



NECOEM Annual Meeting 2018

Femoroacetabular impingement (FAI) and hip arthroscopy



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Disclosures

I (and/or my co-authors) have something to disclose.

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Overview

- Femoroacetabular impingement
- Hip arthroscopy
 - Set up
 - Portals
 - Techniques





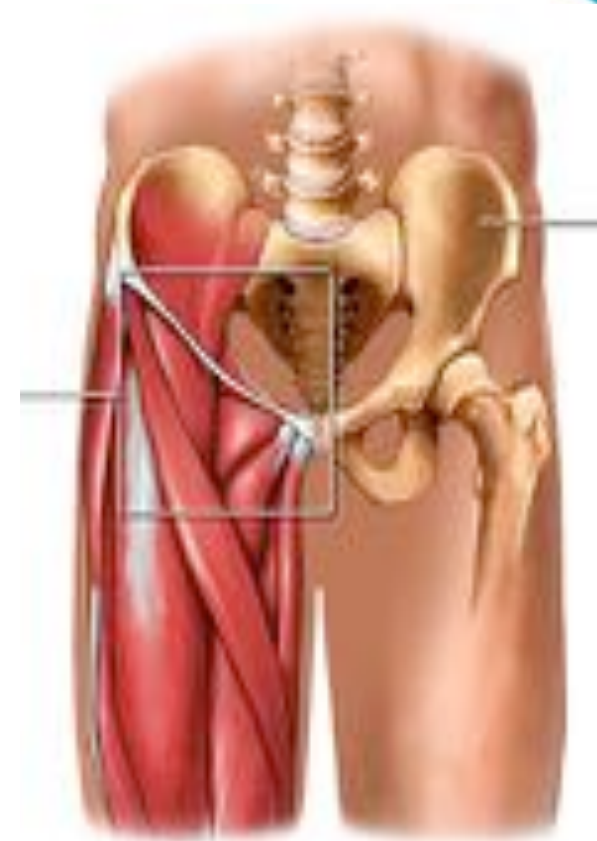
Causes of Hip and Groin Pain

• *Burnett, Clohisy et al. JBJS 2006*

• *Average time from injury to accurate diagnosis 21 months*

• *Average of 3.3 providers seen before definitive treatment*

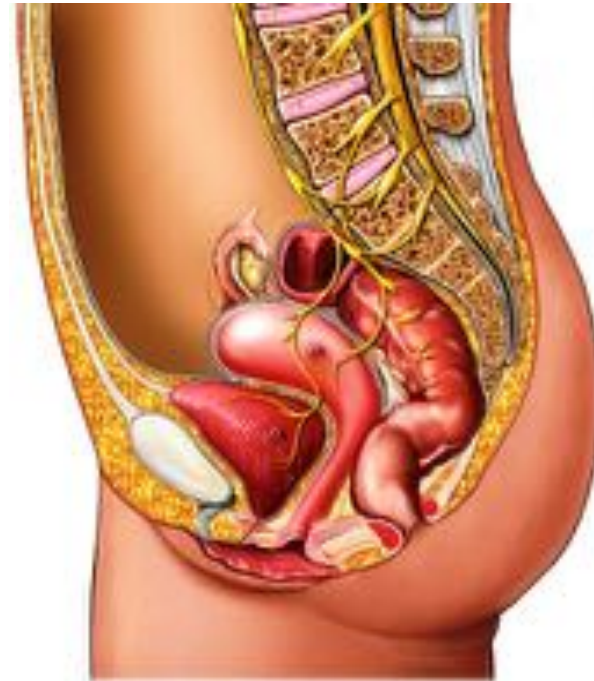
- Anterior Hip Pain
 - Muscle strains
 - Contusion (hip pointer)
 - Avulsions and apophyseal injuries
 - Hip dislocation/subluxation
 - Acetabular labral tears and loose bodies
 - Proximal femur fractures
 - Osteitis pubis
 - Iliopsoas bursitis
 - Stress syndrome
 - SCFE
 - Perthes disease
 - Developmental dysplasia
 - Osteoarthritis
 - Inflammatory Arthritis
 - Avascular Necrosis
 - Femoro-acetabular Impingement
- Lateral Hip Pain:
 - Greater trochanteric bursitis
 - Gluteus medius/minimus tear
 - ITB syndrome
 - Meralgia paresthetica





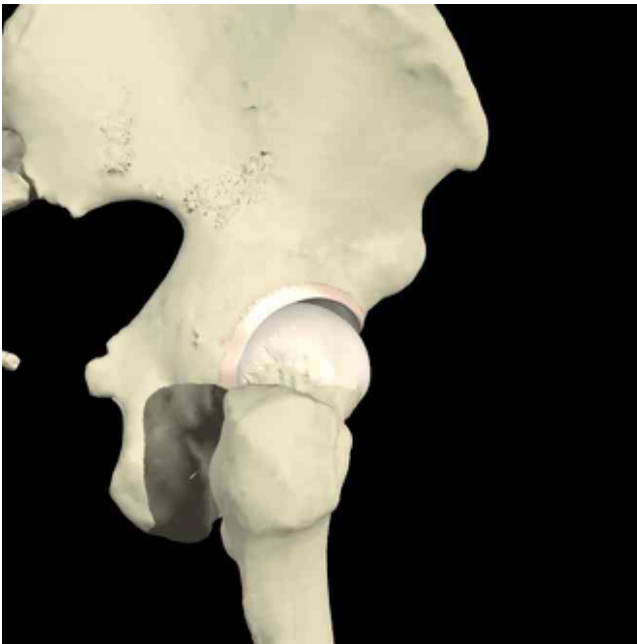
Causes of Hip Pain

- 5 main sources:
 - GI
 - Athletic pubalgia, inguinal hernias*, appendicitis
 - GU
 - Kidney stone, nephritis
 - Gyn
 - Ovarian cysts, PID, pregnancy
 - Neurological
 - Musculoskeletal
 - Psychological





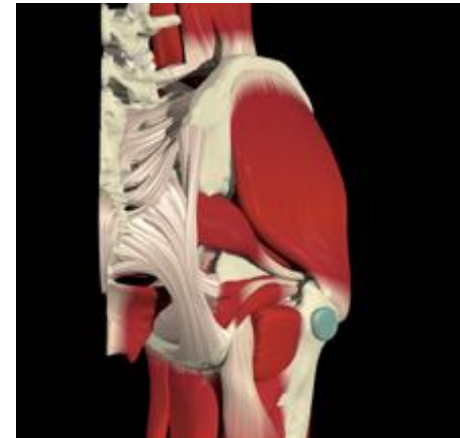
Layered Anatomical Approach to the Hip



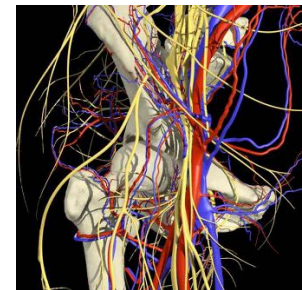
Osteochondral Layer
Mechanics of joint



Dynamic Layer



Neural Layer





Diagnostic work-up

- History
- Physical
- Plain radiographs
 - Pelvis AP
 - Hip false profile
 - Dunn lateral
- Image guided intra-articular injection
- MRI/MRA
- CT



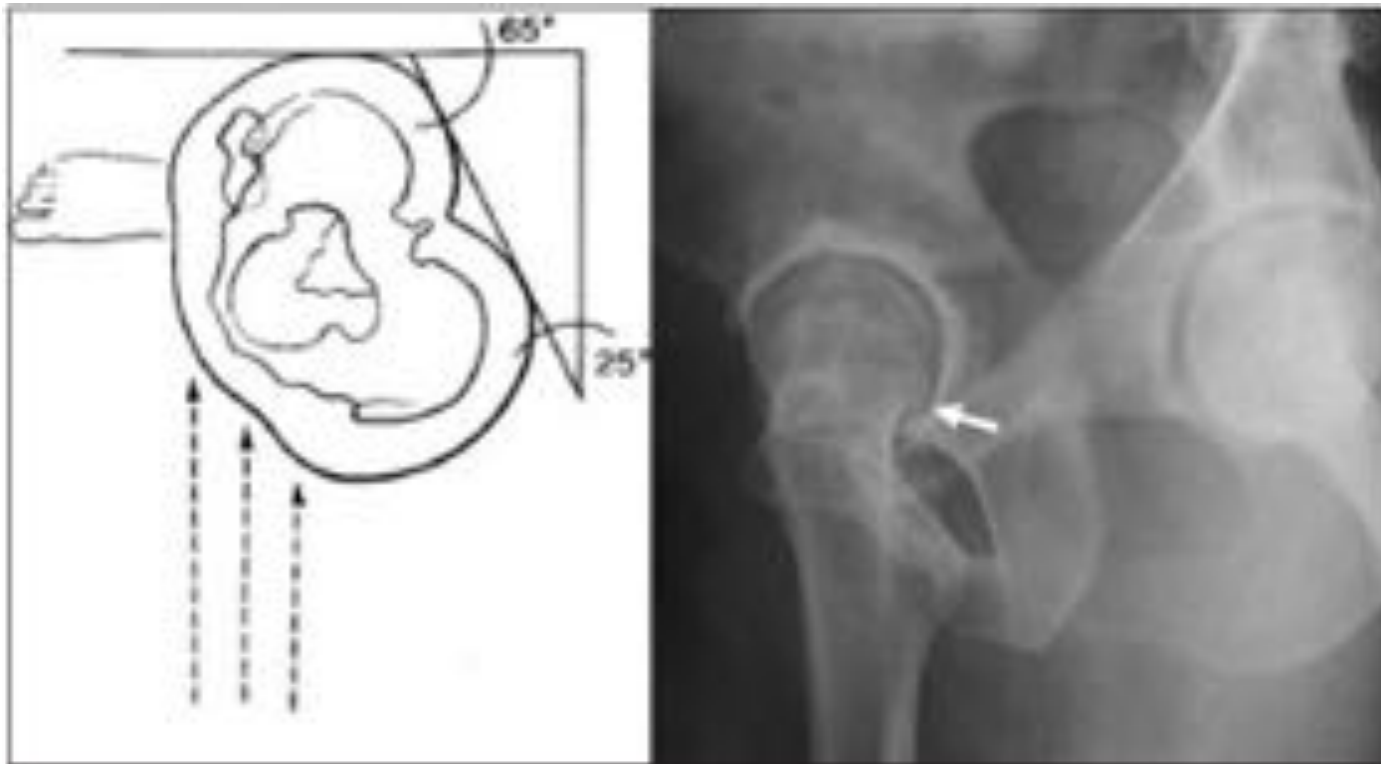
Imaging Analysis





Imaging Studies

- Hip false profile





Imaging Studies

- Dunn lateral view





Injections

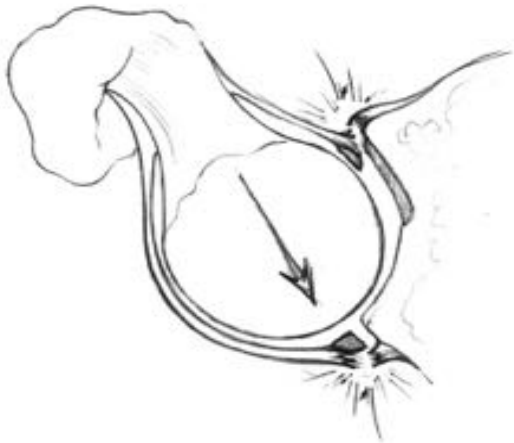
- Intra-articular injection
- Positive Test
 - 90% accuracy of determining intra-articular etiology of hip pain
- Patients with intra-articular pathology have improved outcomes with arthroscopy
- Selective Injections
 - Iliopsoas bursa
 - Peritrochanteric space
 - Adductors / Athletic Pubalgia
 - SI joint, Spine

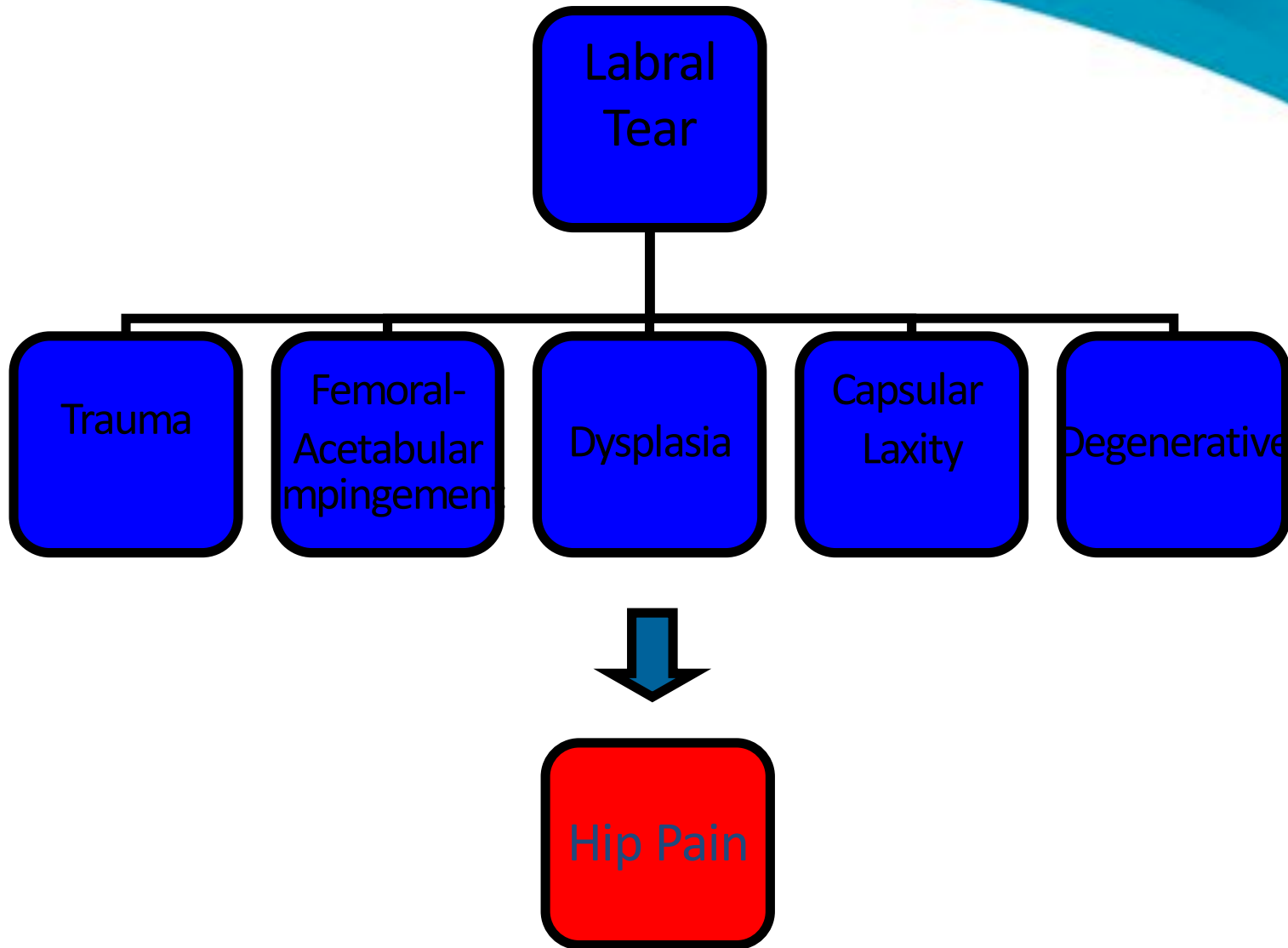




Labral Tears – 10 years ago...

- Etiology – trauma, twisting, instability, dysplasia, degenerative
- Treatment – labral **debridement** vs. repair vs. reconstruction



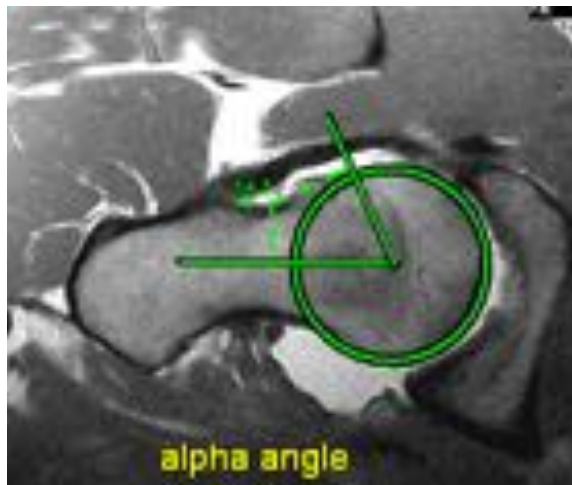




Hip Arthroscopy for Labral Tears

Failure to address bony impingement lesions of the hip are key factors in unsuccessful hip arthroscopy.

- Philippon et al, *Revision Hip Arthroscopy*, AJSM, Vol. 35, No. 11;1918-21, 2007
- Heyworth et al, *Radiologic and Intraoperative Findings in Revision Hip Arthroscopy*, Arthroscopy, Vol 23, No 12;1295-1302, 2007.





Femoroacetabular Impingement

A Cause for Osteoarthritis of the Hip

Reinhold Ganz, MD; Javad Parvizi, MD**; Martin Beck, MD*;
Michael Leunig, MD*; Hubert Nötzli, MD*; and Klaus A. Siebenrock, MD**

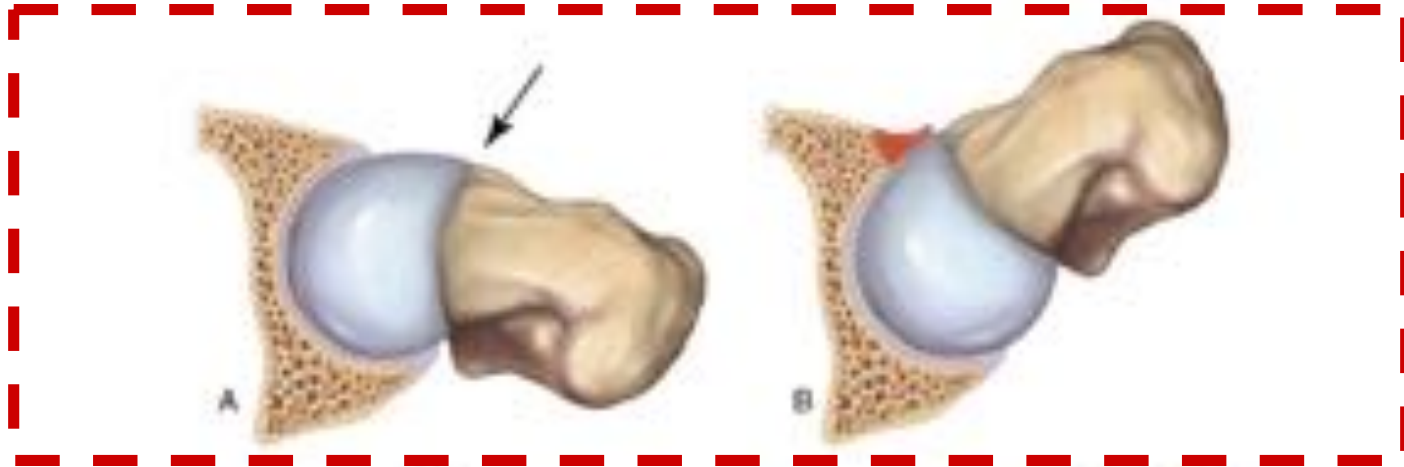
- Femoroacetabular impingement (FAI) occurs when the femoral neck and acetabular rim abut at the extremes of motion due to deformity of the femoral neck (CAM), acetabulum (pincer), or both
- FAI leads to early OA
- Up to **70-90%** of ALL hip arthritis cases are thought to be caused by FAI or hip dysplasia
- Can surgery for FAI delay or prevent the progression of OA?



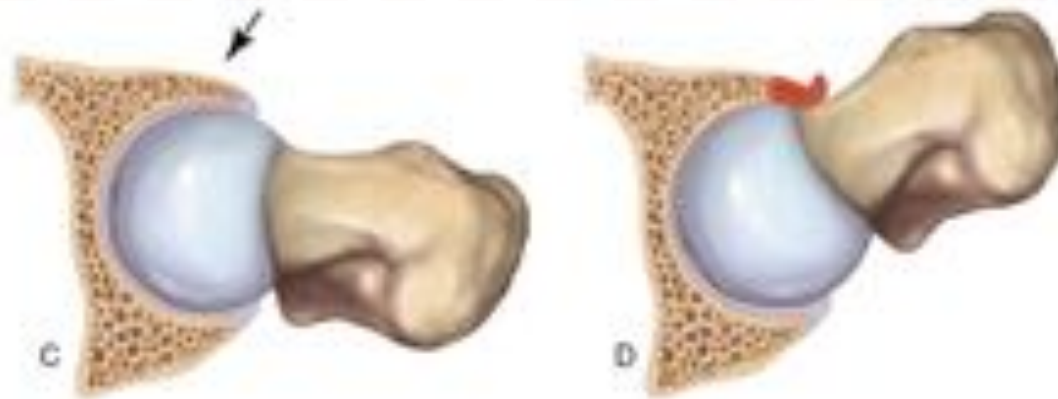


Femoroacetabular Impingement

CAM



Pincer





Femoroacetabular Impingement

CAM



Pincer





Acetabular causes of FAI

Overcoverage

Local

Retroversion

Global

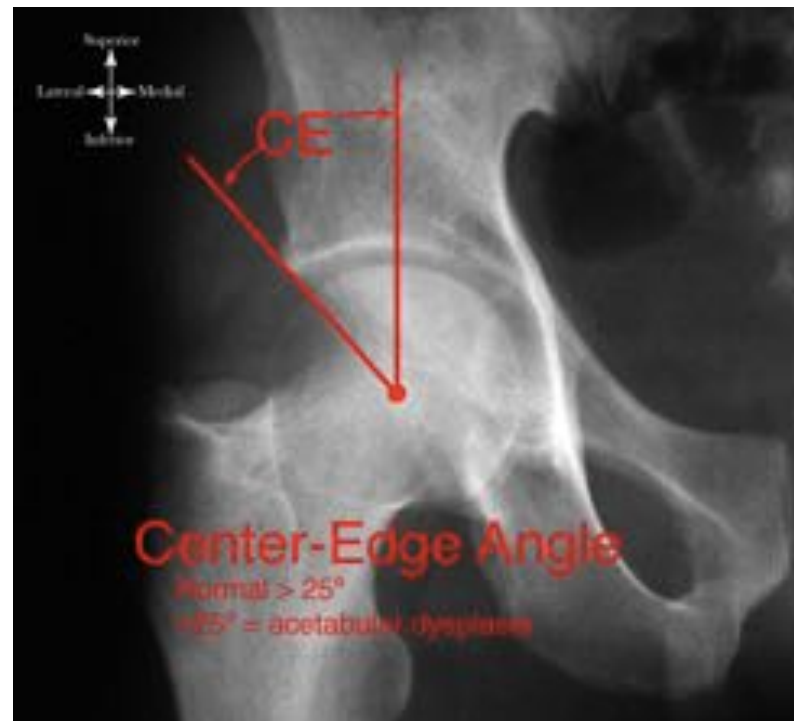
Coxa profunda

Protrusio acetabuli



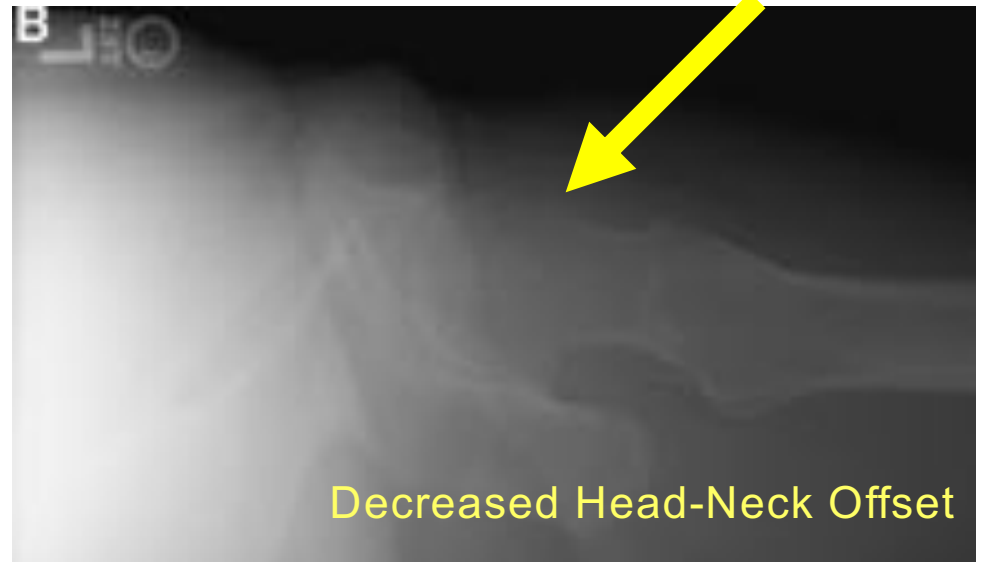
Global: Acetabular Coverage

- Lateral Center Edge Angle (<25 dysplasia, >39 pincer)





Femoral Assessment for Cam Type FAI



Decreased Head-Neck Offset



Femoroacetabular Impingement: CAM Type

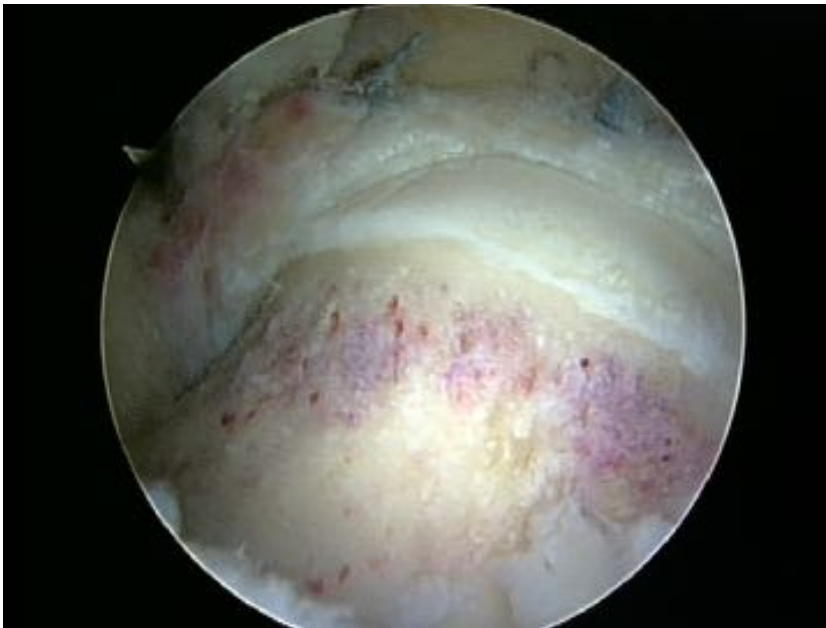
- CAM: loss of femoral head sphericity
- Alpha angles
 - Normal < 45 degrees
 - >50° = predisposes to CAM FAI
 - >60° = articular cartilage lesions
 - >70° = full thickness cartilage lesions





Open versus Arthroscopy

- Arthroscopic osteochondropasty of the femoral neck is technically safe and can adequately be performed.
- In accuracy and precision it approaches the gold standard open technique.

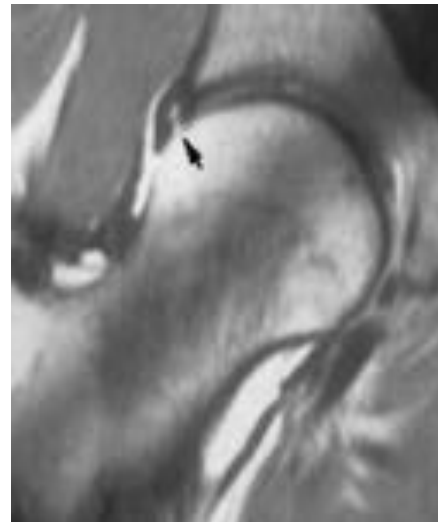




MRI and MRA

Is there a difference between MRI or MRA?

- MRI Arthrogram:
 - Labral tears
 - Articular cartilage lesions
 - Herniation pits
 - Sensitive + Specific for Labral and Chondral Lesions





CT Scan

- Detailed bony anatomy
- Femoral head-neck junction
- Acetabular architecture





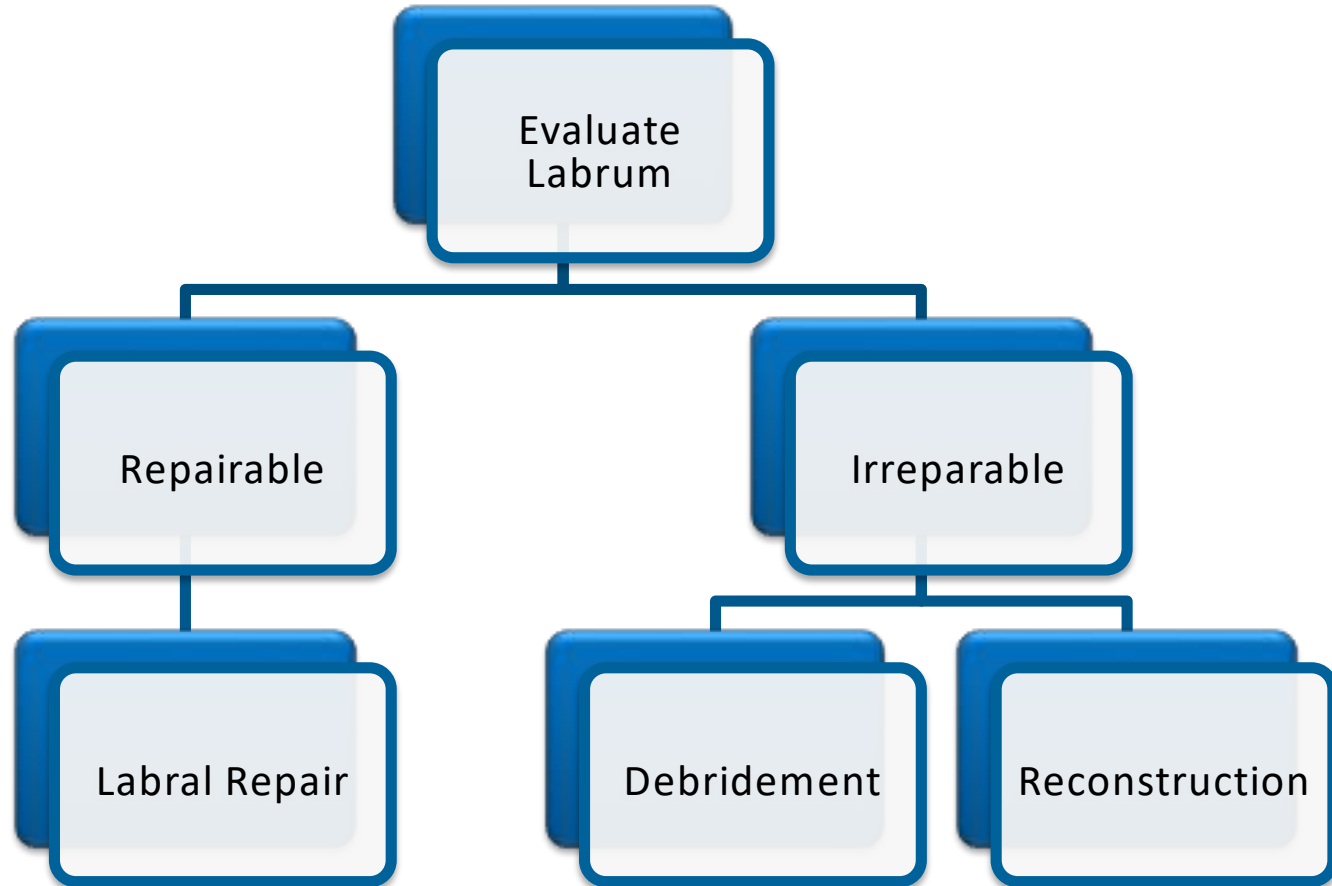
Labral Treatment Options

- Arthroscopic Options for treatment of Labral Tears
 - **Debridement**: Cut torn tissue out
 - **Repair**: Repair native torn labral tissue
 - **Reconstruction**: Excise torn labrum and replace with graft
- Main question: Is the labrum repairable???





Labral Treatment Algorithm





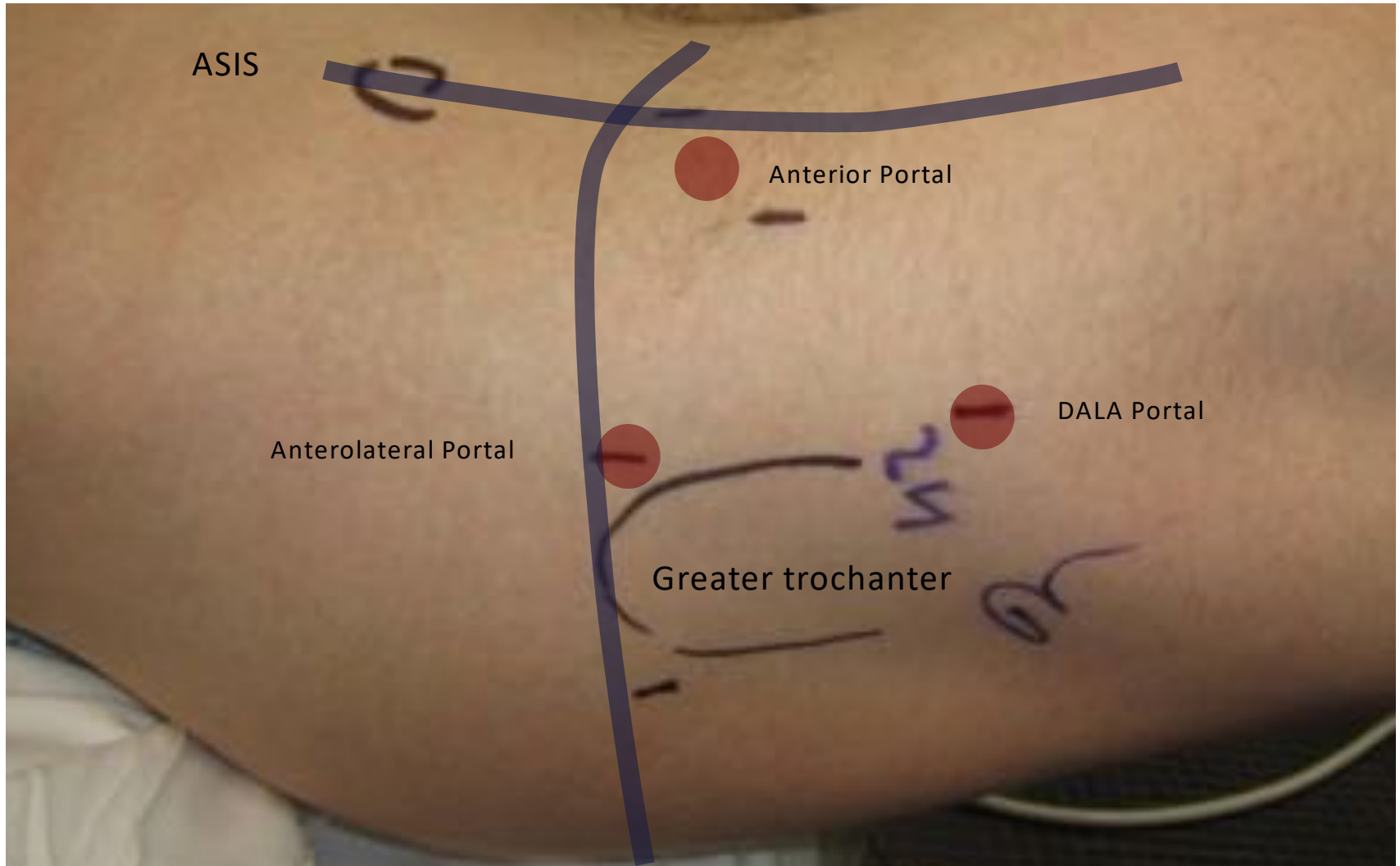
Arthroscopic OR Set-Up

- Hip Traction
 - Limit to 2 hrs
- Perineal Post & Padded Boots
- Fluoroscopy



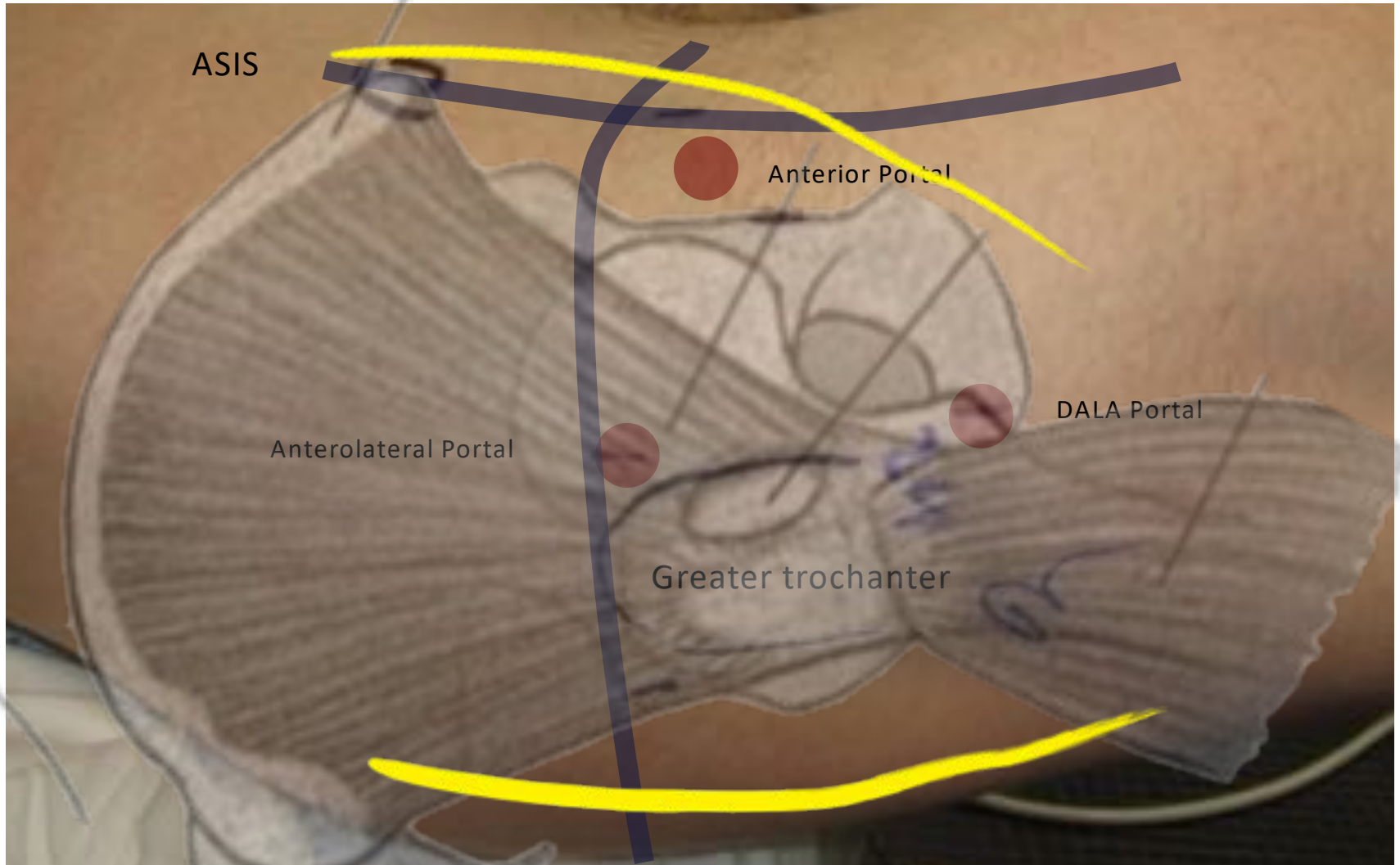


Hip Arthroscopy Portals





Hip Arthroscopy Portals



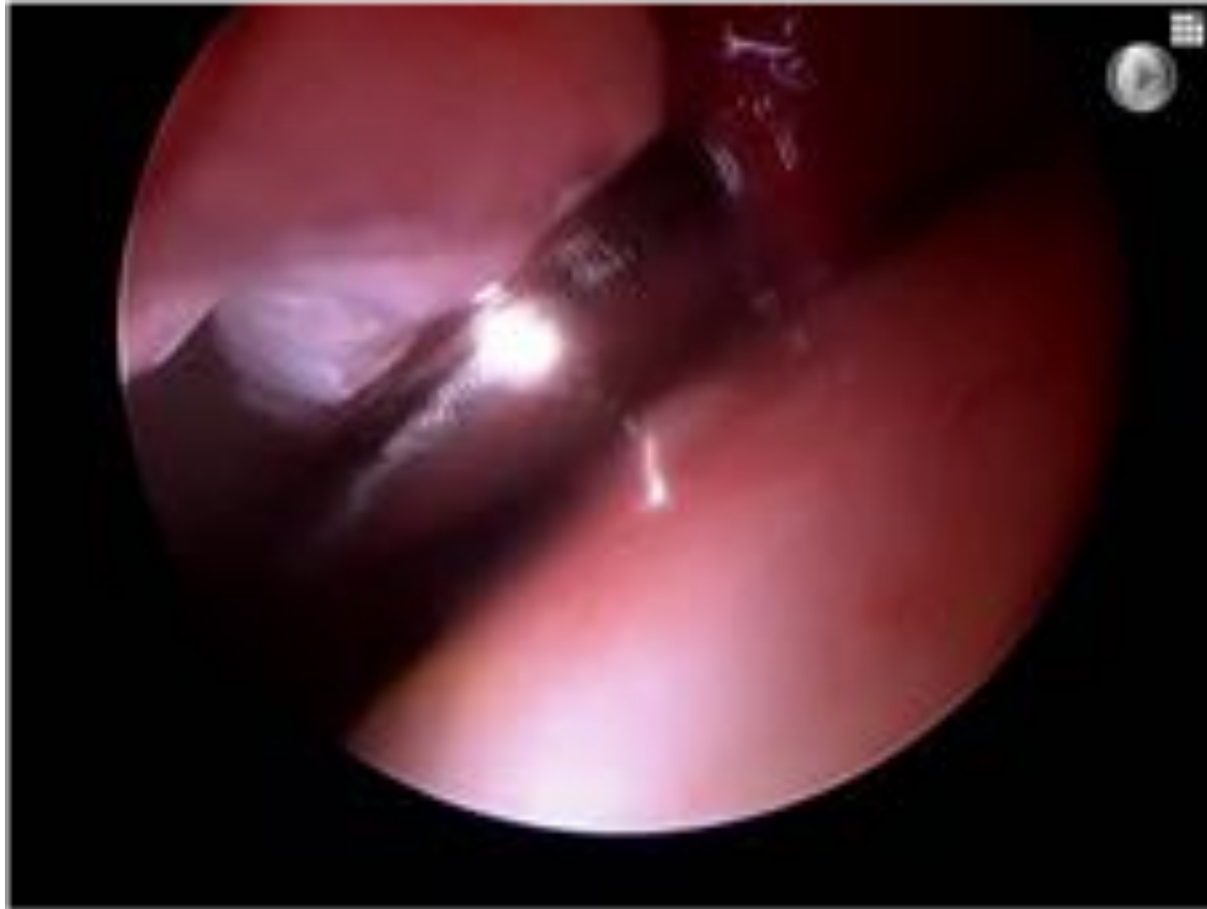


Hip Arthroscopy Portals





Capsulotomy





Arthroscopic Soft Tissue Ablation

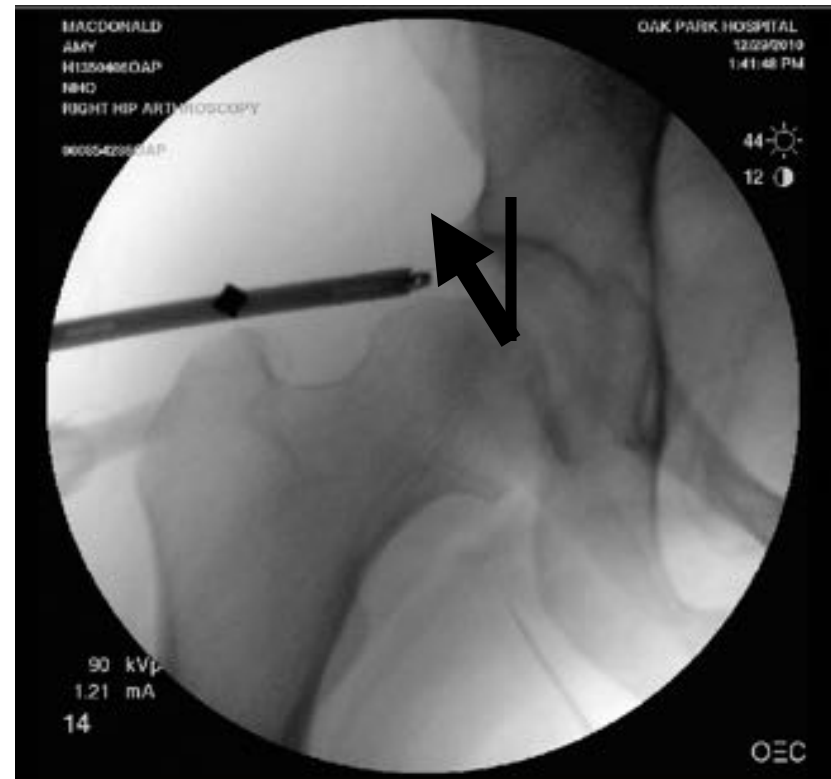




Arthroscopic Rim Trim



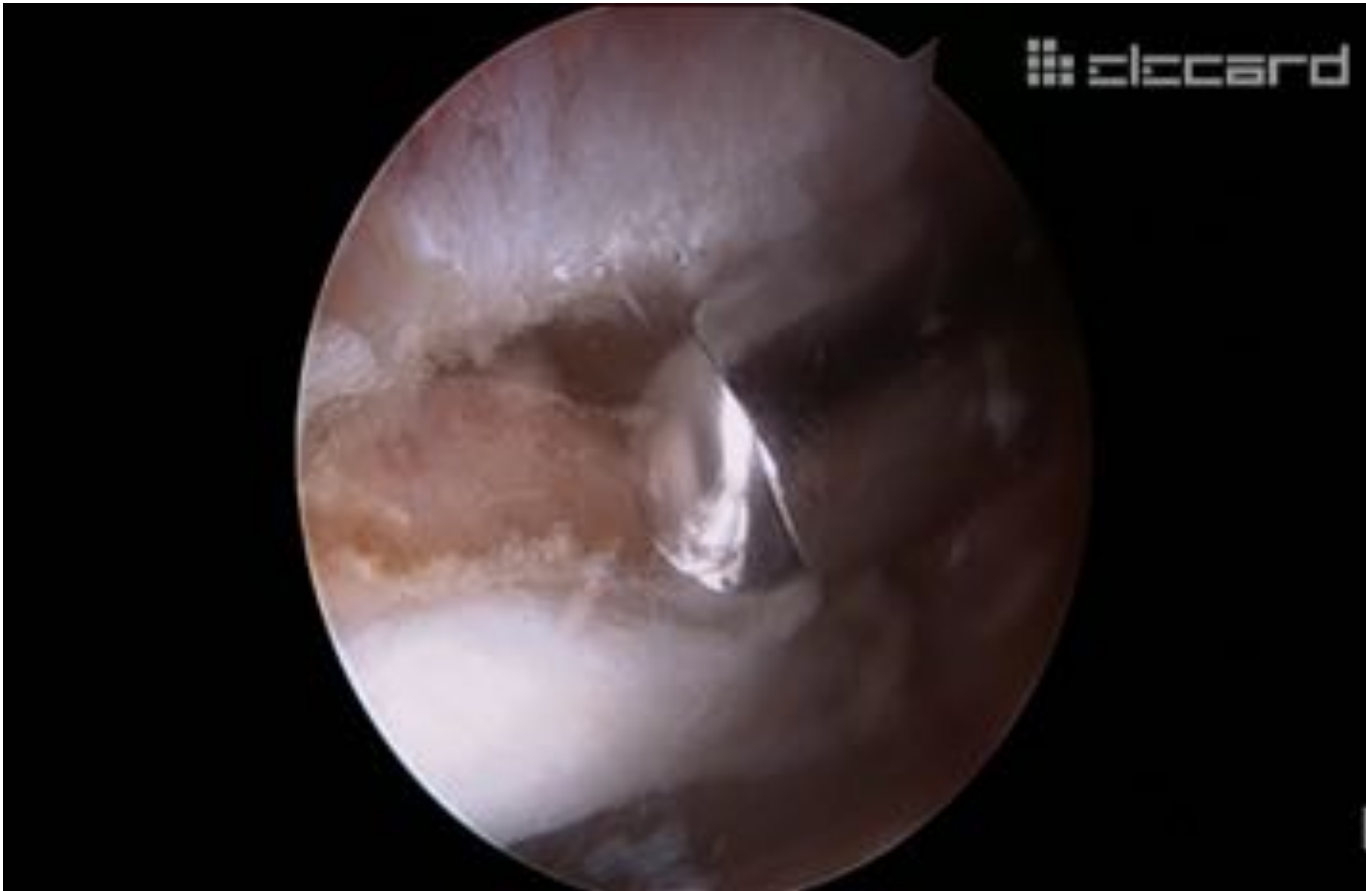
CEA 46°



CEA 30°



Arthroscopic Rim Trimming





Arthroscopic Labral Refixation





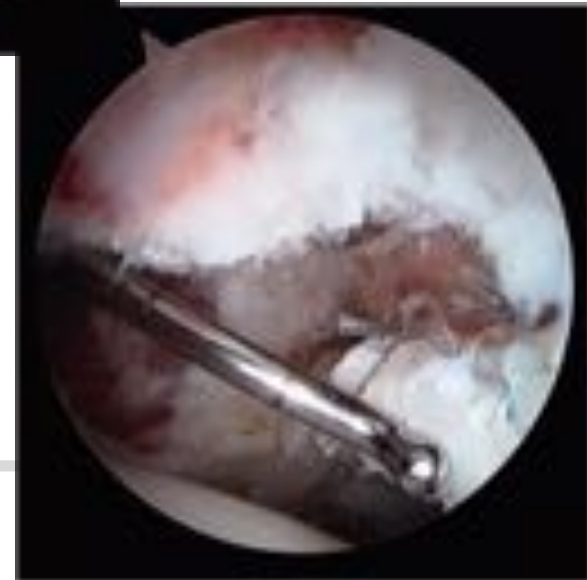
Anatomic Labral Refixation





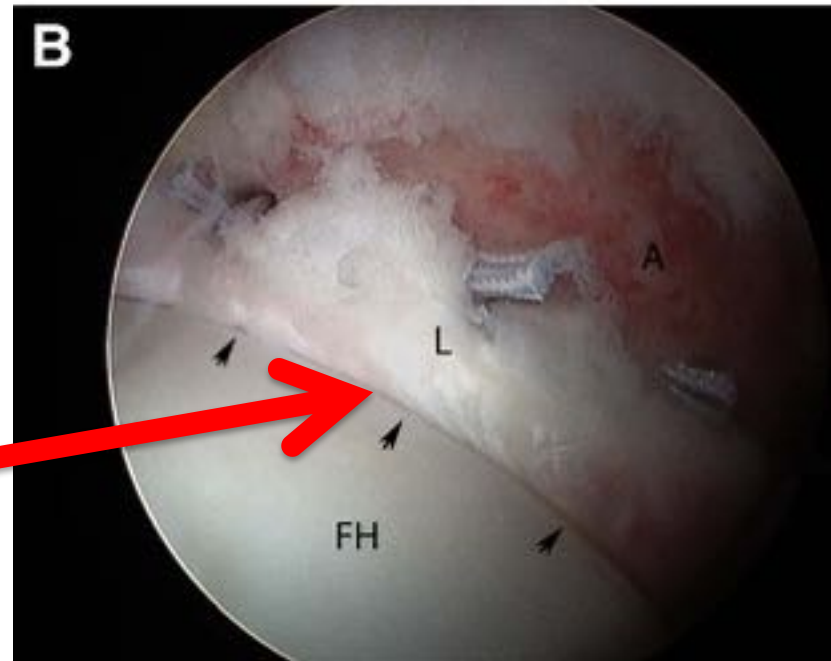
Anatomic Labral Refixation

- The goal is to perform an adequate acetabular rim trim without disrupting the chondrolabral junction
- Preserve biology: proprioception, chondrolabral integrity, intact Sharpey fibers, minimize risk of iatrogenic detachment not healing, **restoration of labral seal for stability**





Anatomic Labral Refixation



Labral seal restored



Labral Reconstruction





Labral Debridement vs Reconstruction

Clin Orthop Relat Res. 2015 Apr;473(4):1349-57.

No regeneration of the human acetabular labrum after excision to bone.

Mislove HF, Cella M, Clark JM, Warden SJ, Hall FD, Nottoli HP.

- Once the labrum is excised, it doesn't grow back
- Segmental resection decreases contact area and increases contact pressures
- Reconstruction increases contact area and decrease contact stress
- Stability of hip better restored with Reconstruction than Debd

Am J Sports Med. 2015 Jan;43(1):98-104. doi: 10.1177/0363546514553089. Epub 2014 Oct 31.

Labral reconstruction with iliotibial band autografts and semitendinosus allografts improves hip joint contact area and contact pressure: an in vitro analysis.

Lee ST, Voigt TF, Sherman E, McCormick FM, Salata MP, Etherton MW, Isha SJ.

The hip fluid seal—Part II: The effect of an acetabular labral tear, repair, resection, and reconstruction on hip stability to distraction

Jeffrey J. Nepple · Marc J. Philippon · Kevin J. Campbell · Grant J. Dornan · Kyle S. Jansson · Robert F. LaPrade · Coen A. Wijdicks

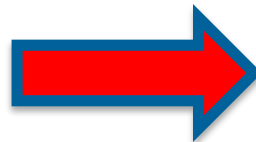
**KSSTA 2014
Winner of ISHA
Award**





Labral Debridement vs Reconstruction

Literature suggests Reconstruction >>> Debridement
for irreparable labral tears





Labral Reconstruction

- Advantages
 - Restores labral function and re-approximate anatomy
 - Re-establish suction seal → improves stability
 - Removes nociceptors



White et al, Arthroscopy 2018



Labral Reconstruction

- Disadvantages
 - Technically difficult → Not without risk!
 - Allograft tissue
 - Labrum size mismatch
 - Disrupt Sharpey's fibers
 - Removes proprioceptive fibers
 - Hip doesn't feel "normal"
 - Limited Outcome data
 - What happens if it fails???

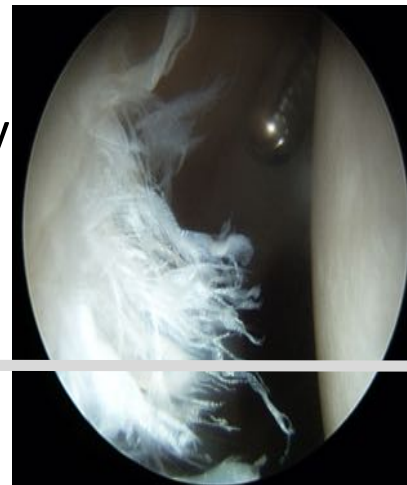
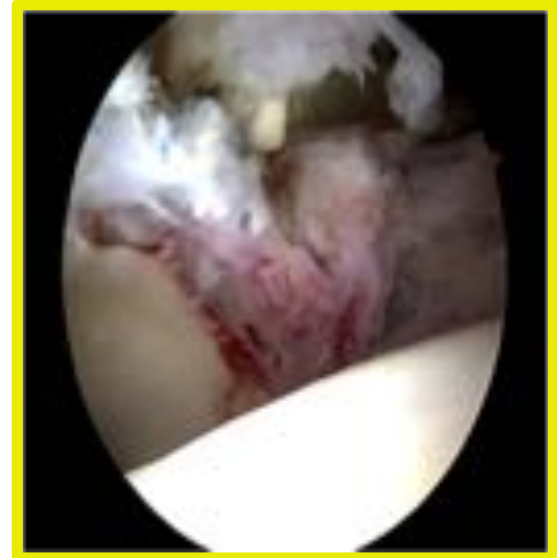


White et al, Arthroscopy 2018



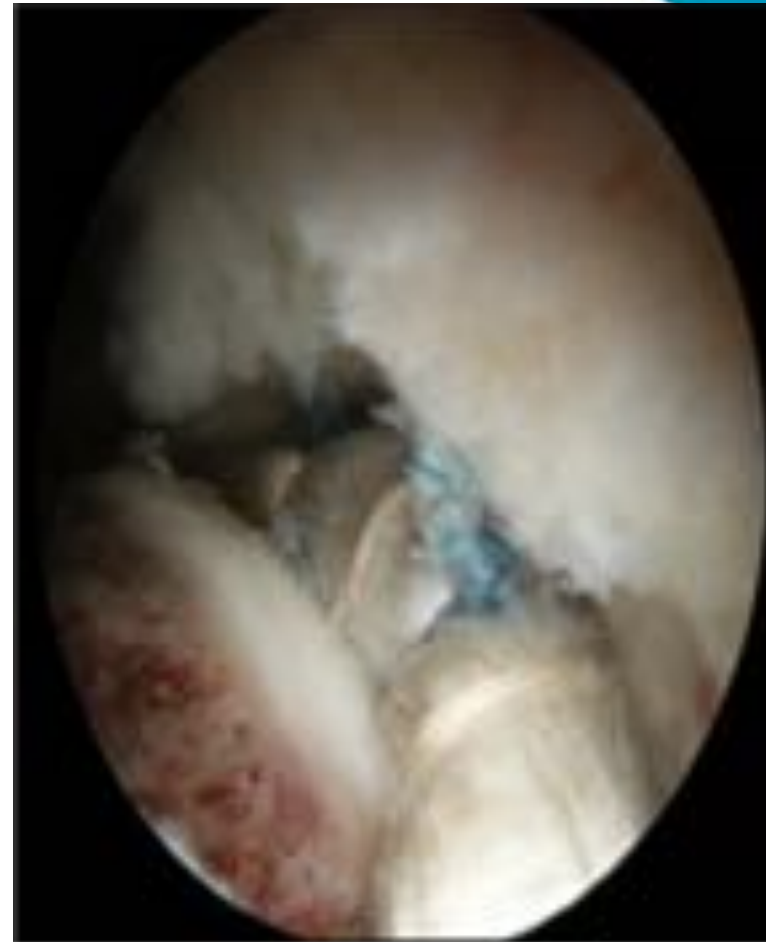
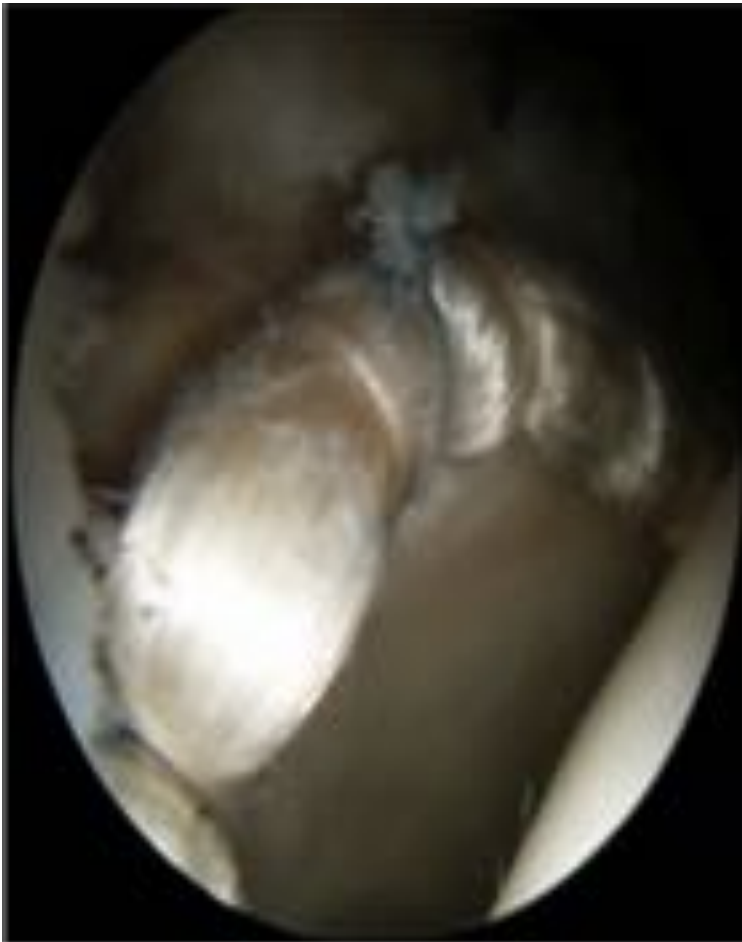
Labral Reconstruction Indications

- Depends who you ask → Developing techniques and evolving indications
- Indications for Reconstruction:
 - Primary setting (<5% of primary cases):
 - Large Pincer with ossified labrum
 - Poor quality/ossified labrum with no OA
 - Labral hypoplasia with poor suction seal
 - Revision setting (~50%):
 - Previous labral debridements
 - Failed repairs with poor quality





Labral Reconstruction





Arthroscopic CAM Osteochondroplasty





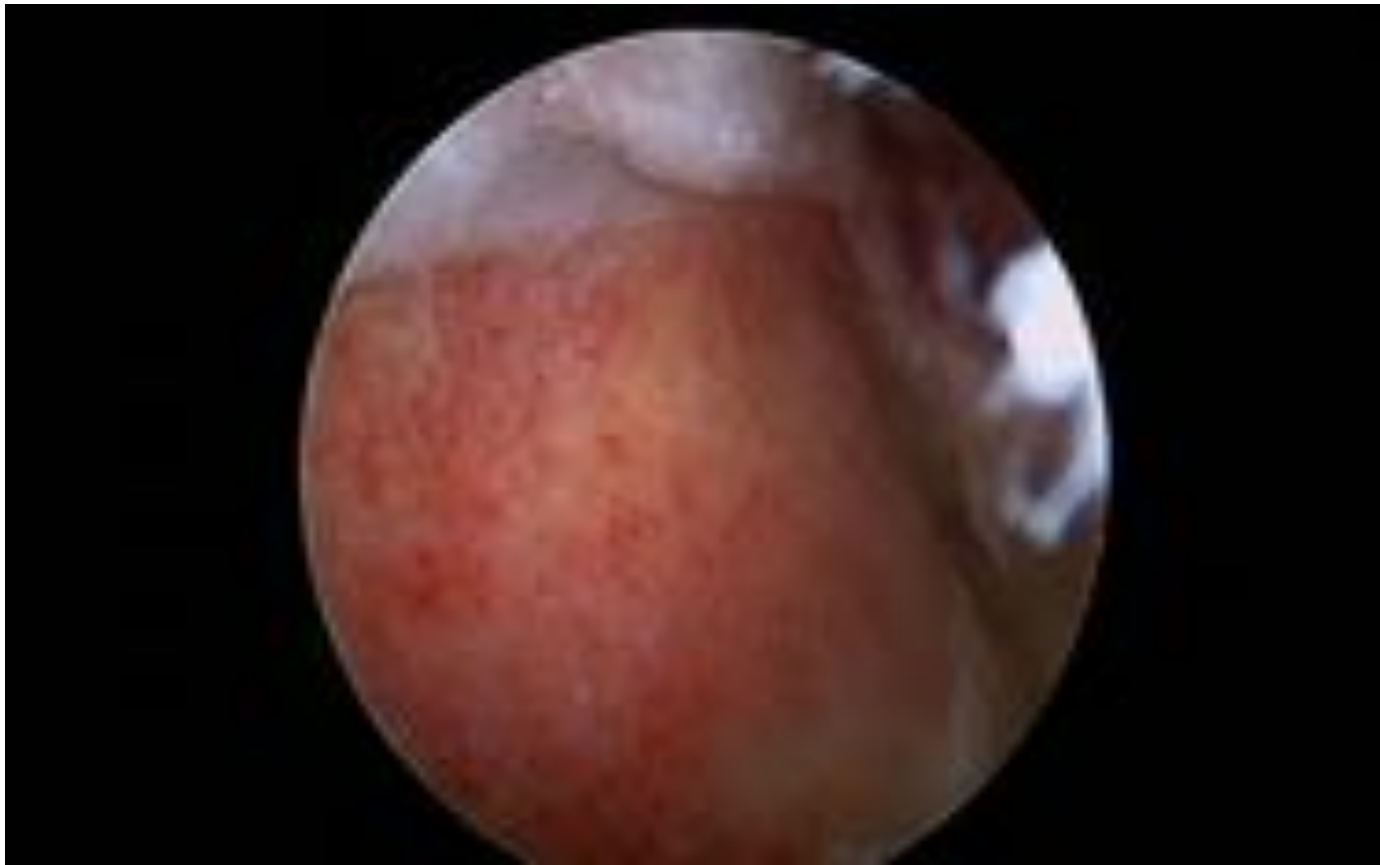
Arthroscopic CAM Osteochondroplasty

- Assessment of CAM osteochondroplasty
- Visually: rotate the lens and camera to obtain feedback of the restoration of offset
- Dynamic exam
 - 45 deg: ER → IR
 - 90 deg: ER → IR
- Fluoroscopy



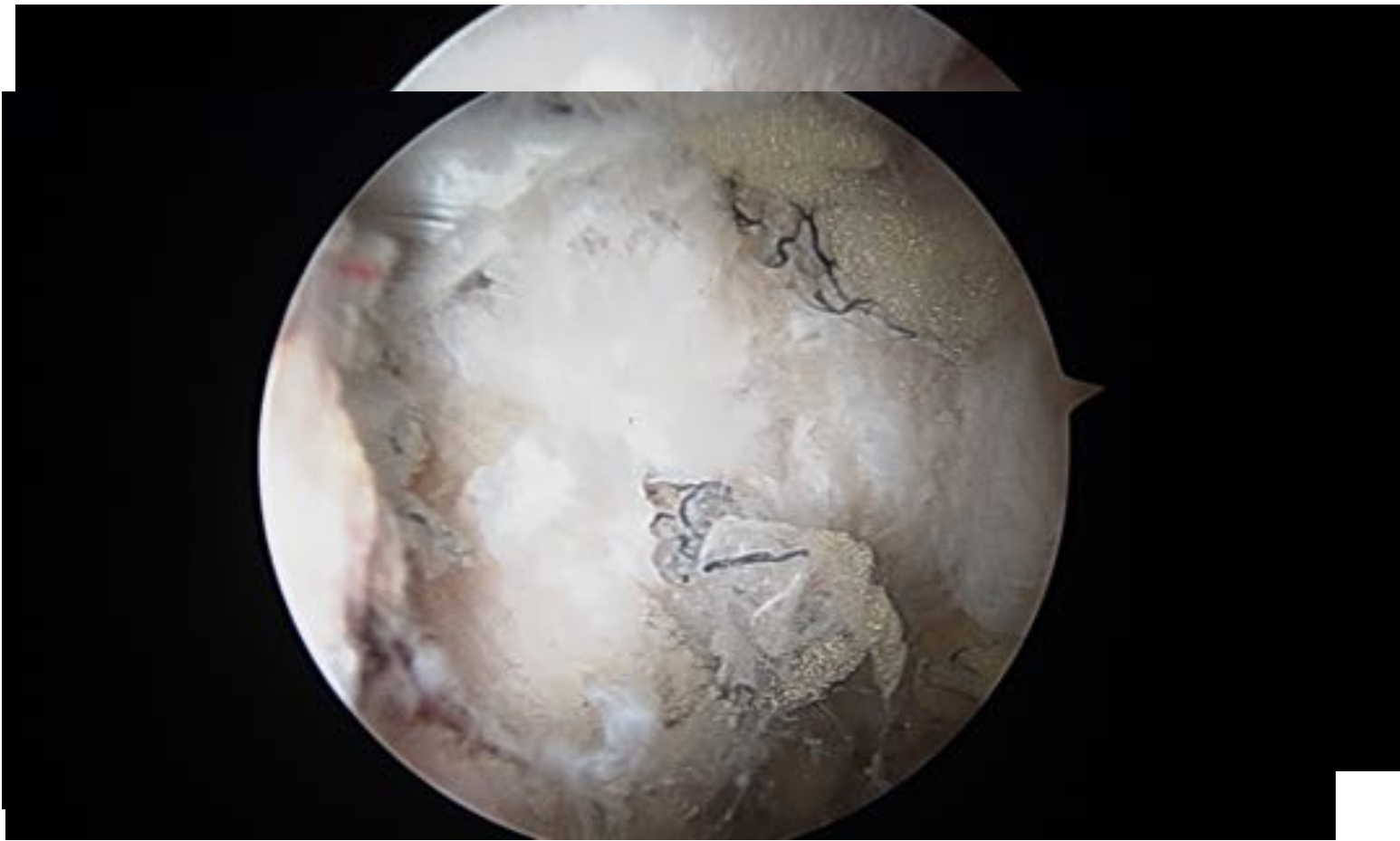


Arthroscopic Dynamic Exam





Capsular Management





Capsular Management





Capsular Management

- Capsular management is an important aspect of hip arthroscopy
 - Improper management can lead to micro- or macro-instability
- Capsulotomy is required for *visualization* and proper treatment of FAI
 - Understand the structure and function of IFL: Axial Strain, Translation, Rotation
 - Clinical studies may suggest that complete capsular closure can lead to improved functional outcomes









1.9 mm dot





Summary

- Majority of patients with hip pain can be treated non-operatively
- Hip surgery only if non-operative treatment has failed and a treatable etiology can be seen
- Postoperative rehab as important as surgery (TEAM sport: patient – therapist- surgeon)
- MMI about 6-8 months (up to a year)
- A lot of periarticular sources of pain to differentiate (e.g. lumbar spine, pelvic floor, SI joint)
- Limitations: Age >50, joint space <2mm, cysts, dysplasia, coxa profunda
- Gluteus medius tears (trochanteric bursitis etc)
- Communication is key!
- Looking forward to working with all of you!



Thank you!



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