamic training at 8 weeks
- Return to sport when isokinetic strength testing is at 80% of the non-injured side



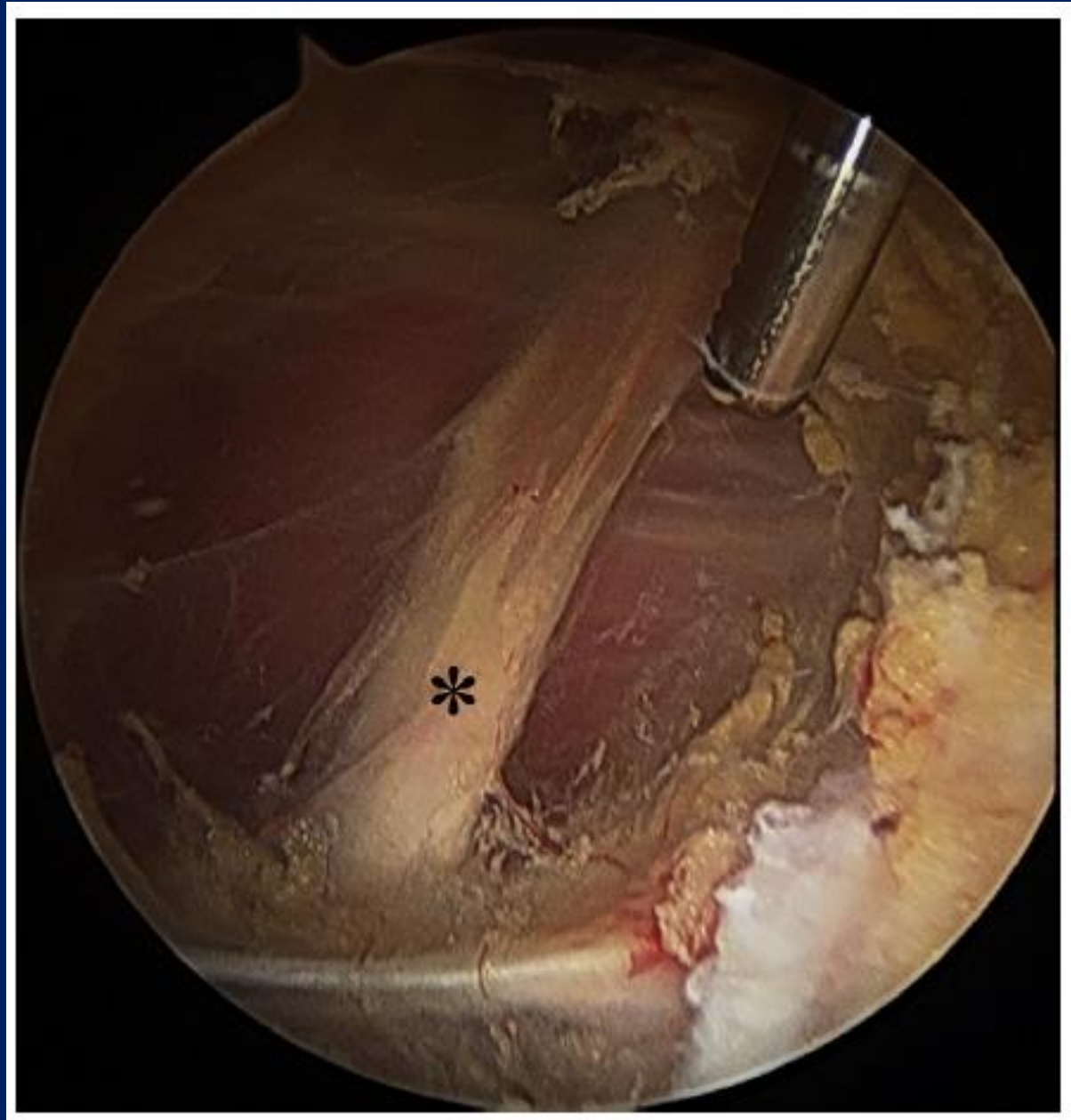
Tips and Pearls

- Use fluoroscopy to establish portals



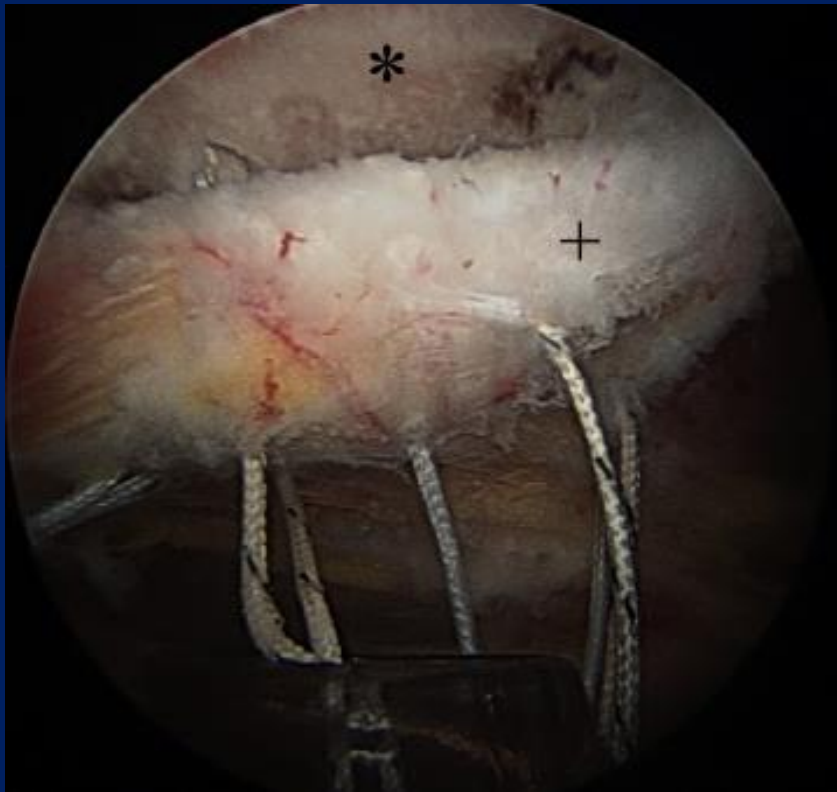
Tips and Pearls

- Find and protect the sciatic nerve



Tips and Pearls

- Suture management
 - Cannulas to avoid soft tissue bridge



Tips and Pearls

- Surgical time
 - Keep minimal to avoid soft tissue swelling



Tips and Pearls

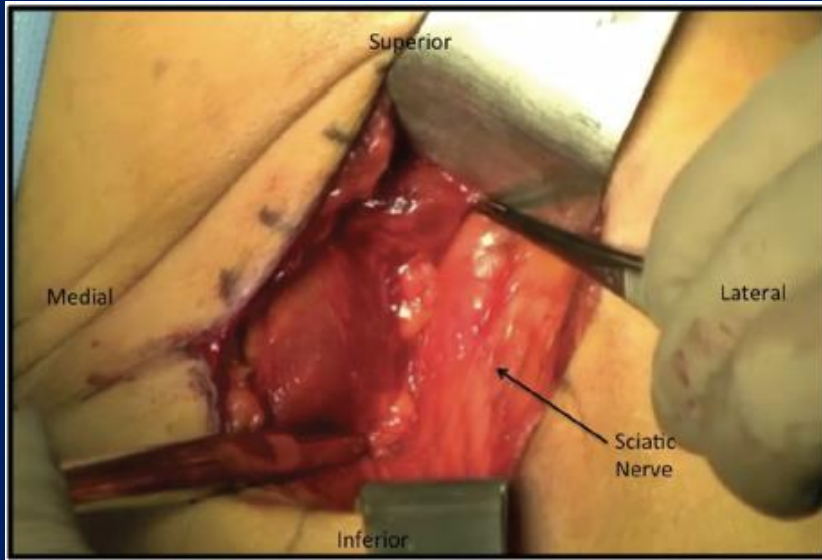
Fluid Pressure

Keep 30-35 mm Hg to avoid extravasation
Epinephrine in the bags



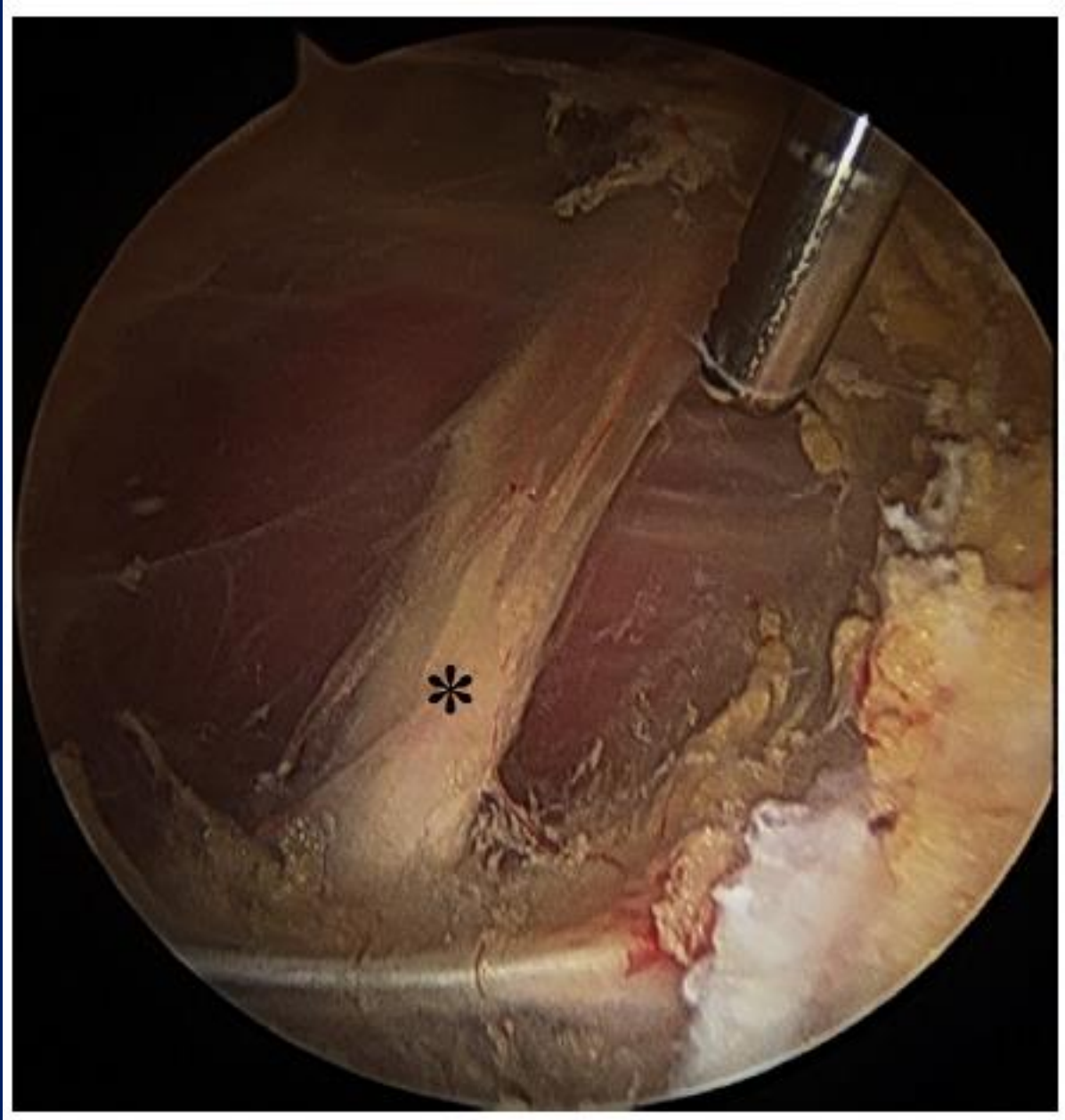
Conclusions

- Endoscopic treatment offers less invasive method to address proximal hamstring pathology



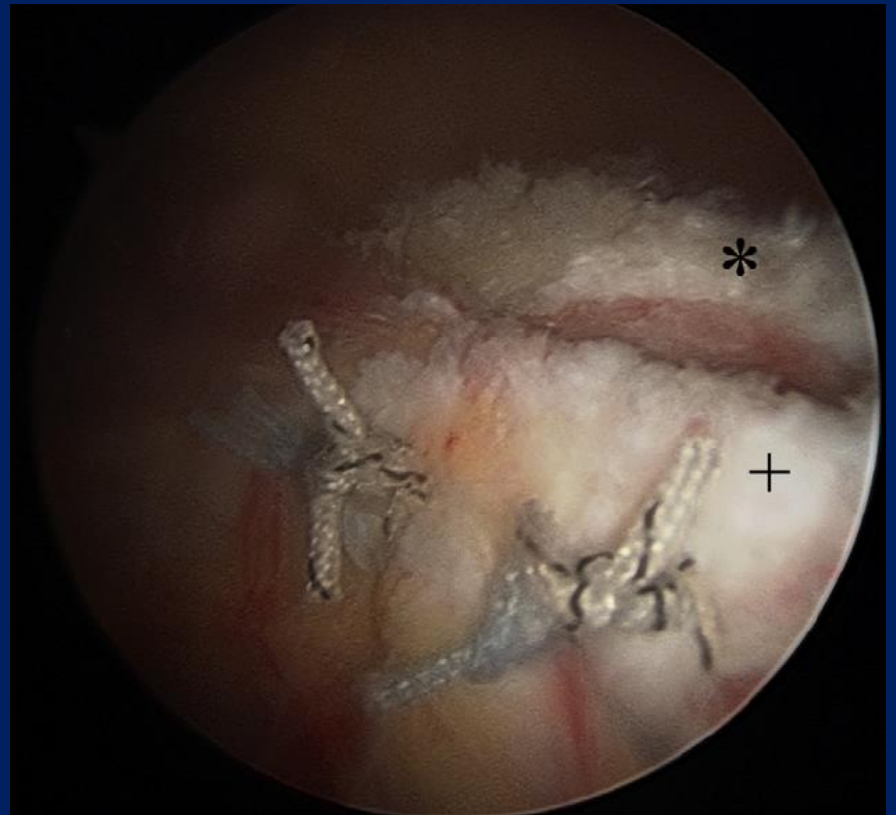
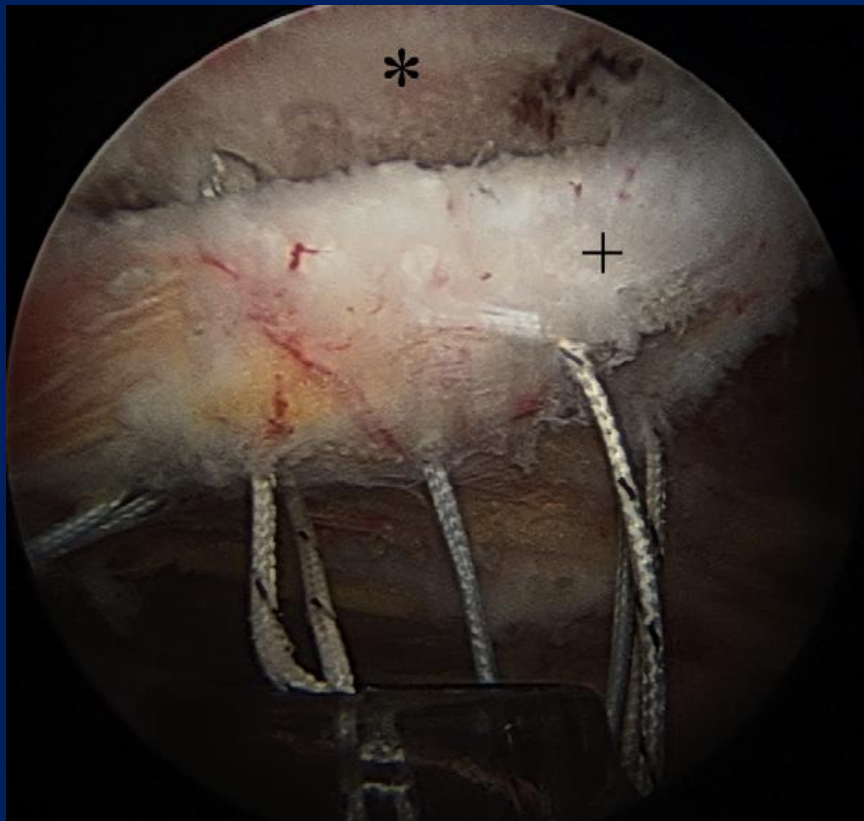
Conclusions

- Allows for improved visualization of the anatomy



Conclusions

- Might decrease perioperative pain and complications
- Might facilitate better repair



Endoscopic Techniques

Technique

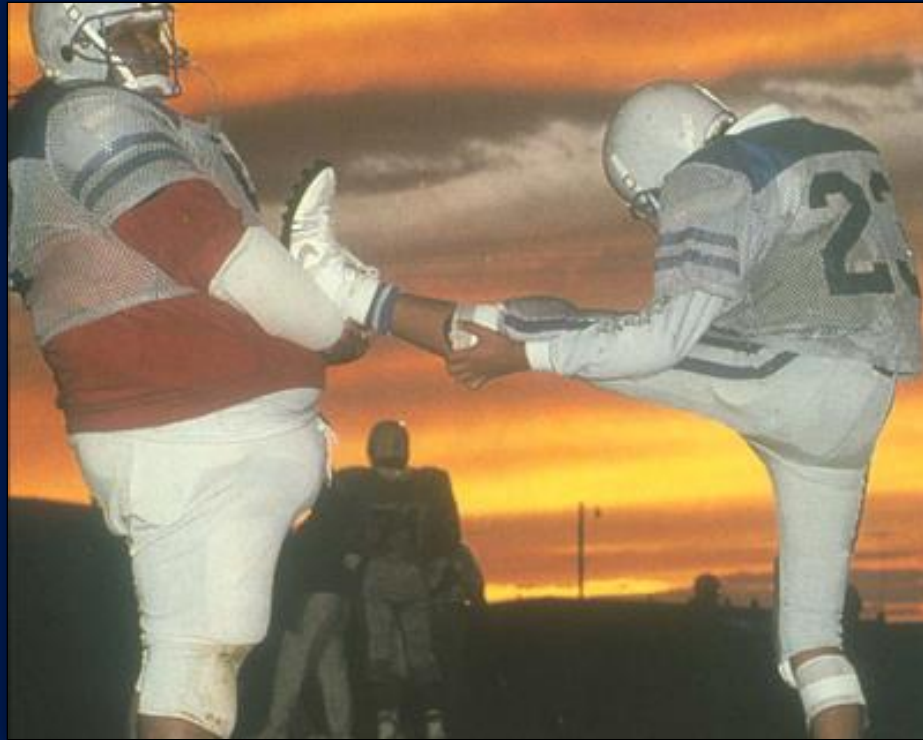
Advantages

- Minimal disruption of normal anatomy
- Evaluation of partial thickness tears
- Superior visualization
- Potentially decreased NV complications
- Decreased bleeding
- Might decrease perioperative pain and complications
- Might facilitate a better repair (better visualization)

Potential Pitfalls

- Injury to NV structures during blind portal placement
- Injury to the sciatic nerve if disoriented to arthroscopic anatomy
- Technical challenges of passing and shuttling sutures for repair
- Increased operative time (early part of learning curve)
- Steep learning curve

Athletic Pubalgia – Sports Hernia



Historical Perspective

- ❖ Sports Hernia is NOT a hernia...
- ❖ Athletic groin injury (**sentinel injury**) that persists and mimics the pain pattern of a traditional inguinal hernia
- ❖ Complaints of exertional pain, lack of explosiveness or inability to sprint & cut
- ❖ Will typically migrate into the lower abdomen and therefore usually misinterpreted as an inguinal hernia
- ❖ Sportsman with hernia-like symptoms
 - ❖ SPORTS HERNIA

Groin Related Injuries

- ❖ Common in pivoting sports
 - ❖ Soccer, football, hockey¹⁸
- ❖ Acute: easier to manage
- ❖ Chronic: diagnostic challenge
 - ❖ Multisystem overlap
 - ❖ GI/GU/GYN/MSK
 - ❖ Utilize consultants & studies
 - ❖ Diagnostic injections can aid

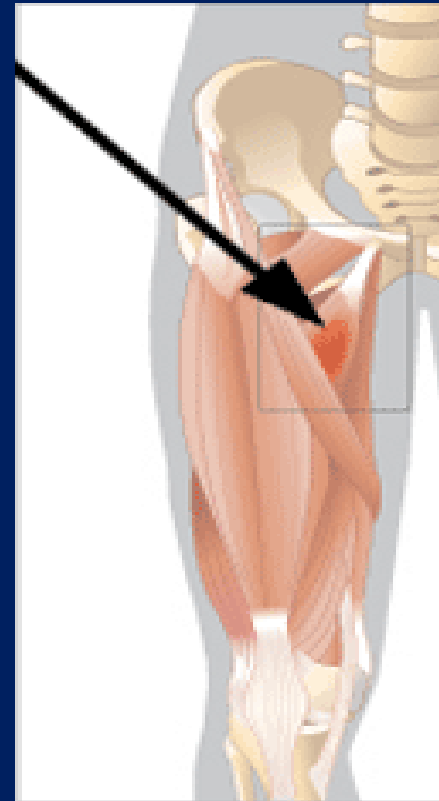


Groups of Groin Disorders

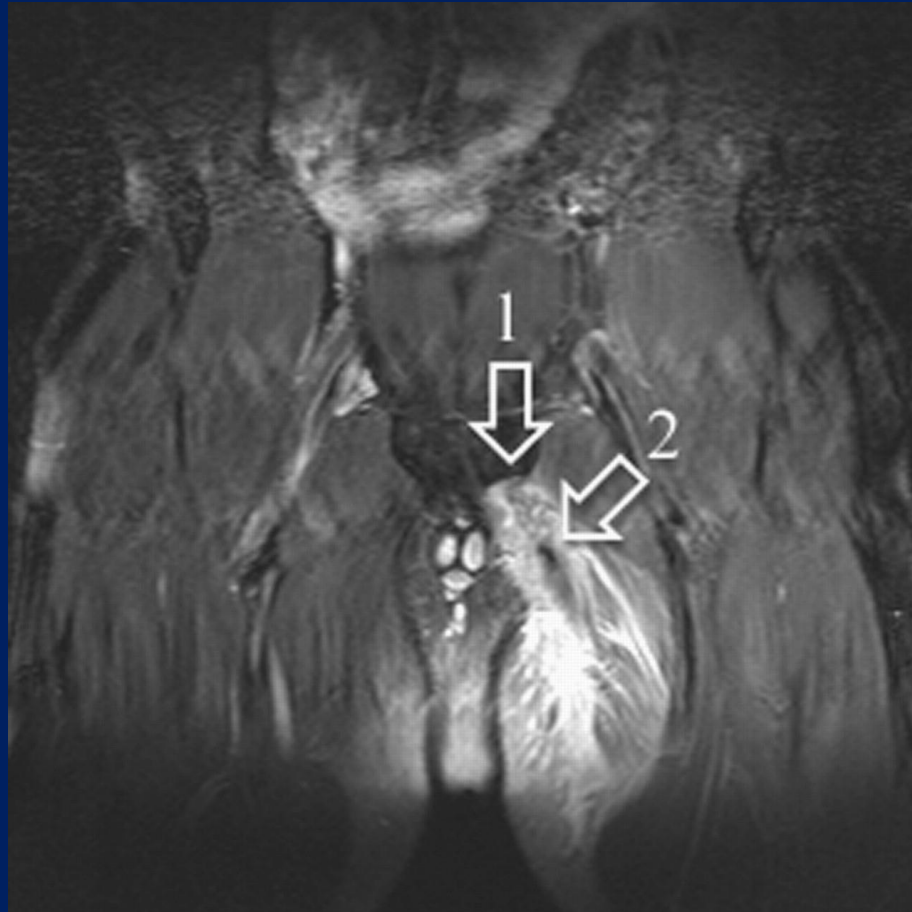
- ① Strains - #1 cause of groin pain
 - Adductor strains
 - Pelvic avulsions
- ② Occult groin injuries – no hard clinical signs
 - Athletic pubalgia/sports hernia
 - Osteitis pubis
- ③ Classic hernias
 - Inguinal hernia with a classic bulge

Adductor injuries

- ❖ Adductor brevis & longus most commonly involved
- ❖ ABD/ER hip against resistance
- ❖ Reproducible pain, usually localized to **MTJ** without pain over the RA or pubis
- ❖ Imaging
 - ❖ X-ray to rule out avulsions
 - ❖ MRI
- ❖ Treatment
 - ❖ Conservative is mainstay
 - ❖ Surgery rarely indicated
 - ❖ Orthobiologics?

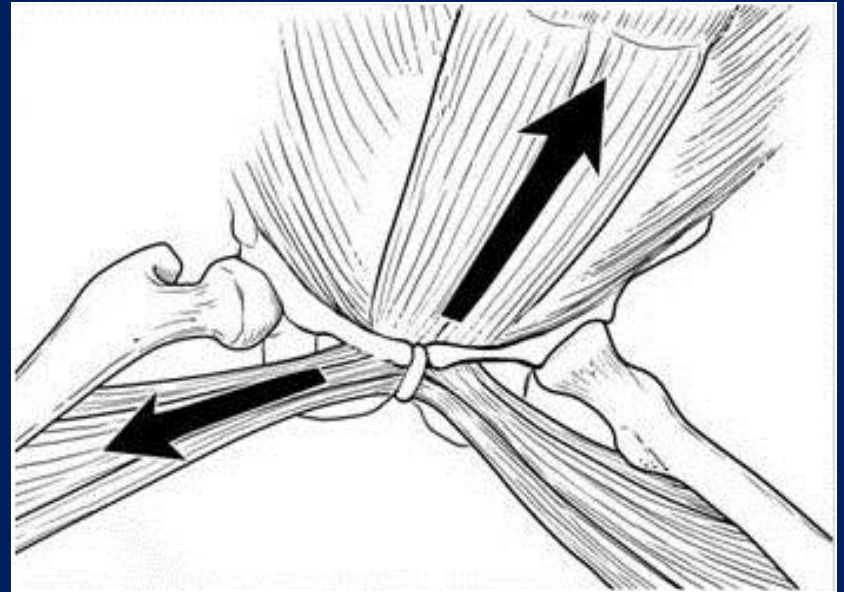


Adductor injuries



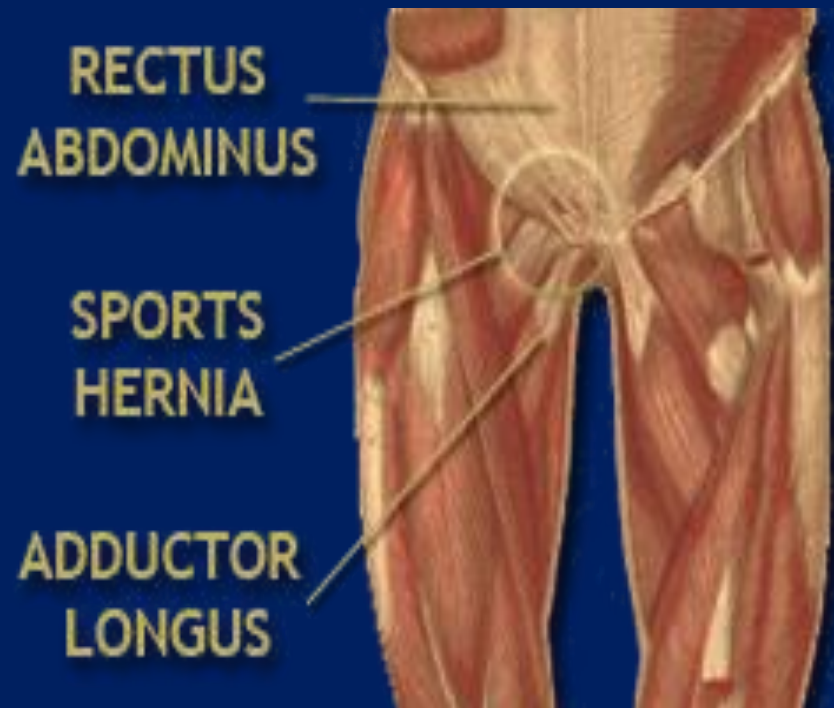
Athletic Pubalgia

- ❖ Injury/strain to:
 - ❖ Posterior inguinal wall
 - ❖ Terminal rectus sheath
 - ❖ Adductor origin
- ❖ Pain distribution
 - ❖ Inguinal region
 - ❖ Lower abdominal area
 - ❖ Adductors
 - ❖ Referred pain
 - ❖ Scrotum
 - ❖ Medial thigh



Athletic Pubalgia

- ❖ Pathophysiology
 - ❖ Repetitive, unsustainable loads on terminal abdominal insertions & adductor origin
 - ❖ Hip abduction & extension
 - ❖ Imbalance between rectus & adductor attachments
 - ❖ Reduced hip ROM (common with FAI) compensated by increased pelvic motion resulting in increased stress on pelvic stabilizers



Athletic Pubalgia

❖ History

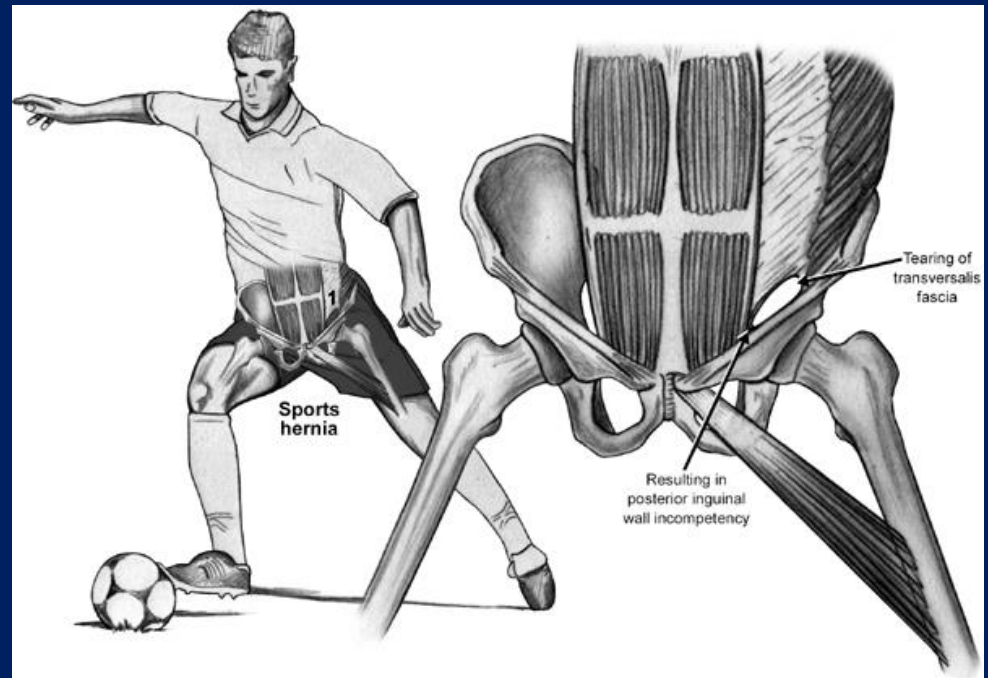
- ❖ Exertional pain
- ❖ Lack of explosiveness
- ❖ Inability to sprint & cut

❖ Exam findings

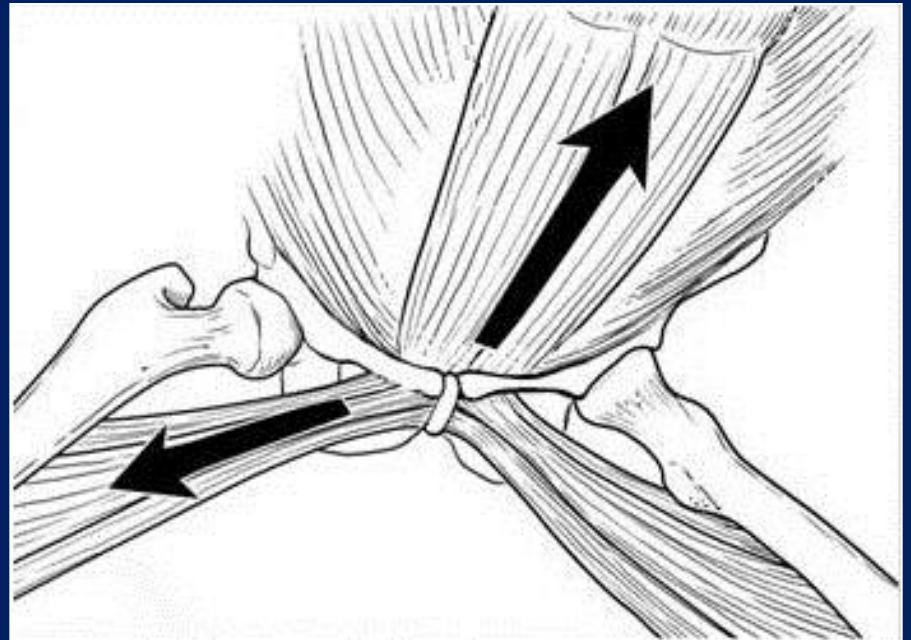
- ❖ Localized tenderness over the **pubis and tendon attachments**
- ❖ Pain with resisted sit-ups and hip adduction
- ❖ At times, difficult to reproduce on exam...

❖ Imaging

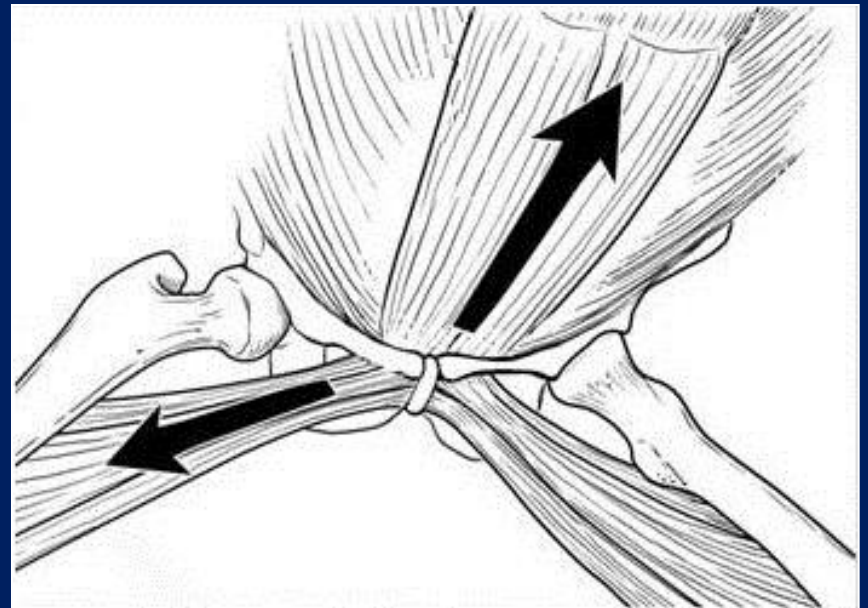
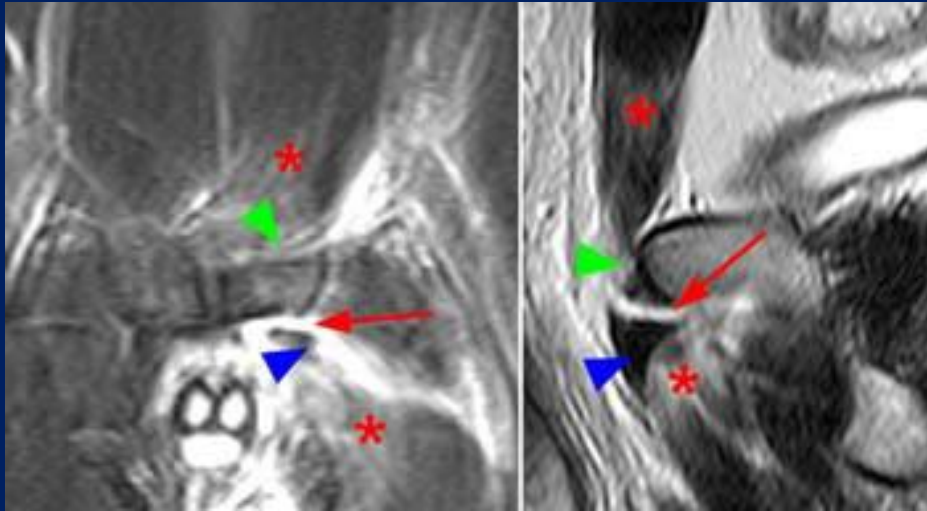
- ❖ MRI with oblique axial cuts



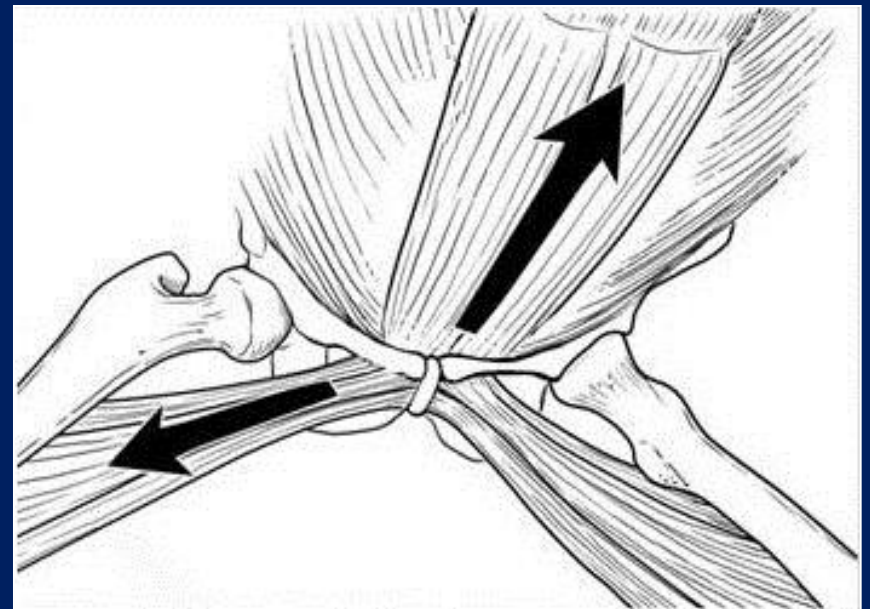
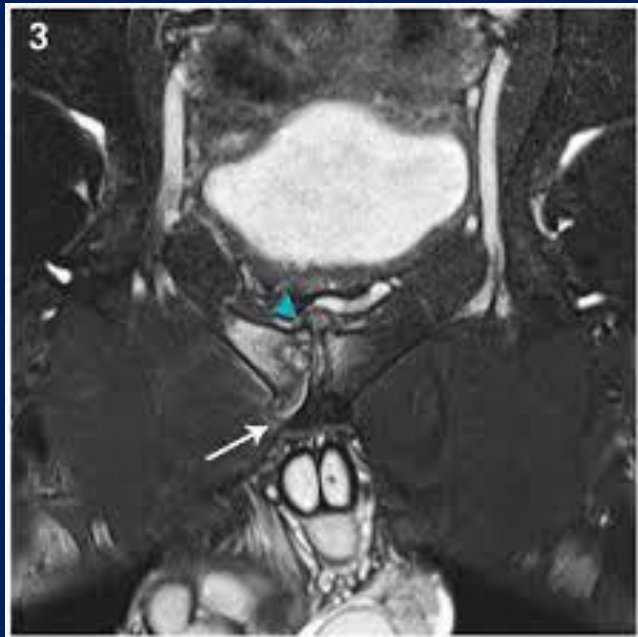
Athletic Pubalgia



Athletic Pubalgia

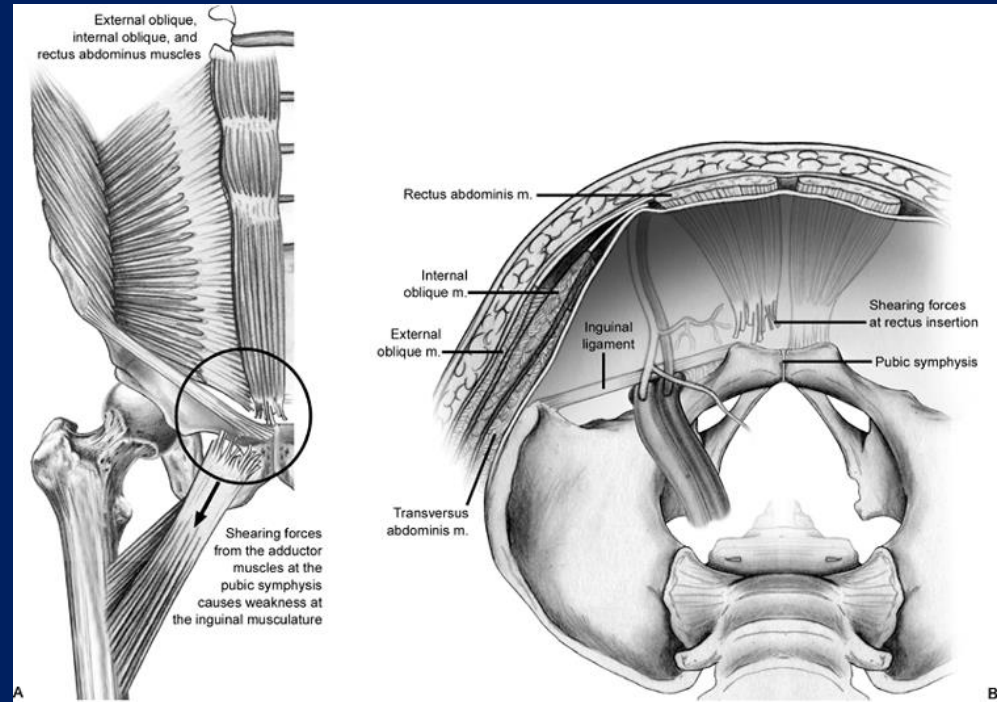


Athletic Pubalgia



Athletic Pubalgia

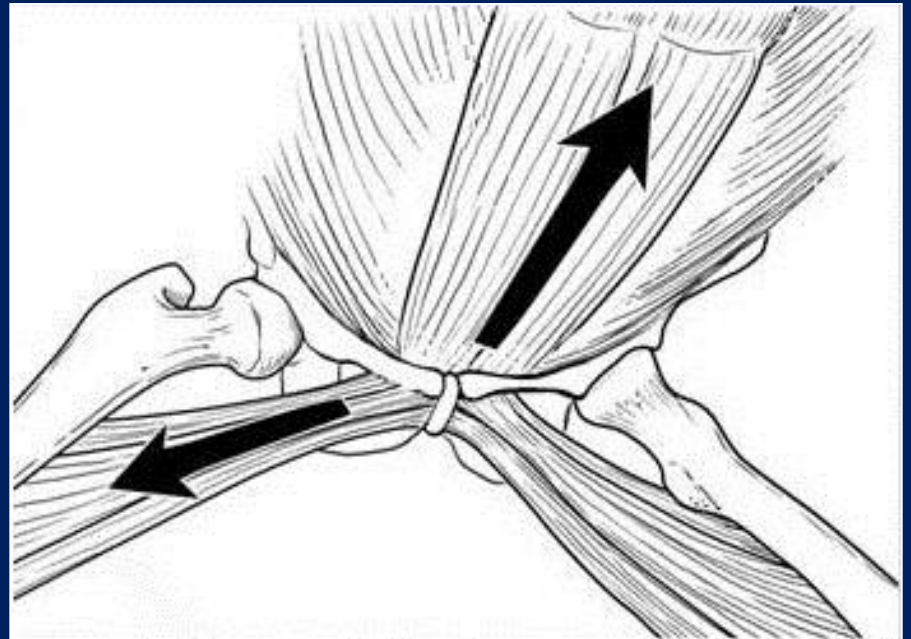
- ❖ Treatment
 - ❖ NSAIDS...Indocin SR
 - ❖ Active rest
 - ❖ Core training & flexibility
 - ❖ Injections +/- biologics
 - ❖ In office vs. sedation
 - ❖ Surgery in elite athletes
 - ❖ Mini-open, no mesh
 - ❖ Restore tension
 - Recovery weeks to months



Athletic Pubalgia

- ❖ Special considerations

- ❖ Do not overlook concomitant pathology
 - ❖ FAI
 - ❖ Labral tear in hip
- ❖ Use caution in females
 - ❖ Endometriosis
 - ❖ Ovarian cysts
- ❖ Question diagnosis in the non-elite athlete



Conclusions

- Hip injuries in sports are common...with increasing frequency
- Evaluation of the hip & groin is not so hard
 - Requires an understanding of the anatomy & pathomechanics
- Different problems may have similar appearances and may coexist...such as concomitant FAI and athletic pubalgia
- Conservative treatment remains mainstay
 - Effective surgical techniques have been developed
- Arthroscopy has greatly enhanced our understanding of hip joint pathology
 - And forced our understanding of other associated disorders
- Specific sport and position may affect degree of symptoms and timing of treatment
- Biologics are playing an increasing role in treatment, but more research is needed

Thank You!



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