Femoral Acetabular Impingement

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Disclosures

- Smith & Nephew
  - Consultant
- Zimmer Biomet
  - Consultant

Objectives

- Define femoral acetabular impingement
- Diagnose femoral acetabular impingement
- Determine treatment for femoral acetabular impingement

My background

- Medical School at Loyola University-Chicago
- Orthopaedic Residency completed at University of Tennessee-Campbell Clinic
- Orthopaedic Sports Fellowship at Kerlan Jobe Orthopaedic Clinic in Los Angeles
- Sports Orthopaedic Surgeon at ASMC

Hip Pain from Cradle to Grave

- Age 0-8
  - Perthes, Dysplasia
- Age 10-14
  - SCFE
- Adolescents & Adults
  - ????
- Adults
  - Osteoarthritis

Hip Arthroscopy

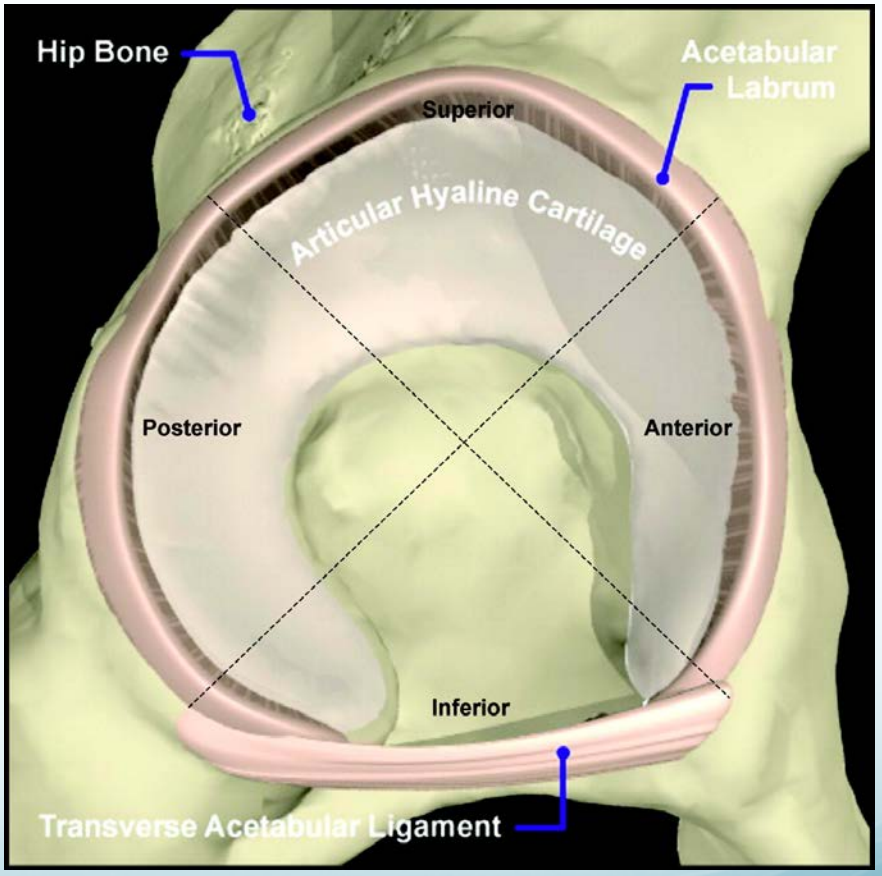
- Last 20 years has seen rapid growth in
  - Referrals for hip pain
  - Understanding of hip pathology
  - Technology to treat the hip

Labrum

What's its role and implications when torn

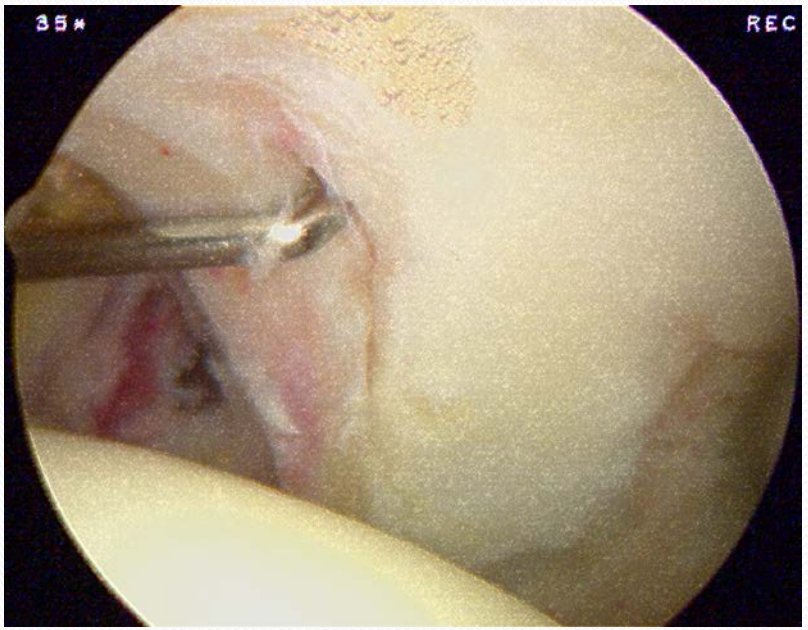
Acetabular Anatomy

- Cartilage lined socket with rim of labrum
- Labrum acts like an "O" ring to provide a suction seal for the hip
  - Provides stability and keeps joint fluid between the ball and socket



Etiology of Labral Tears

- Trauma (14%)
  - Usually repetitive trauma
- **<u>Femoroacetabular Impingement (43%)</u>**
- Capsular Laxity/Instability (25%)
- Dysplasia (4%)
- Degenerative (14%)



- 90% of patients with labral pathology have underlying structural abnormalities in femoral or acetabular morphology

Mechanism leading to OA

- When the labrum fails…..
  - Hip pain
  - ⇧ rate of articular cartilage compression (up to 40% quicker)
  - Contact stress (up to 92% higher) between the femoral and acetabular cartilage layers
  - Loss of suction seal may lead to loss of fluid dynamics and joint instability
  - Early DJD

Femoral Acetabular Impingement

Femoroacetabular Impingement Syndrome

Reference: The 2016 Warwick Agreement by DR Griffin et al. BJSM 2016

Designed by @YLMSportScience

DEFINITION

FAI syndrome is a motion-related clinical disorder of the hip with a triad of symptoms, clinical signs, and imaging findings. It represents a symptomatic premature contact between the proximal femur and the acetabulum

DIAGNOSIS

FAI SYNDROME = SYMPTOMS + CLINICAL SIGNS + DIAGNOSTIC IMAGING

SYMPTOMS

1. Motion or position related hip or groin pain
2. Sometimes back, buttock or thigh pain
3. Sometimes clicking, catching, locking, stiffness, restricted range of motion or giving way

CLINICAL SIGNS

1. Hip impingement tests should reproduce the patients symptoms
2. Often there is limited range of motion

DIAGNOSTIC IMAGING

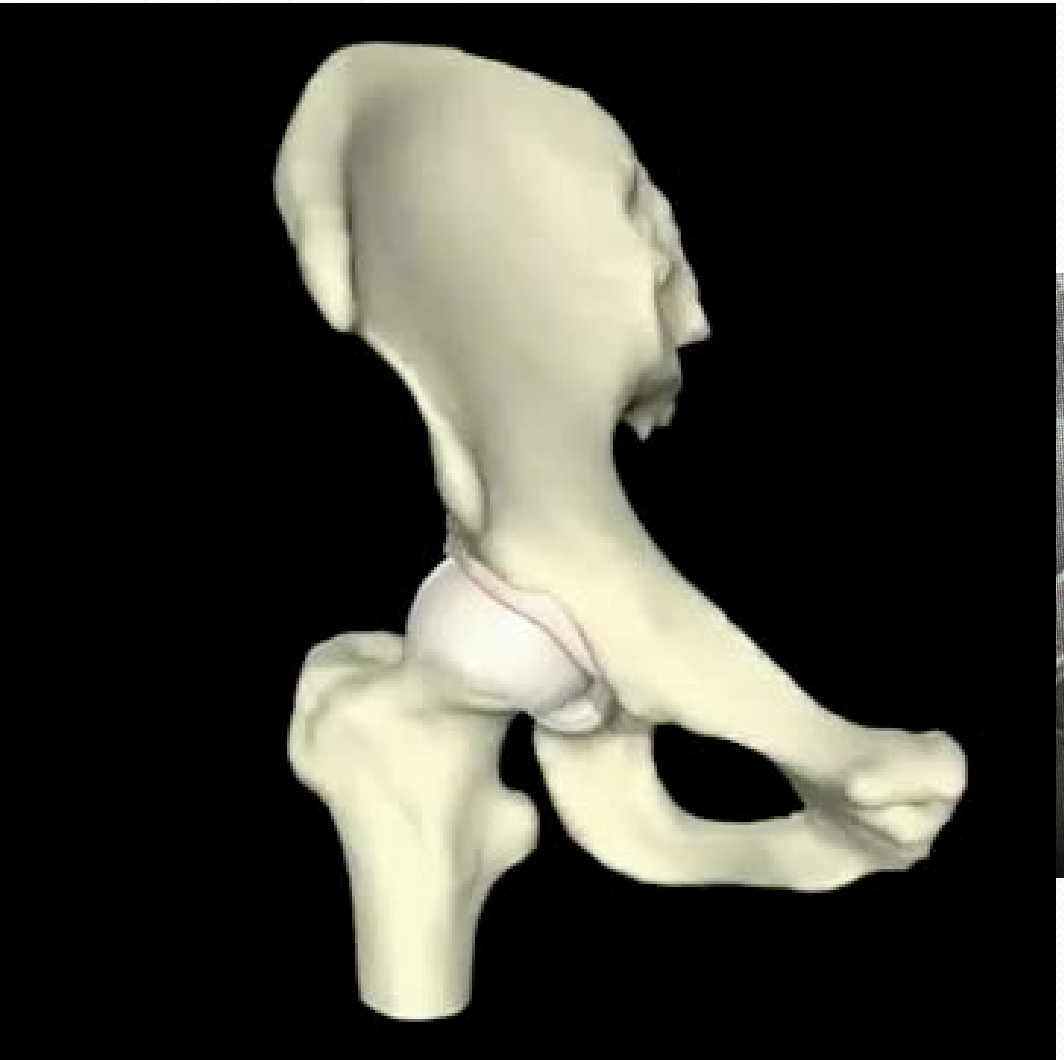
1. Antero-posterior radiograph of the pelvis and a lateral femoral neck view of the symptomatic hip to identify cam or pincer morphologies, and identify other causes of hip pain
2. Where further assessment of hip morphology and associated cartilage and labral lesions is desired, cross sectional imaging is appropriate

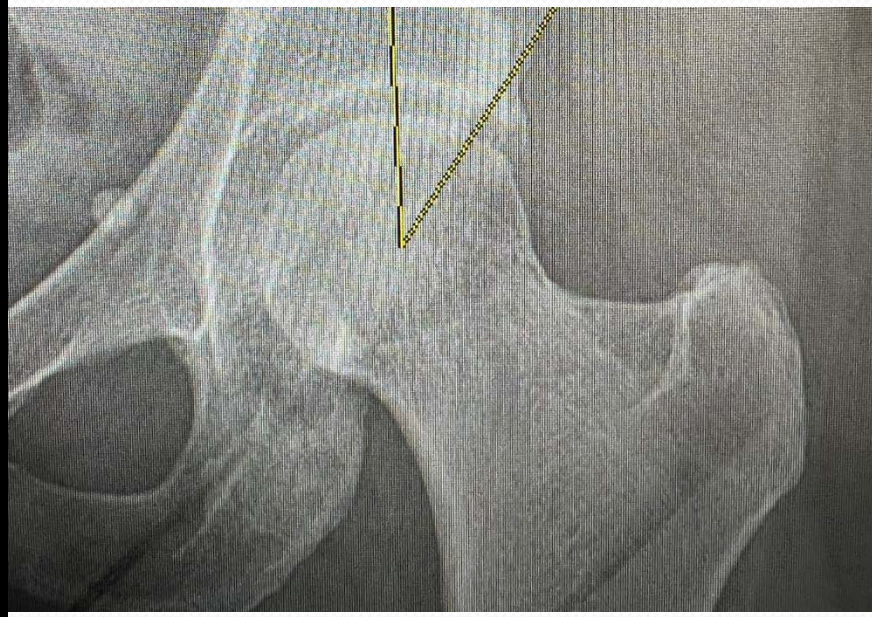
Development of FAI in Athletes

- Congenital deformity
- Exacerbated by repetitive micro trauma to epiphysis during adolescents
  - Accumulation of abnormal bone
- Higher incidence of FAI in athletes
  - Sports with repetitive hip motion
  - Enter competitive levels at an early age

Cam Impingement

Pincer Impingement





Diagnostic Delay

- Clinical presentation is variable
- Diagnosis often missed initially
- Burnett et al *JBJS 2006*
  - 66 patients diagnosed with labral tear on arthroscopy
  - Mean time to diagnosis 21 months
  - 3.3 health care providers seen prior to diagnosis

et al

Hip Diagnosis to Consider

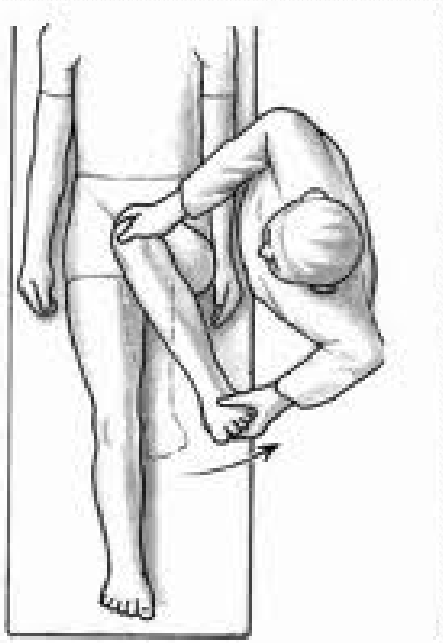
- Impingement/FAI
- Labral Tears
- Iloapsoas tendinitis
- Loose bodies
- Stress Fractures
- Avulsion fractures
- Apophysitis
- Dysplasia
- SCFE
- Perthes Disease
- Infection
- Trauma
- AVN
- OA

Presentation

- Common complaints
  - Pain with deep hip flexion, IR, abduction
  - Lateral or posterior hip pain
    - Flexion, abduction, external rotation
  - Sitting for prolonged periods
  - Climbing up stairs
- Athletes with FAI
  - Difficulty with squatting, lateral/cutting movements
  - Starting/stopping.
- Nature of discomfort
  - Mechanical symptoms
  - Stiffness
  - Weakness
  - instability

Impingement Test

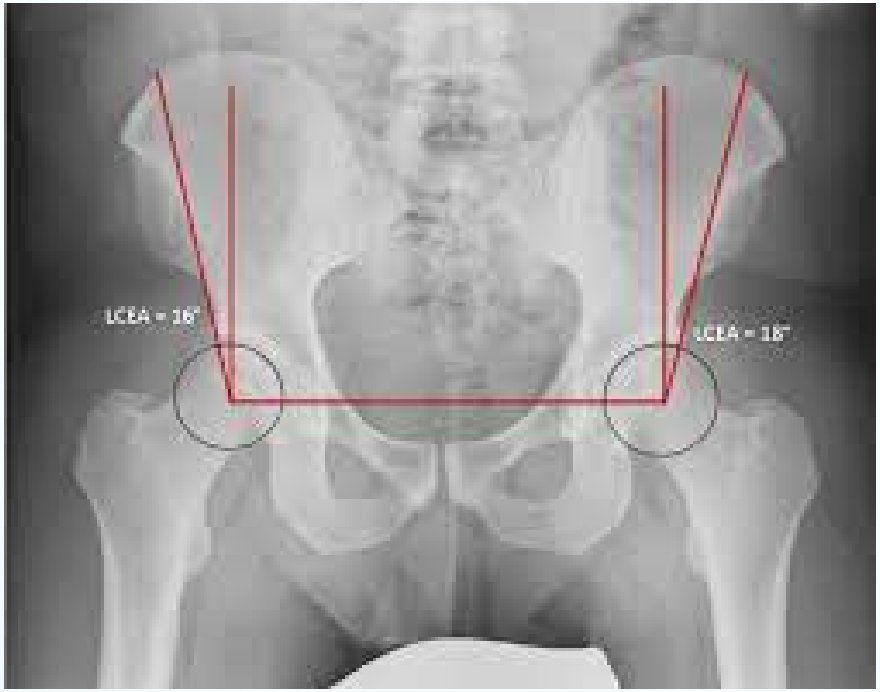
- FADDIR (flexion/adduction/IR)- elicits pain with anterior femoroacetabular impingement and/or torn labrum
- Burnett et al *JBJS 2006*
  - Positive in 95% of patients with labral tear



FABER

- FABER (Flexion/abduction/External Rotation)-helpful determining hip vs lumbar complaints
  - Can be measured by fist widths and compared side to side
  - Anterior pain suggest tight anterior capsule and labral pathology
  - Clinically used to follow patients post operatively

Radiographs



LCEA:20-40
ACEA:20-40
Alpha Angle:<55

Diagnostic Imaging

- Who needs MRI?
  - Stress fracture, labral tear, tendon tears, cartilage injury
  - Radiology reads are inconsistent
  - MRA if small CAM or previous hip scope
- Who needs a CT scan?
  - Detailed imaging of the bony pelvis
  - Relatively low radiation
  - Hip Dysplasia, FAI, revision setting

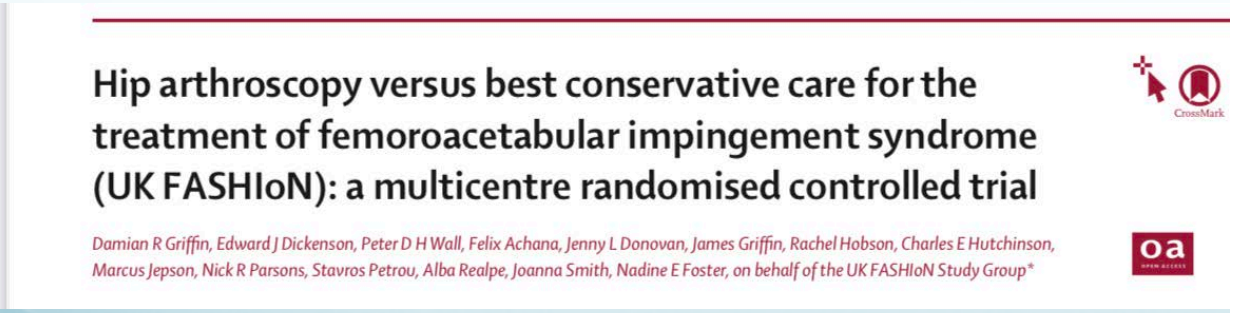
Treatment

Non-operative treatment

- Activity modification
- NSAID's
- Optimizing core and gluteal strength
- Avoid repetitive training activities
  - Lunges and squats
- Intra-articular injection
  - Cortisone with lidocaine
    - Diagnostic and therapeutic
  - PRP

Surgery vs PT

- 2 multicenter prospective RCTs
- Surgery more effective than PT for FAI
  - Some patients improved without requiring surgery



Hip arthroscopy versus best conservative care for the treatment of femoroacetabular impingement syndrome (UK FASHIoN): a multicentre randomised controlled trial

Damian R Griffin, Edward J Dickenson, Peter D H Wall, Felix Achana, Jenny L Donovan, James Griffin, Rachel Hobson, Charles E Hutchinson, Marcus Jepson, Nick R Parsons, Stavros Petrou, Alba Realpe, Joanna Smith, Nadine E Foster, on behalf of the UK FASHIoN Study Group*

Arthroscopic hip surgery compared with physiotherapy and activity modification for the treatment of symptomatic femoroacetabular impingement: multicentre randomised controlled trial

Antony J R Palmer, NIHR academic clinical lecturer in trauma and orthopaedics, Vandana Ayyar Gupta, trial manager, [...], and Sion Glyn-Jones, professor of orthopaedic surgery

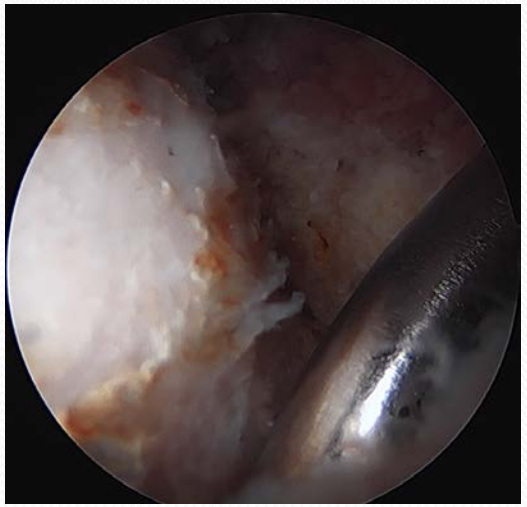
Management

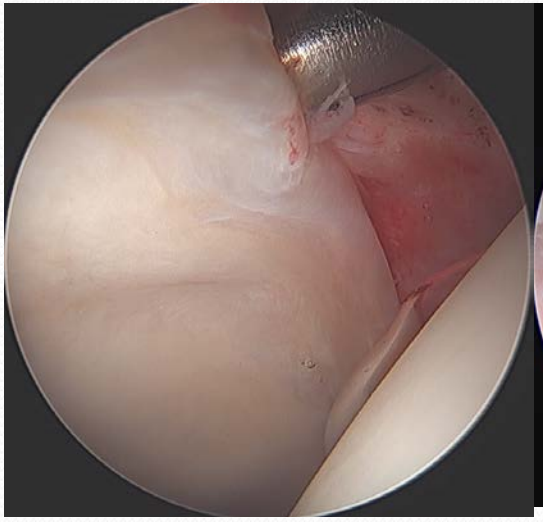
- INTERVENE EARLY to prevent irreversible damage and future degenerative disease

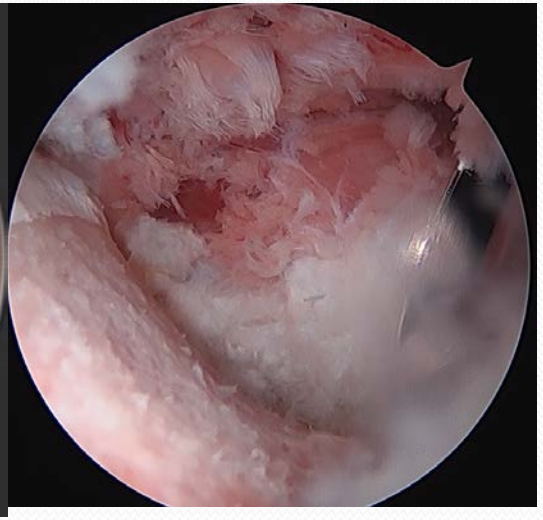
- Criteria for intervention:
  - Symptoms >3 months if articular damage not severe
  - Unresponsive to conservative treatment for 6 weeks to 3 months
  - Radiographically confirmed abnormalities
  - Clinical exam consistent with FAI

Operative Treatment

- Goals of surgical intervention
  - Improving clearance for hip motion
  - Addressing the labrum
  - Prevent degeneration of hip

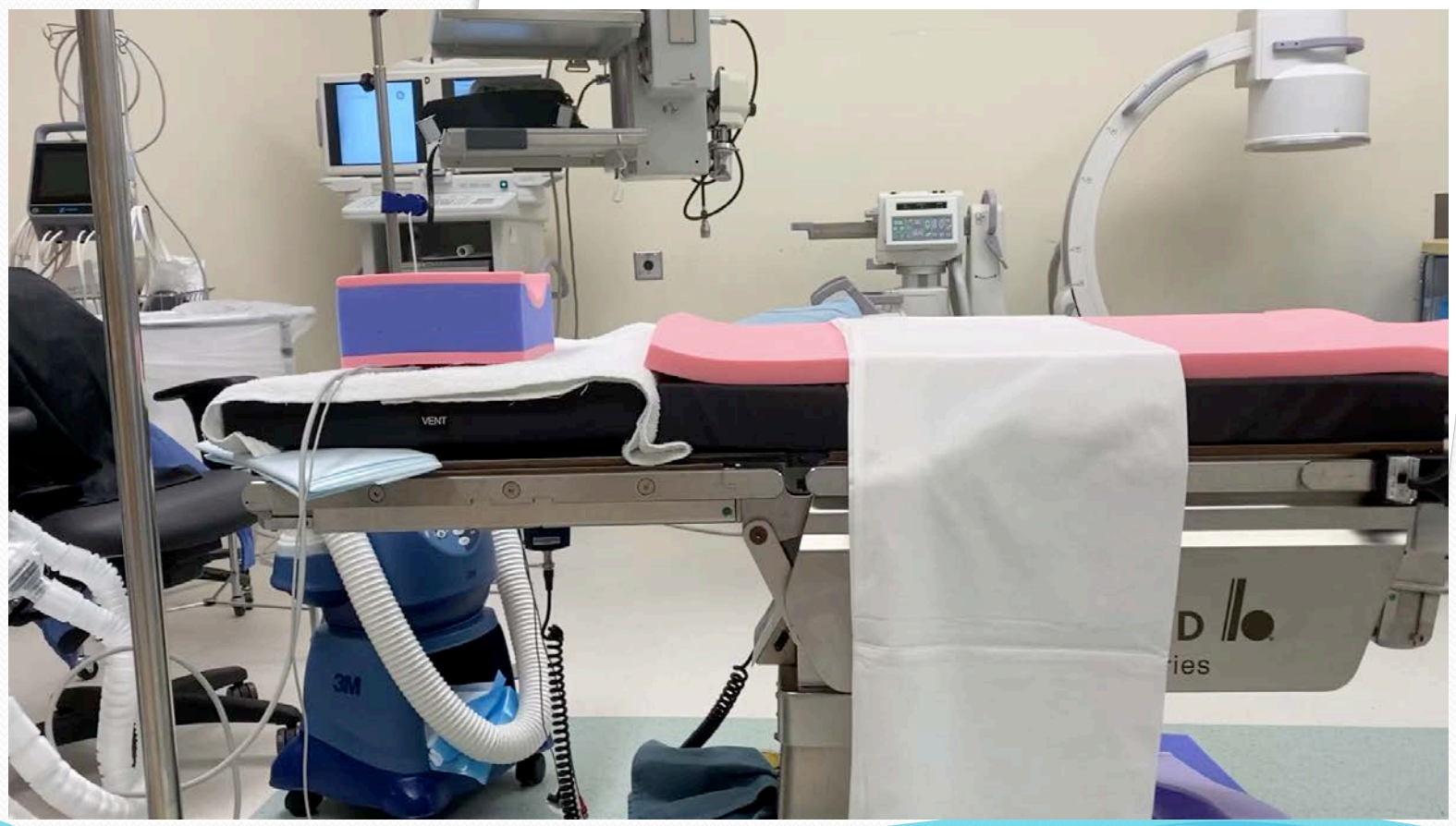




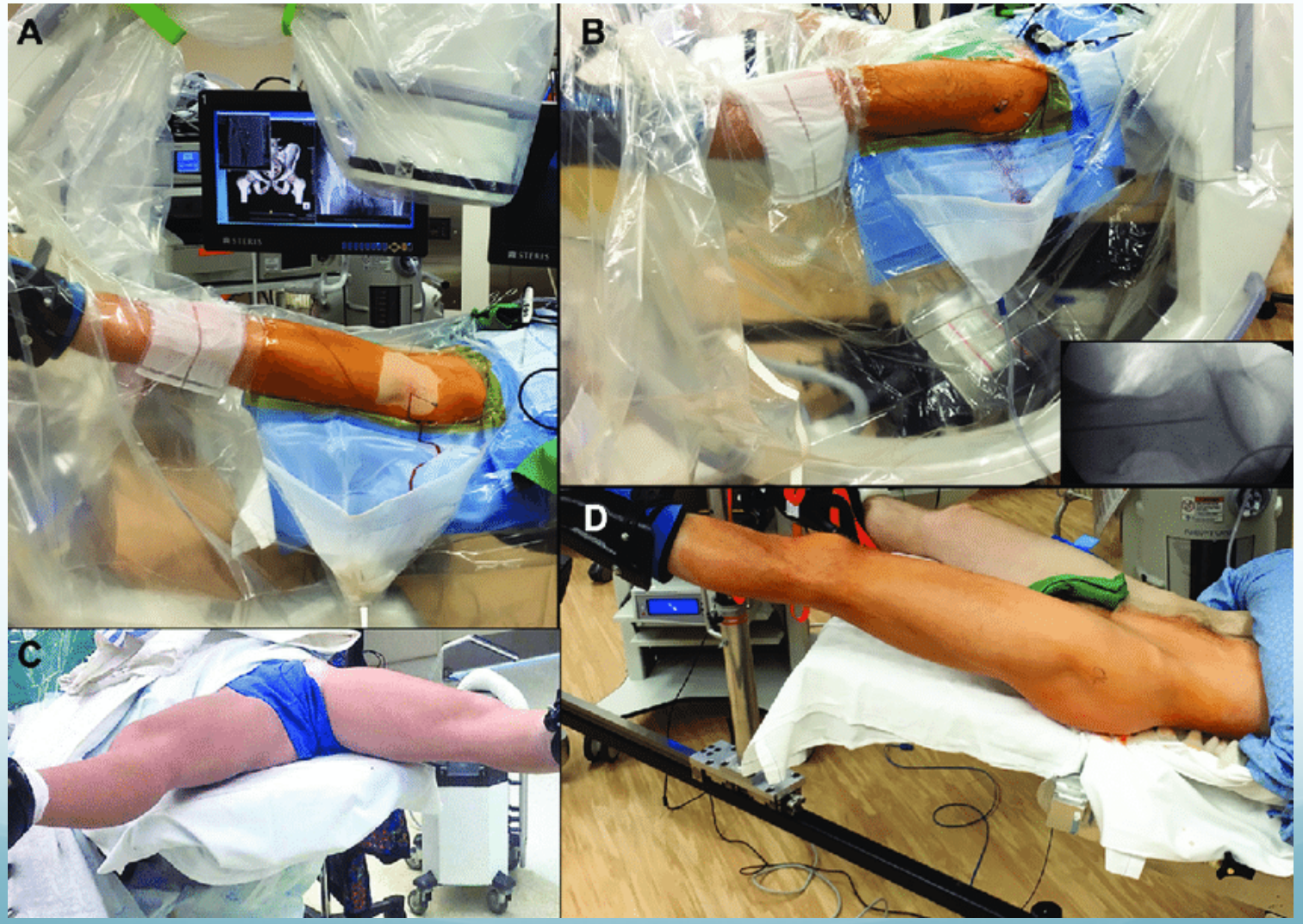


Hip Arthroscopic Technique

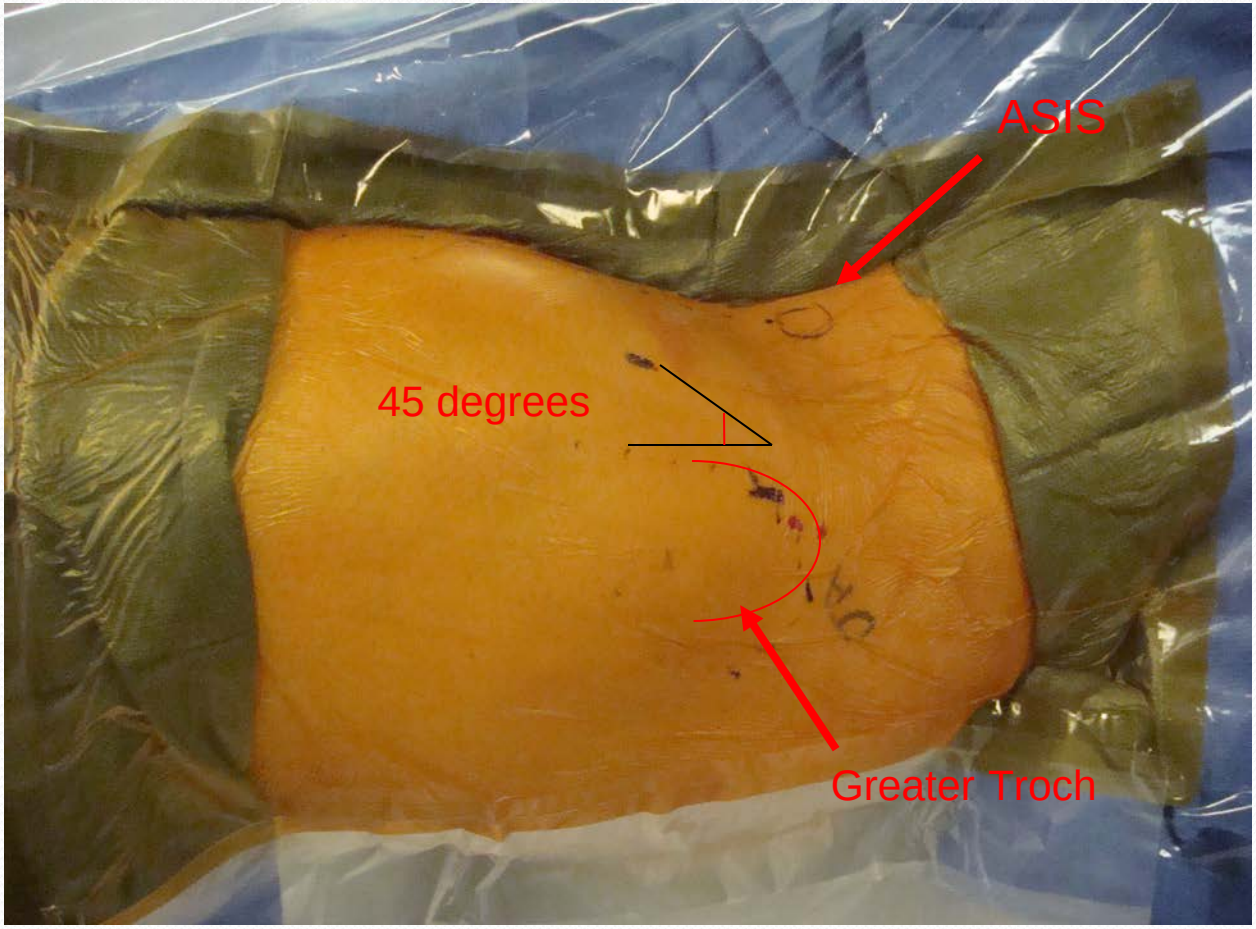
Post-Free Table



Post-less distraction

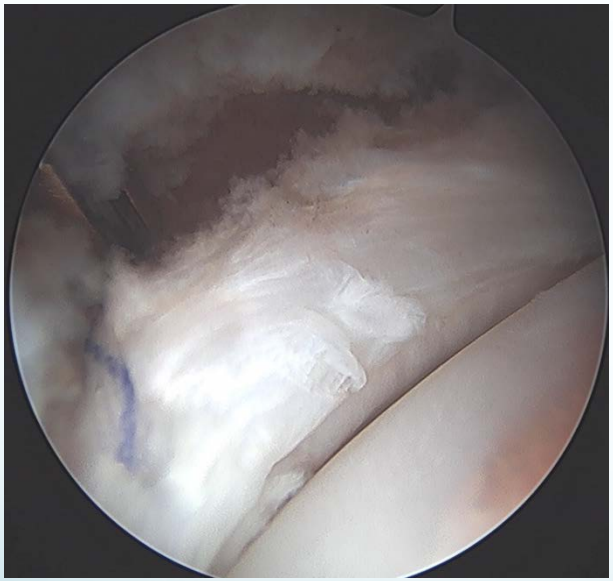
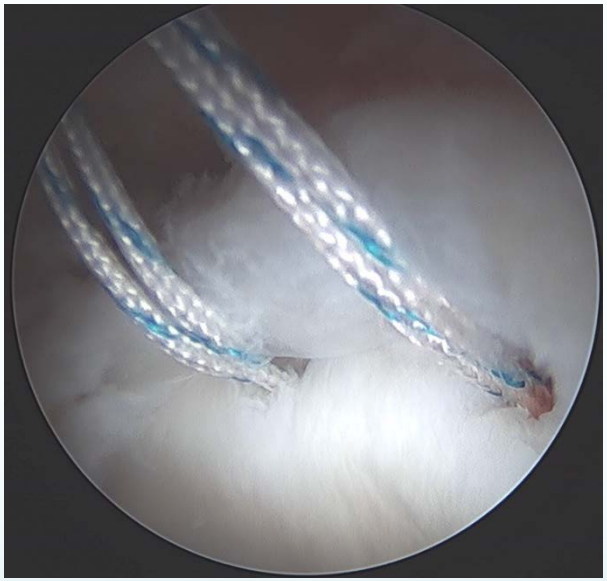
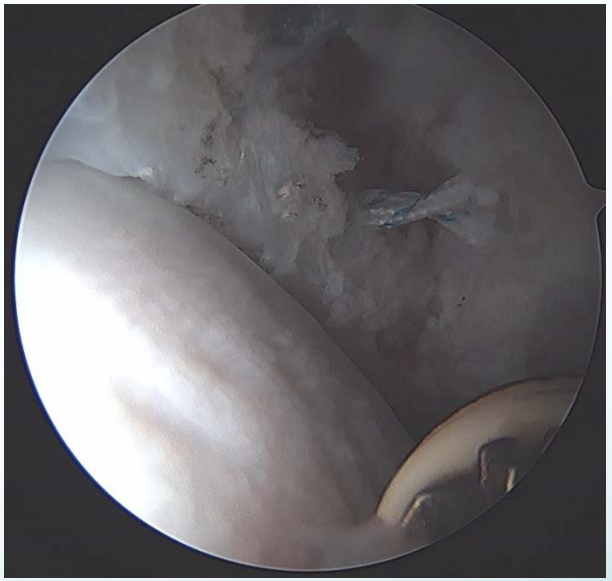


Portal Placement

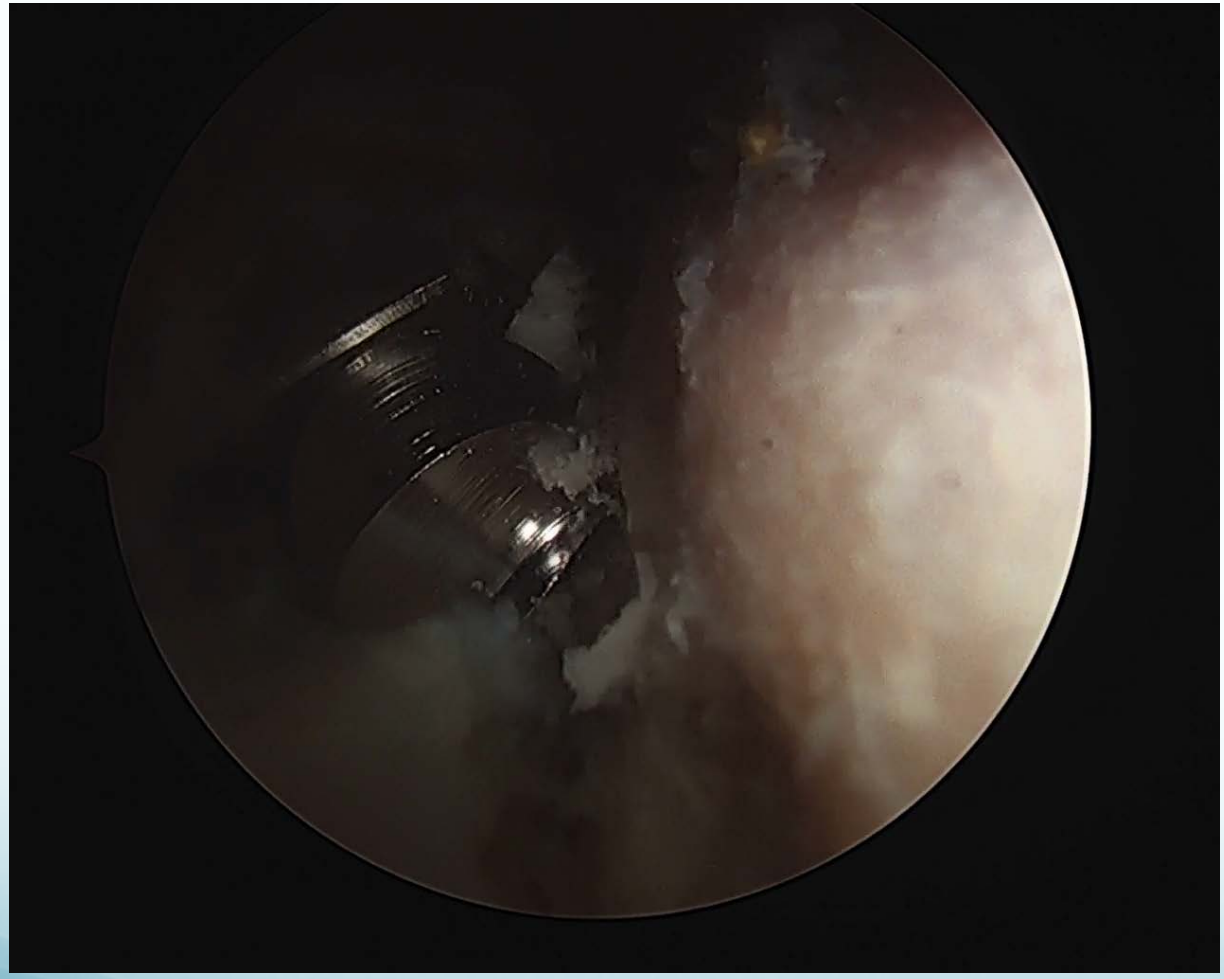


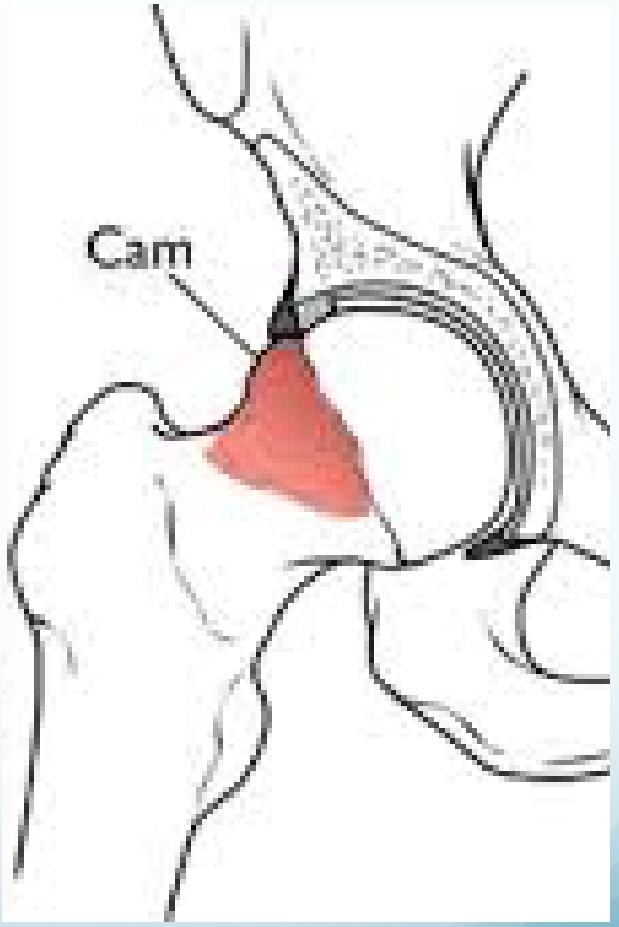
Labral Repair

Everted Labrum

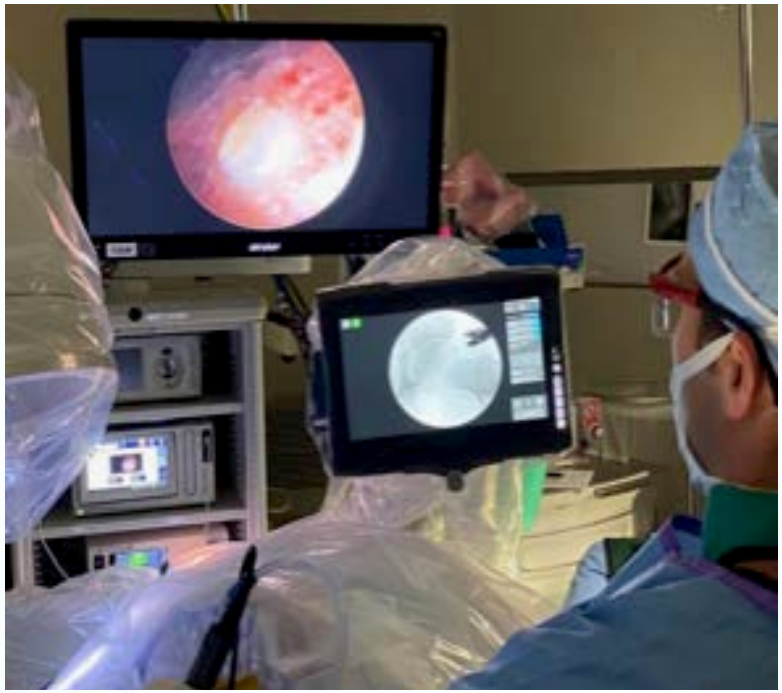




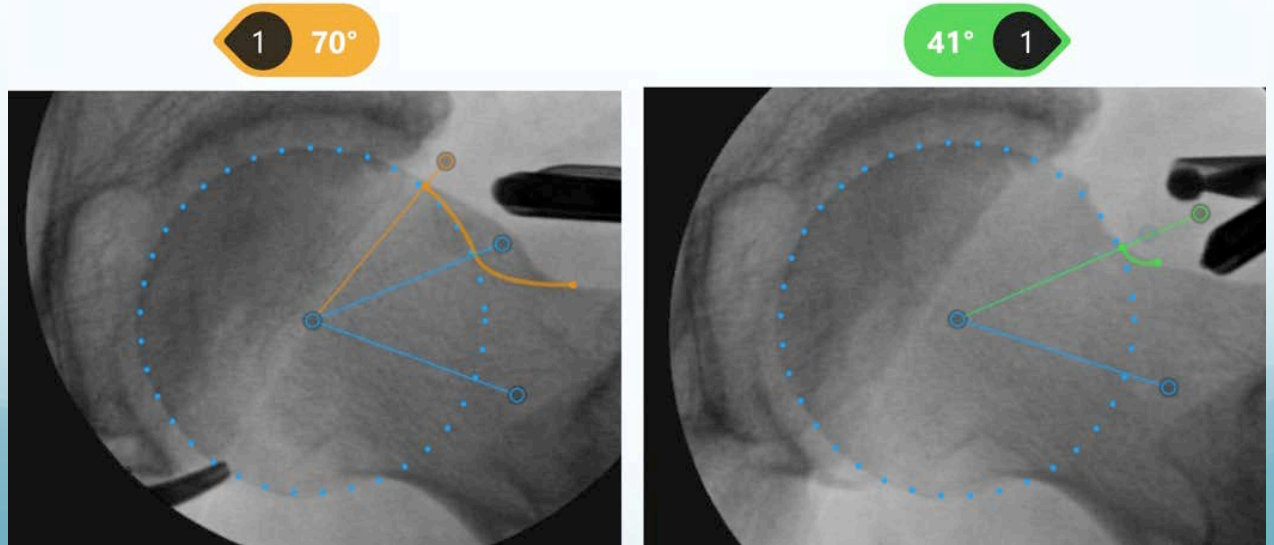
Hip Arthroscopy Cam Procedure



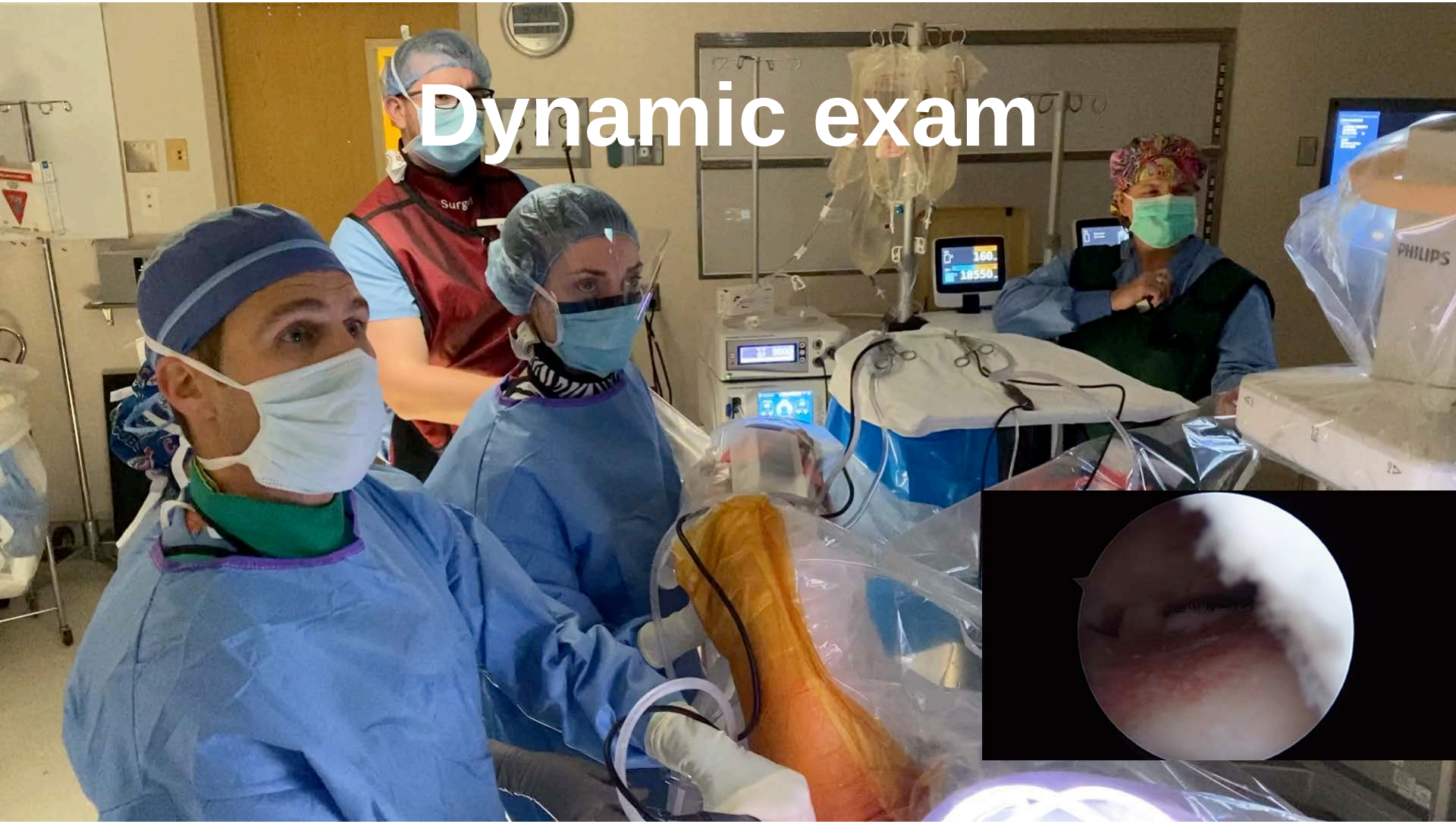


Guided Cam Resection





Dynamic exam



FAI:Surgical Outcomes

- Good/Excellent Results in 80% at 5 years
  - labral repair the norm, rarely debridement
    - Larson et al 2012: repair > debridement
- 70-90% Return to play at 2 years
- No evidence for prevention of arthritis (yet?)
- 20% of patients with labral tears have bilateral surgical intervention
- No indication for treatment if asymptomatic
  - Frank et al, 2015: Meta-analysis of FAI findings in asx volunteers: 23% in normal, >35% in athletes
- Indications and technology are rapidly evolving

Hip arthroscopy limitations

- OA is #1 cause of hip pain in adults >40 and #2 in adults < 40
- Arthroscopy in young patient with OA?
  - Outcomes poor when joint space <2mm (JBJS-Am, 2010)
- Hip dysplasia
  - contraindicated as a sole treatment option for LCEA <18
    - performed concomitantly with PAO's
  - some success in borderline dysplastic patients

Labral Reconstruction

- Indications
  - Failed primary repair with inadequate tissue
  - Minimal to mild chondromalacia
  - Degenerative labrum non-amenable to repair
  - Hypoplastic labrum
    - inadequate seal

Why wasn't surgery successful?

- Residual impingement
- Micro instability
- Iloapsoas Release
- Adhesions

Why wasn't surgery successful?

- Incomplete Reshaping
  - Most frequent indication in revision hip arthroscopy
    - Philippon et al AJSM 2007 - cause in 92% of their revision cases
    - Hayworth et al 2007 - cause in 79% of their revision cases

Why wasn't surgery successful?

- Capsule repaired?

Capsulotomy Size Affects Hip Joint Kinematic Stability

Thomas H. Wuerz, M.D., M.Sc., Sang H. Song, B.S., Jeffrey S. Grzybowski, B.S., Hal D. Martin, D.O., Richard C. Mather III, M.D., Michael J. Salata, M.D., Alejandro A. Espinoza Orías, Ph.D., and Shane J. Nho, M.D., M.S.

Improved Outcomes After Hip Arthroscopic Surgery in Patients Undergoing T-Capsulotomy With Complete Repair Versus Partial Repair for Femoroacetabular Impingement

A Comparative Matched-Pair Analysis

Rachel M. Frank,*† MD, Simon Lee,† MPH, Charles A. Bush-Joseph,† MD, Bryan T. Kelly,† MD, Michael J. Salata,§ MD, and Shane J. Nho,† MD, MS
Investigation performed at Rush University Medical Center, Chicago, Illinois, USA

Why wasn't surgery successful?

- Adhesions
  - Increased risk of adhesions without capsular closure
  - Become symptomatic at 3 to 4 months
  - Treatment is Lysis of Adhesions vs labral reconstruction

Rehabilitation after Hip Arthroscopy

- Phase 1 (1-2 weeks)
- 20 lbs WB x 2 weeks
- Stationary Bike POD #1 or CPM, circumduction
  - Goals
    - Protection of repaired tissue
      - Avoid active hip flexion and rotation
    - PROM within guidelines
    - Prevent muscular inhibition and gait abnormalities
    - Diminish pain and inflammation

Rehabilitation after Hip Arthroscopy

- Phase 2 (Intermediate Rehab weeks 3-8)
  - **Goals:**
    Protection of the repaired tissue
    Restore full hip ROM- (ROM must come before strengthening)
    Restore normal gait pattern (1 crutch until normalized)
    Progressive strengthening of hip, pelvis, and LE's
    Emphasize gluteus medius strengthening (non-weight bearing)

Rehabilitation after Hip Arthroscopy

- Phase 3 Advance rehab (weeks 9-12)
  - Goals
  - Full restoration of muscle strength and endurance
  - Eliminate muscular imbalances
    - Tightness of hip flexor with weakness of glutes and core
  - Emphasize gluteus medius strengthening in weight bearing
  - Avoid losing mobility with introduction of new exercises
    - Add manual therapy treatment

Rehabilitation after Hip Arthroscopy

- Phase 4 Return to sport (weeks 12-20)
  - Hip specific protocols have not been validated to date
  - Safe transition to power, speed, agility, and skilled training
  - Micromanaged and introduce one exercise or variable per session
  - Treatment should be functional, multi-directional, and individualized to patients goals and sport specific

Top 5 Takeaways

- FAI is a major cause of labral tears
- Diagnose FAI
  - Clinical signs
  - Symptoms
  - Diagnostic Imaging
- Treatment for FAI
  - Surgery>PT
  - Repair labrum and address bony morphology
- High Rate of return to sport for athletes
- 4 phases of PT

Thank you

www.timothybertmd.com