

# Hip Instability



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Medical Center**



# Presenter Conflict

Consultant : Stryker and Ossur

Royalties : Stryker and Ossur

# Learning Objectives

- Understand Laxity and Instability
- Know Types of Hip Instability:
  - Traumatic hip instability
  - FAI-Induced instability
  - Atraumatic hip instability
  - Iatrogenic hip instability
- Know Outcomes after Hip Arthroscopy

# Not all hip instability is the same...



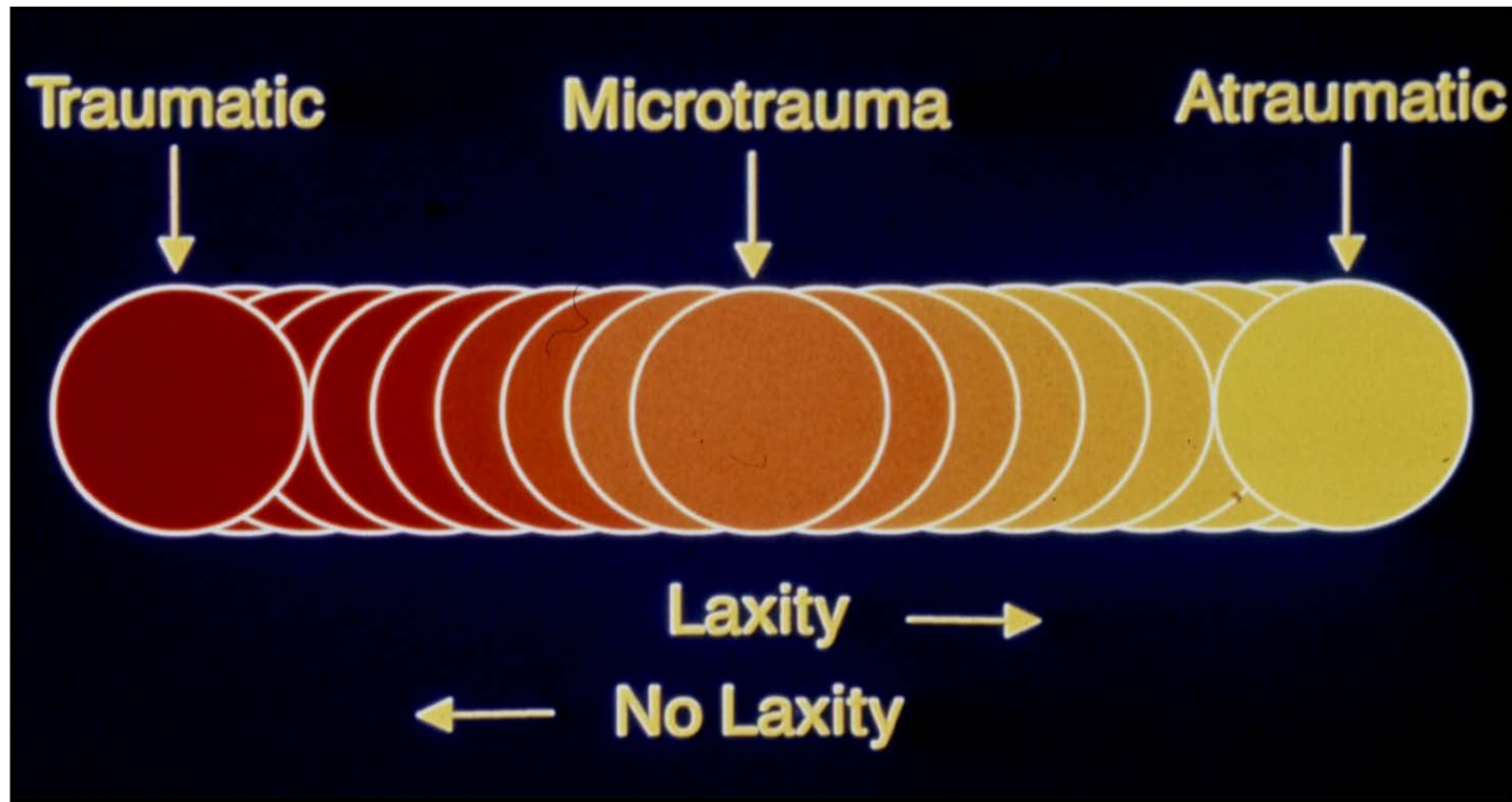


# Instability

Symptomatic pathologic  
translation of the  
femoral head



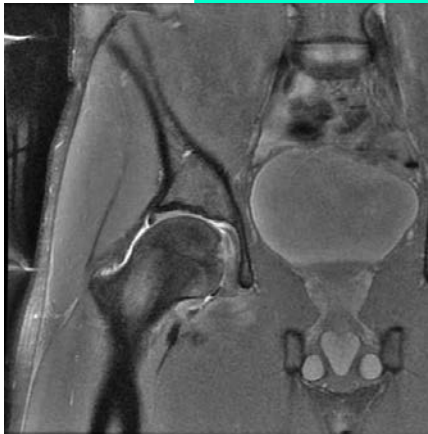
# Spectrum of Hip Instability



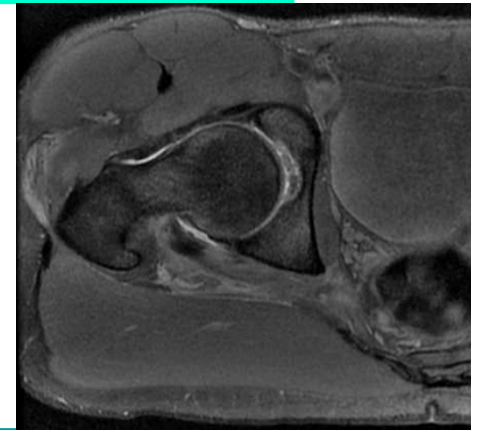
# Hip Biomechanics

Passive

Static Factors



Stabilize  
femoral head in  
acetabulum



Active

Dynamic Factors

# Hip Joint Stability

## Hip joint stability

### Static stabilizers

- Osseous morphology & version
- Labrum
- Capsuloligamentous
- Suction seal: negative intraarticular pressure / adhesion-cohesion

### Dynamic stabilizers

- Gluteus medius and minimus
- Short external rotators
- Iliopsoas
- Neuromuscular control
- Proprioception





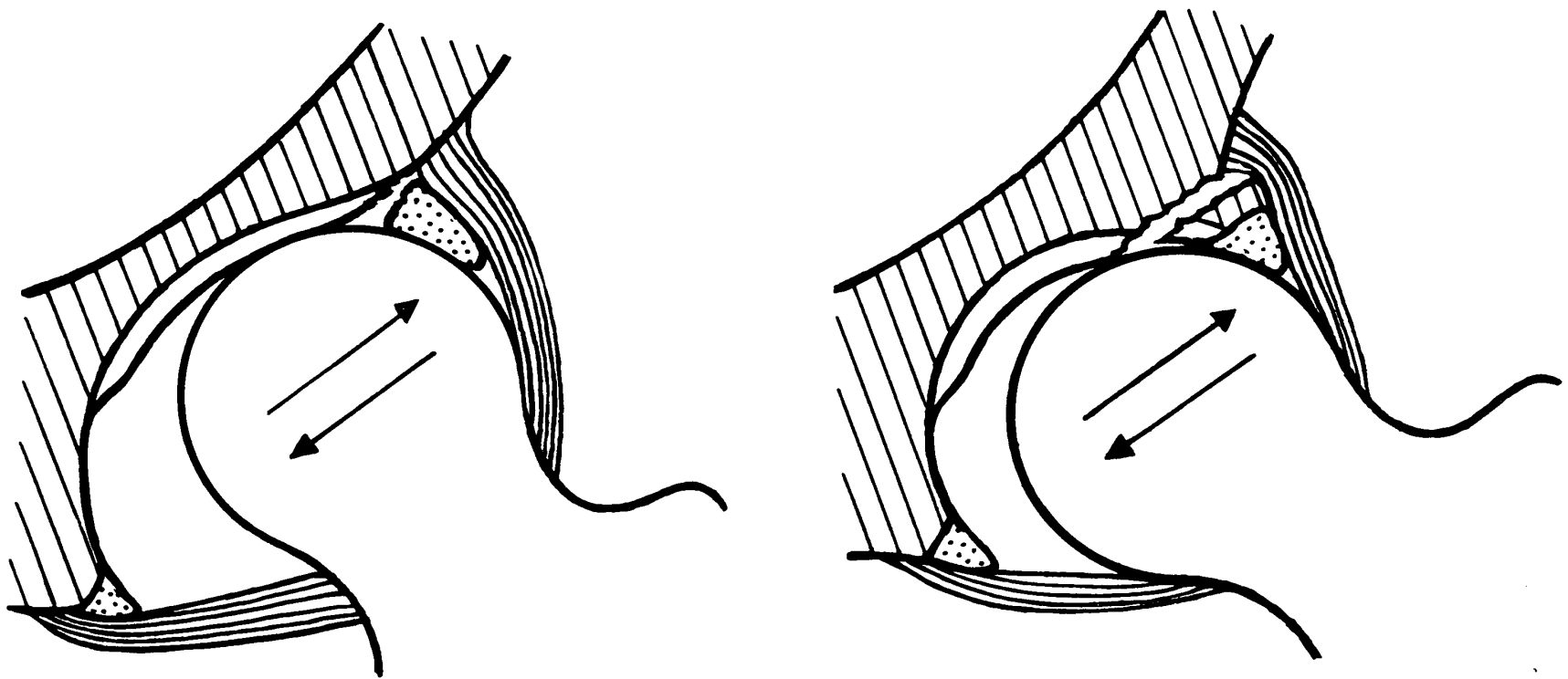
# Osseous Morphology

## Radiographic Appearance of Hips

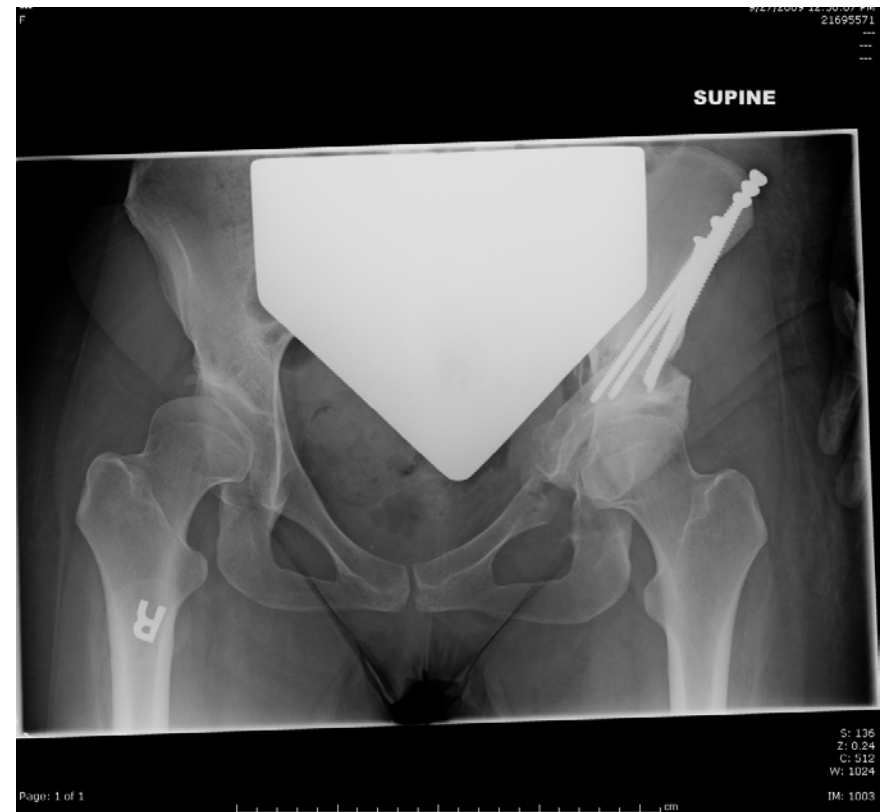
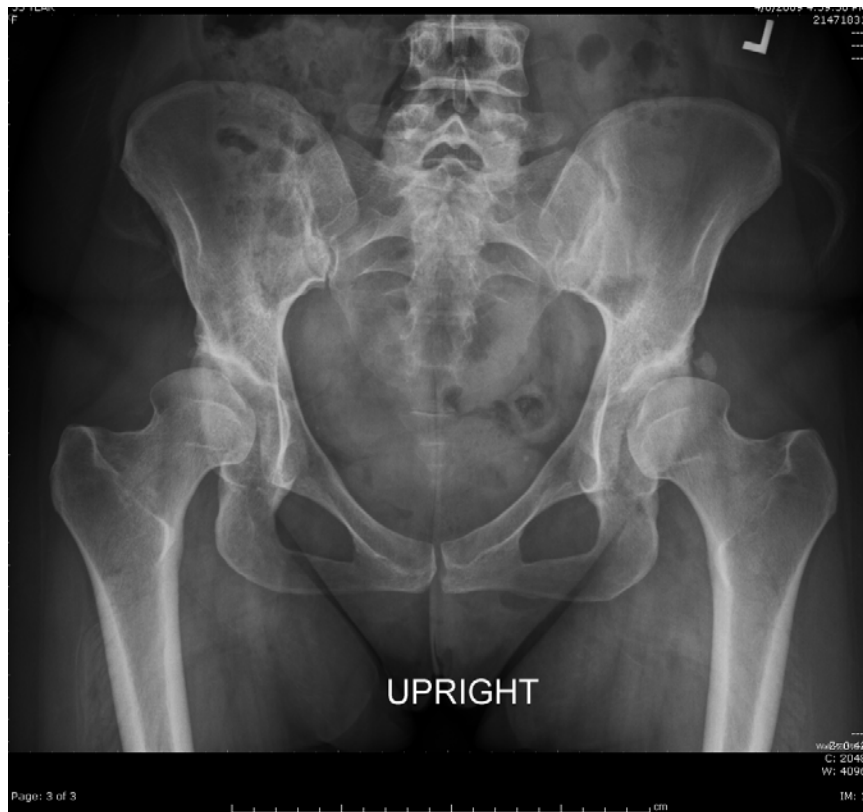
Impingement (Deep) <--> Normal <--> Dysplasia (Shallow)



# Dysplasia



# Peri-Acetabular Osteotomy



# Is there a role for hip arthroscopy in dysplasia?

Parvizi et al. J Arthroplasty 2009.

- 36 Hips for dysplasia (DDH in 30; Retroversion in 6) and FAI underwent HA *labral debridement* and osteoplasty
  - Improvement at 6 wks then deteriorated over time
  - 13 Femoral head migration
  - 14 Accelerated OA

Matsuda et al. Arthroscopy 2012.

- 2 cases of rapid acceleration of hip OA

Mei-Dan et al. Catastrophic Failure in Hip Arthroscopy Due to Iatrogenic Instability: Can Partial Division of Lig Teres and Iliofemoral Ligament Cause Subluxation? Arthroscopy 2012.

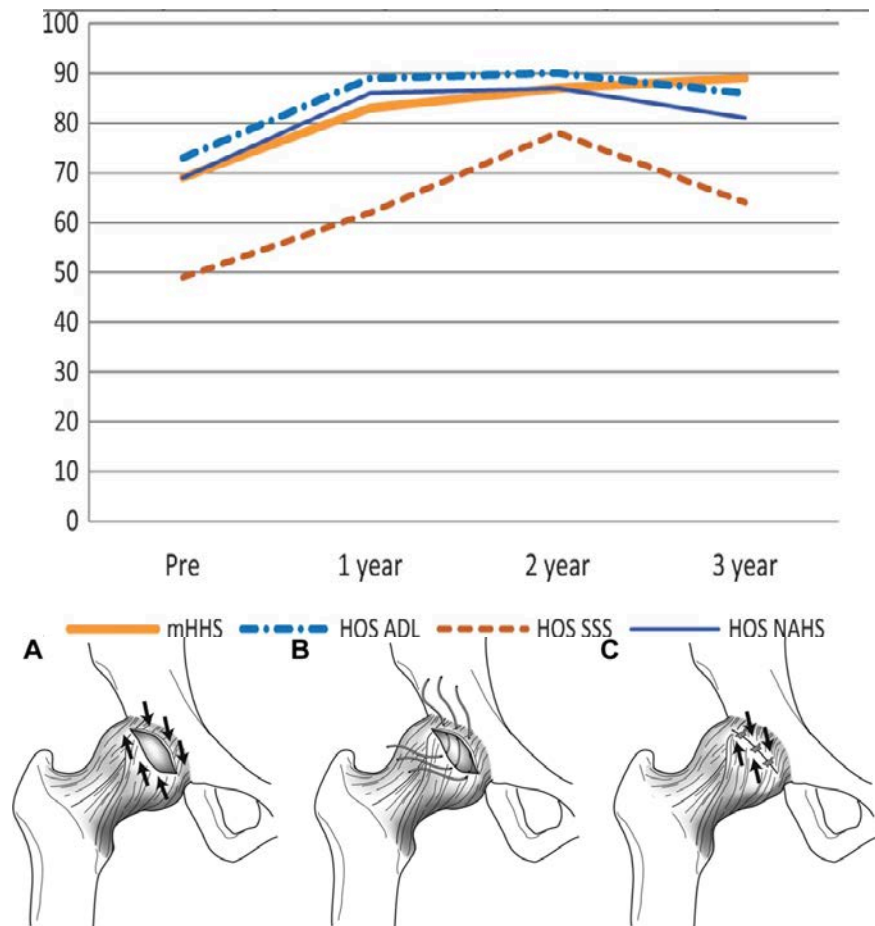


Matsuda et al. Arthroscopy 2012.



# Dysplastic Variants

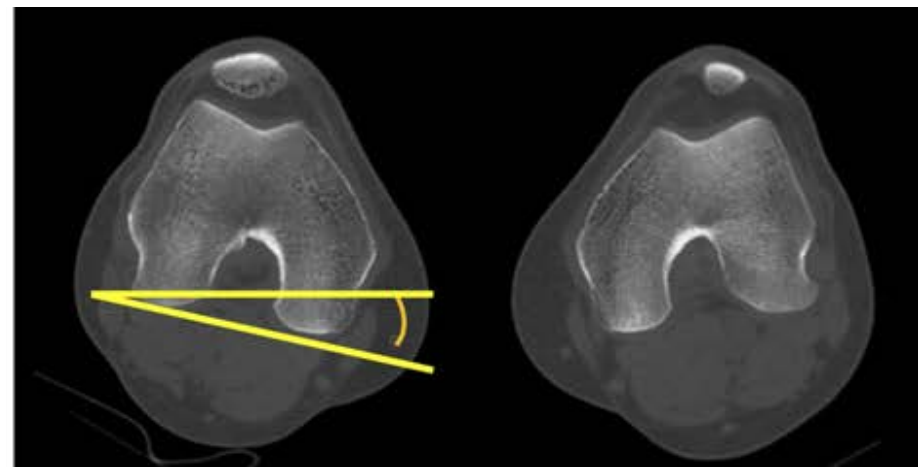
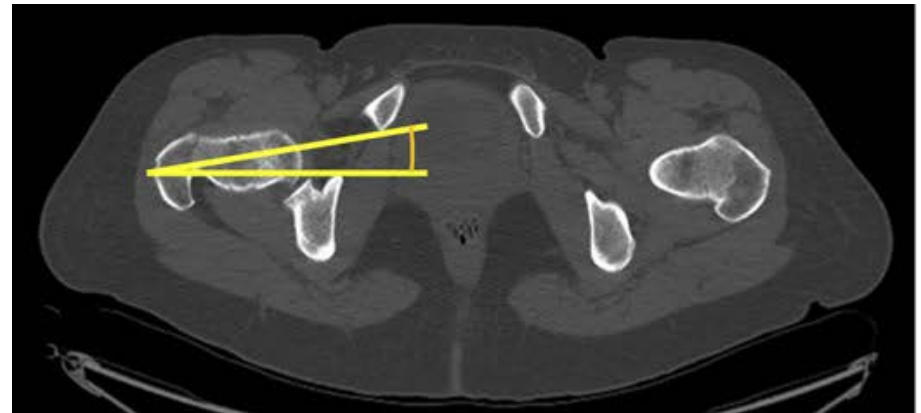
- Borderline dysplasia
  - Domb et al. AJSM 2013.
    - 26 patients with CEA  $22.2^\circ$  (range,  $18$ - $25^\circ$ ) underwent HA with labral repair and capsular plication
    - 77% (17/22) G/E outcome
    - 14% (3/22) Tonnis 0  $\rightarrow$  1
    - 9% (2/22) Revision



*Domb et al. AJSM 2013.*

# Dysplasia Variants

- Excessive femoral anteversion/Femoral valgus
  - Femoral anteversion  $> 25^\circ$ 
    - Iliopsoas lengthening with femoral anteversion  $> 25^\circ$  have inferior clinical outcomes (Fabricant et al. Arthroscopy 2012.)
    - Recent studies do not show a difference in outcome and femoral version (Ferro et al. Arthroscopy 2015)



Fabricant et al. Arthroscopy 2012.

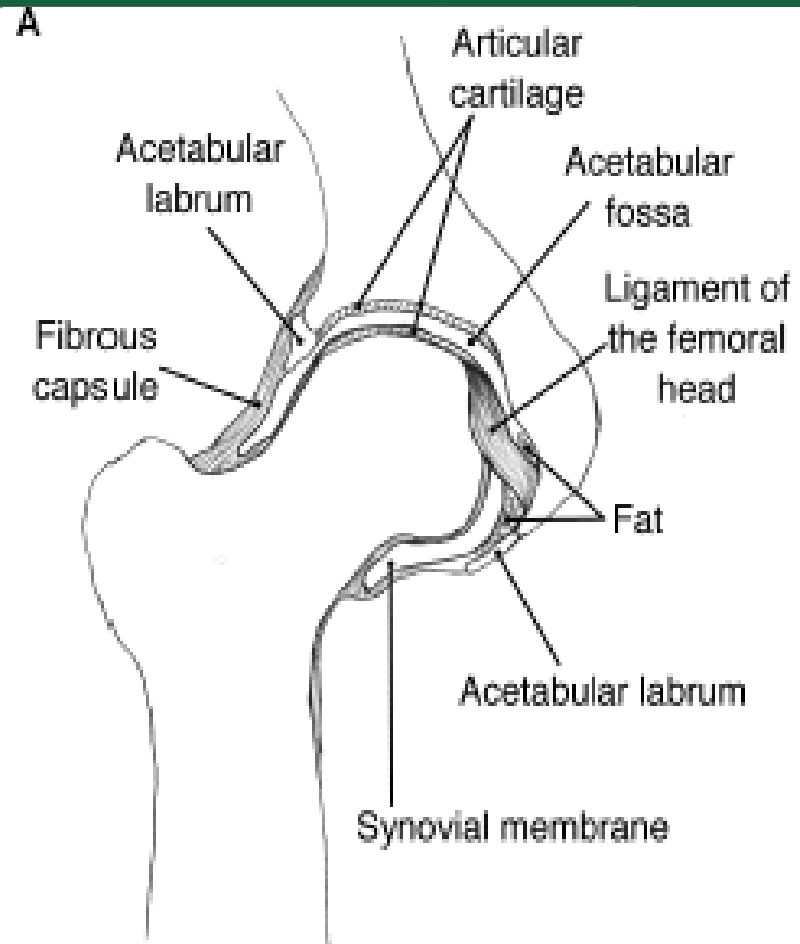
# Acetabular Labrum

Deepens the socket allowing for greater coverage of the femoral head

- Maintain stability
- Decrease contact pressure

Provides a fluid seal for the hip joint

**\*\*Most common area of injury is at the capsulolabral junction**



# Labral Function

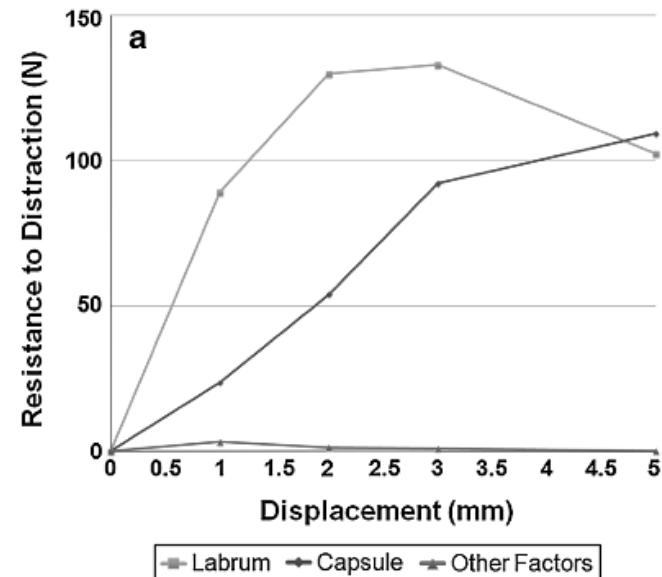
Labrum maintains intra-articular fluid pressurization

- Decreases with labral tear / resection
- Through-type labral repair > looped-type labral repair
- Labral reconstruction normalized IAP

Labrum stabilizes hip by maintaining suction seal at small displacement (1-2mm) but capsule has a greater role at larger displacement

- May explain microinstability in the setting of labral injury.

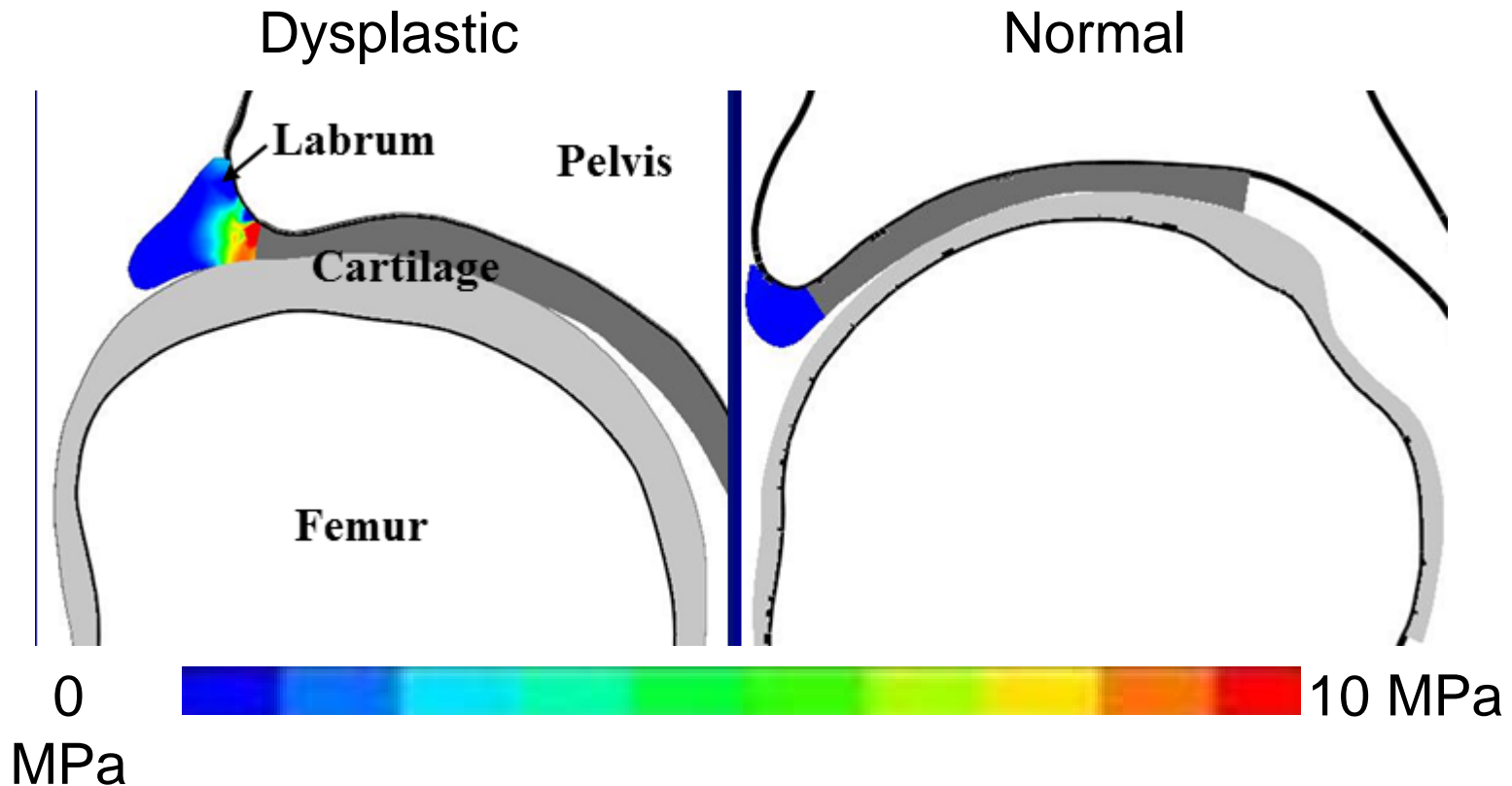
Role of Capsule and Labrum in Force Required for Distraction





# Labrum Contact Mechanics

Findings: Compared to normal hips, the labrum in dysplastic hips supported a larger percentage of total load transferred to the hip<sup>1</sup>



# Role of the Acetabular Labrum and the Iliofemoral Ligament in Hip Stability

## An In Vitro Biplane Fluoroscopy Study

Casey A. Myers,<sup>\*†</sup> MSc, Bradley C. Register,<sup>‡</sup> MD, Pisit Lertwanich,<sup>§</sup> MD, Leandro Ejnisman,<sup>\*</sup> MD, W. Wes Pennington,<sup>\*</sup> MSc, J. Erik Giphart,<sup>\*</sup> PhD, Robert F. LaPrade,<sup>\*</sup> MD, PhD, and Marc J. Philippon,<sup>\*||</sup> MD

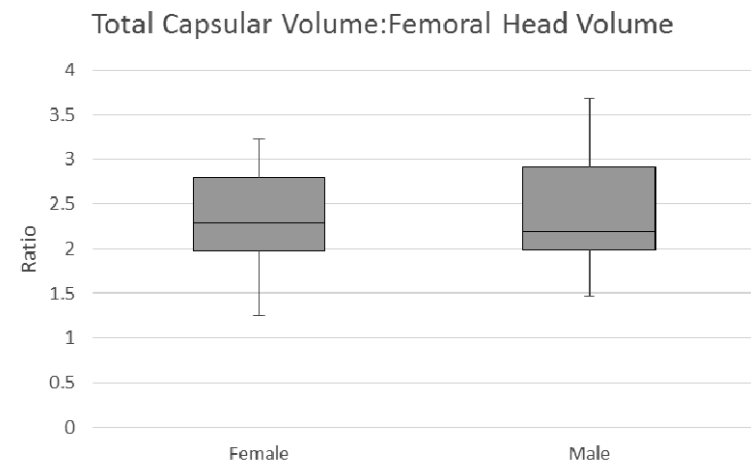
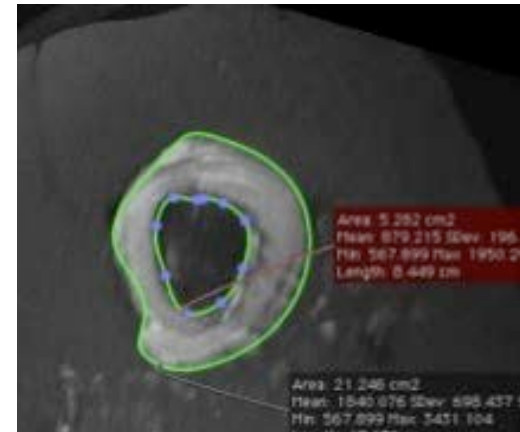
*Investigation performed at the Biomechanics Research Department of the Steadman Philippon Research Institute, Vail, Colorado*

ER and translation  
increased when IFL  
and labrum sectioned

- IFL has a significant role in limiting ER and anterior *translation*
- Labrum has a secondary role

- 97 patients had MRA for suspected labral injury with FAI
  - Males had larger total capsular volume, femoral head volume, and true capsular volume compared to females
  - No difference TCV : FHV
- Study does not account for the tissue histology and connective tissue content
  - Increased elastin (Rodeo AJSM 1998)
  - Increased cysteine - AA found in type III collagen and fibrillin (Hirakwa et al. 1991)

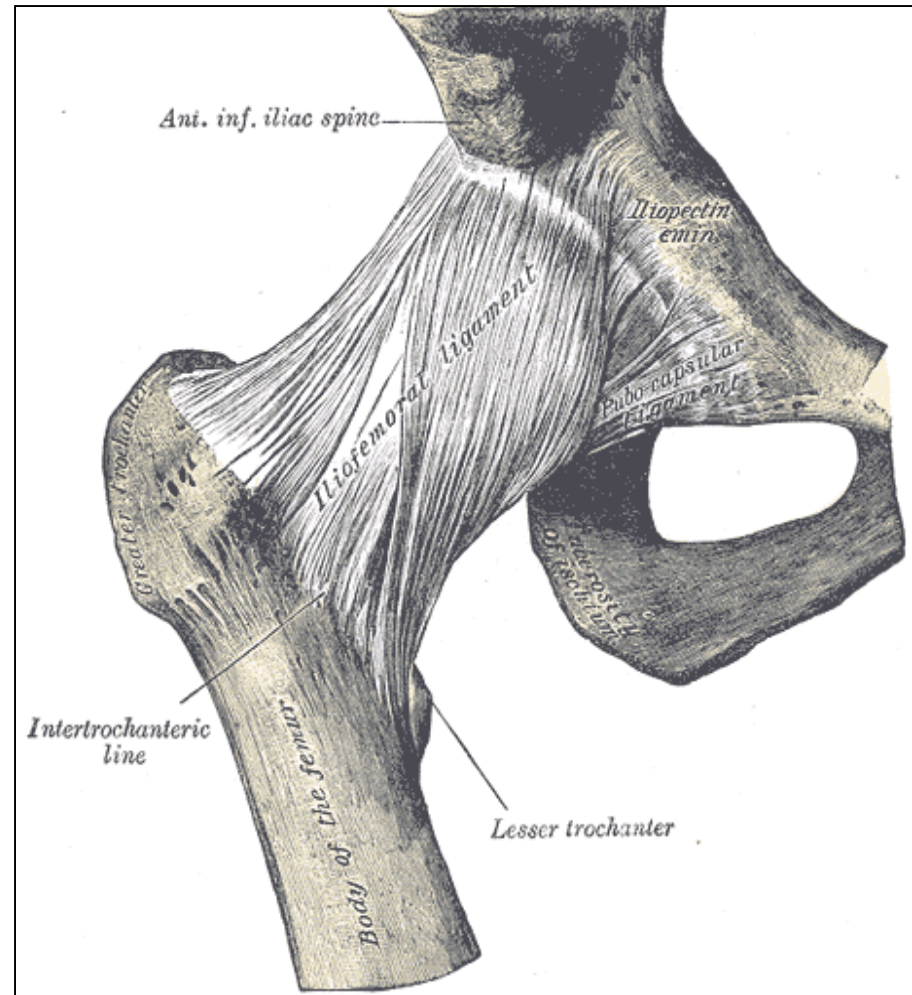
Frank et al. KSSTA 2014.



# Anterior Hip Capsule and Ligamentous Support

Anterior Static Stabilizers: restrains extension & external rotation

- Iliofemoral ligament (Y Ligament of Bigelow): strongest hip ligaments
  - Originates from AIIS and inserts on the intertrochanteric line of femur.
  - Terminal fibers form zona orbicularis
  - “Screw home” mechanism with hip extension / ER
- Pubofemoral ligament
  - Originates from the pubic rami and inserts on the intertrochanteric crest





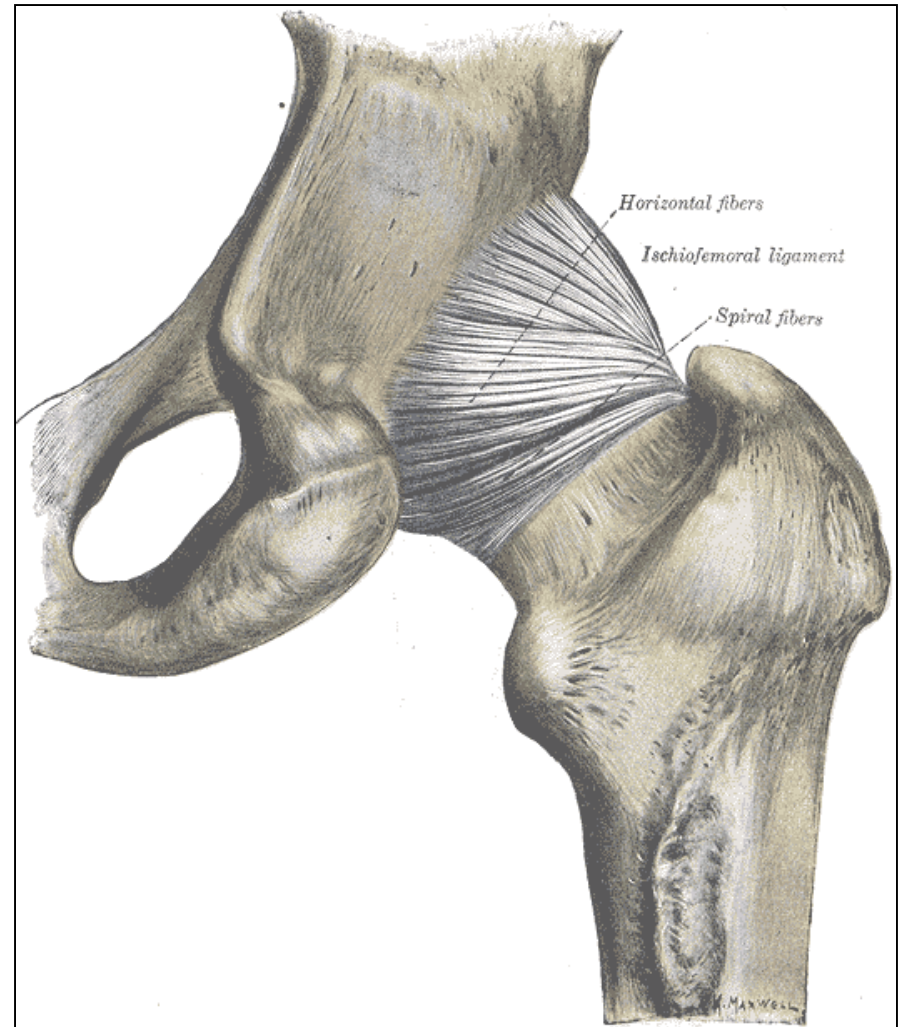
# Posterior Hip Capsule and Ligamentous Support

Posterior Static Stabilizers: restrains internal rotation in flexion and extension

- Ischiofemoral ligament:
  - originates from the ischial rim and inserts on the posterosuperior base of the GT
    - Blends with zona orbicularis posteriorly

Zona Orbicularis

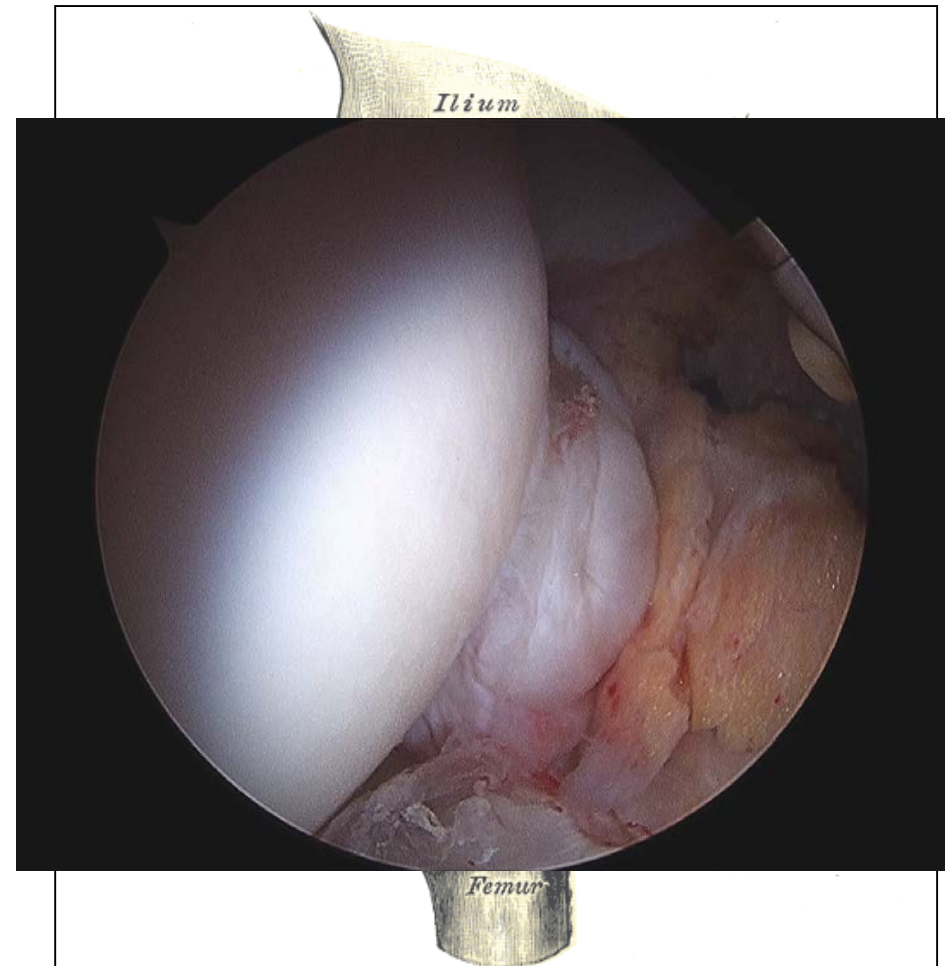
- Encircles entire femoral neck
- Functions as locking ring around the femoral neck and provides stability with distraction



# Ligamentum Teres

## Ligamentum Teres

- Travels from the inferior aspect of the acetabulum at the transverse acetabular ligament to fovea of the femoral head (fovea capitis).
- Tension with adduction and ER
- May serve as a secondary stabilizing structure
- Torn LT has been described as a source of hip pain (Byrd & Jones. Arthroscopy 2004).
  - Some have recommended debridement (Haviv & O'Donnell. KSSTA 2011)
  - Some have recommended LT reconstruction (Amenabar et al. Arth Tech 2012; Lindner Arth Tech 2012; Philippon et al. JBJS Br 2013.)

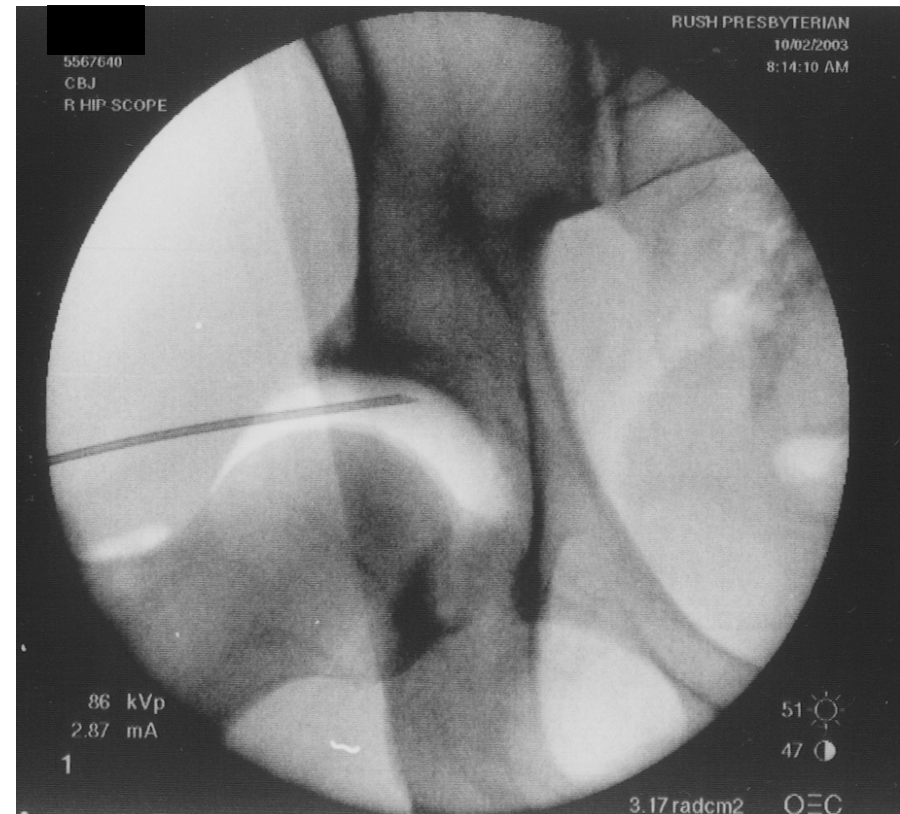


# Negative Intra-Articular Pressure

## Pre-Capsular Venting

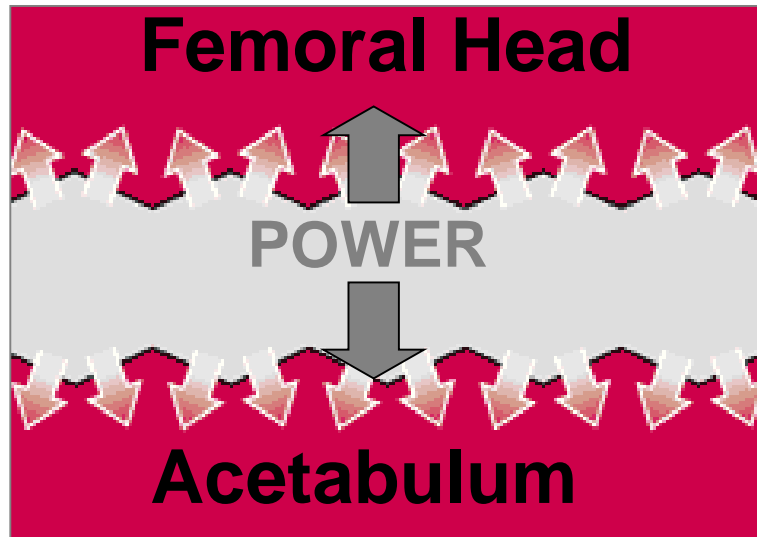


## Post-Capsular Venting

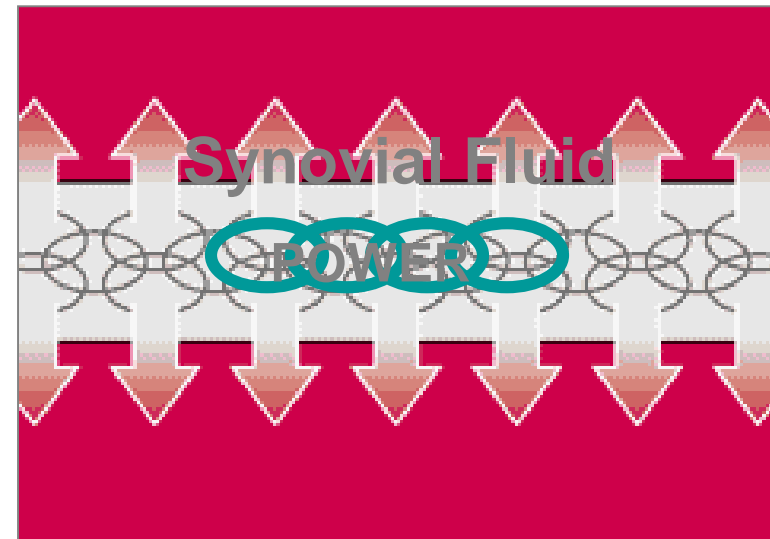


# Adhesion - Cohesion

## Adhesion

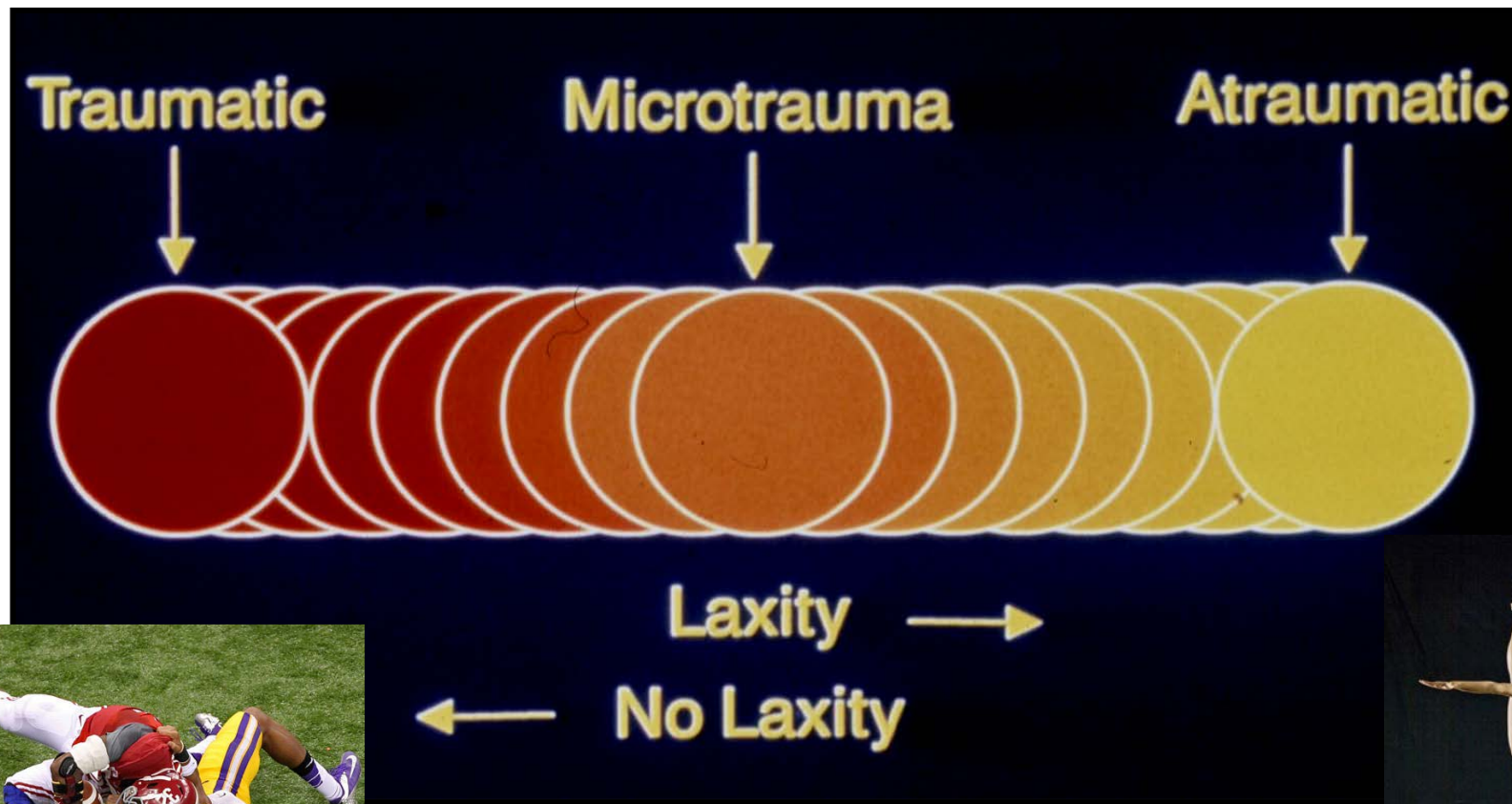


## Cohesion





# Spectrum of Hip Instability





# Traumatic Hip Instability

## Traumatic Instability

High energy: motor vehicle accident

Lower energy: athletic competition with fall on flexed hip

- Football, rugby, soccer, gymnastics, basketball, biking

Philippon et al. Arthroscopy 2009.



# Management of Acute Hip Dislocations

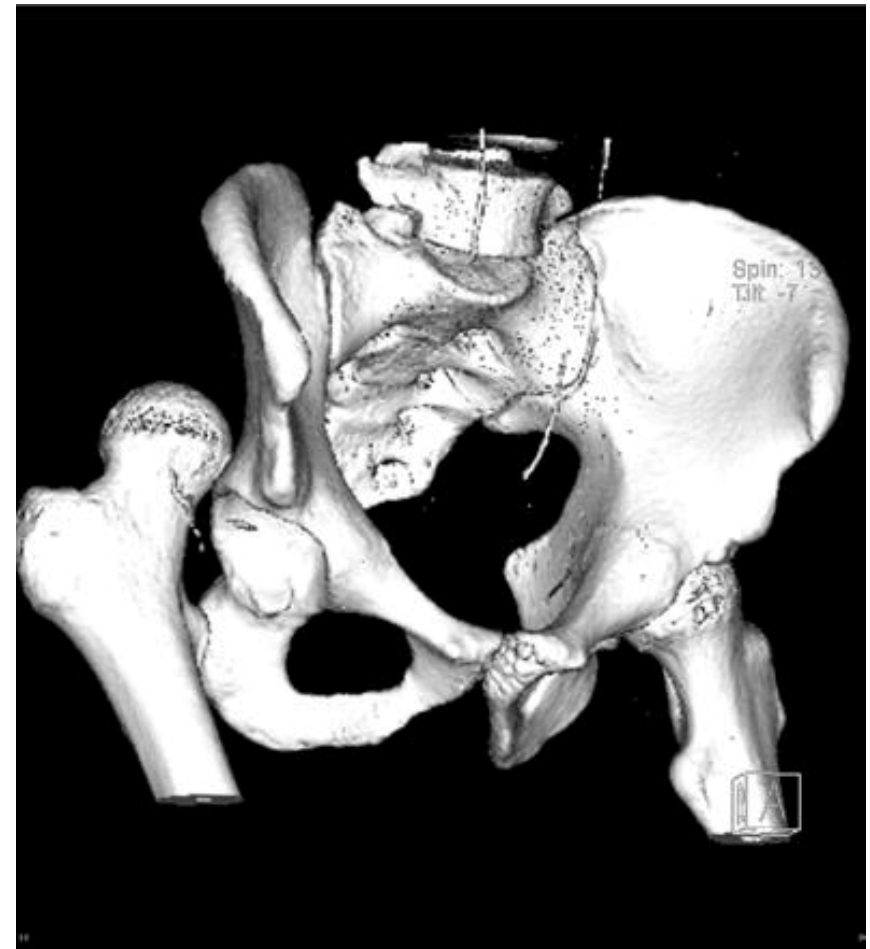
History and physical exam

- Hip fixed in flexion, adduction, internal rotation
- Neurovascular exam

Radiographs: AP & lateral views & Judet views

Acute management: closed reduction < 6 hrs

- AVN 7-25%
- CT scan after reduction
- Operative
  - Acute arthroscopy for retained fragment
  - ORIF : Fracture - Dislocations



# FAI Induced Hip Instability

## Traumatic Hip Dislocations (Philippon et al. Arthroscopy 2009)

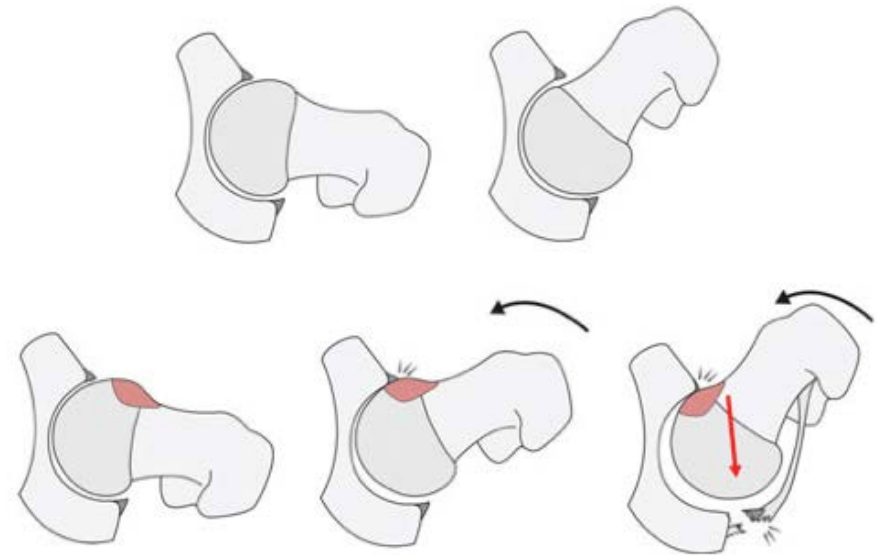
- All 14 RTP in professional athletes
- 9 of 14 with FAI

## FAI – Induced Hip Instability (Krych et al. CORR 2012.)

- 20 of 22 patients RTP
- 18 of 22 with FAI

## MOI

- No FAI: posterior directed force with hip in flexion – adduction (ie, dashboard)
- FAI: torsion and hyperflexion



CAM, Femoral Retroversion,  
Acetabular Retroversion

Krych et al. CORR 2012.

# Atraumatic Hip Instability

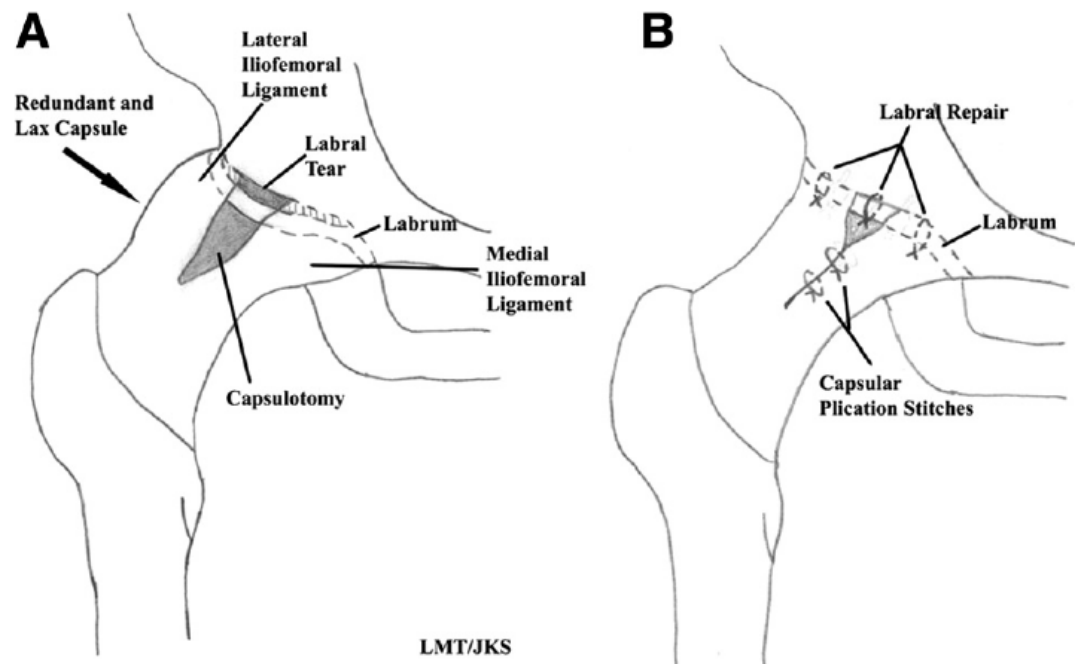
## A Clinically Relevant Review of Hip Biomechanics

*Arthroscopy: The Journal of Arthroscopic and Related Surgery, Vol 26, No 8 (August), 2010: pp 1118-1129*

Karl F. Bowman, Jr., M.D., Jeremy Fox, B.A., and Jon K. Sekiya, M.D.

### Capsular laxity

- Etiology: repetitive microtrauma, generalized lig laxity, connective tissue disorders, etc.
- Symptoms: groin pain and associated snapping iliopsoas tendon in setting of hypermobility
- MOI: increased translation may cause labral injury
- Surgery: controversial





# Ehlers-Danlos Syndrome: Arthroscopic Management for Extreme Soft-Tissue Hip Instability

Christopher M. Larson, M.D., Rebecca M. Stone, M.S., A.T.C., Emma F. Grossi, B.S.,  
M. Russell Giveans, Ph.D., and Geoffrey D. Cornelsen, D.O.

## EDS hypermobility type

- Giving way and pain
- Easily distractable hip with manual traction with fluoro
- Patulous capsule intra-op

16 patients with 44.6 months follow-up (LCEA 31°, AA 63.6°, Tonnis 3.6°)

13 cases primary HA

3 cases revision HA

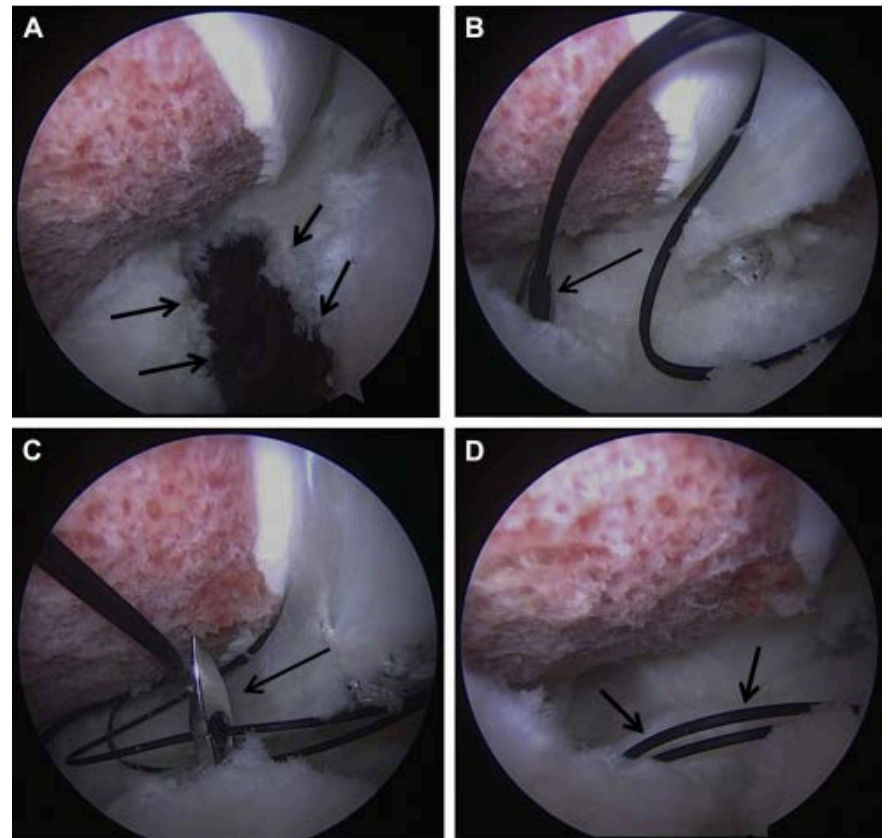
## Hip Function Outcomes

MHHS 45.6 → 88.5

No dislocations

1 revision for continued pain

Larson et al. Arthroscopy 2015.





# Atraumatic Hip Instability

## Imaging Studies

- Radiographs / CT scan: Osseous anatomy to identify dysplasia/FAI
- MRI: attenuation of lateral insertion of IFL with max ER (60°)

## Pathomechanics

- Normal osseous morphology
- Trends towards increased abduction and ER (ie, turnout) and decreased IR
- Femoral head subluxation of 2.05mm – 5.14mm in dancers when in splits position

Blakey, Field, et al. Hip Int 2010.



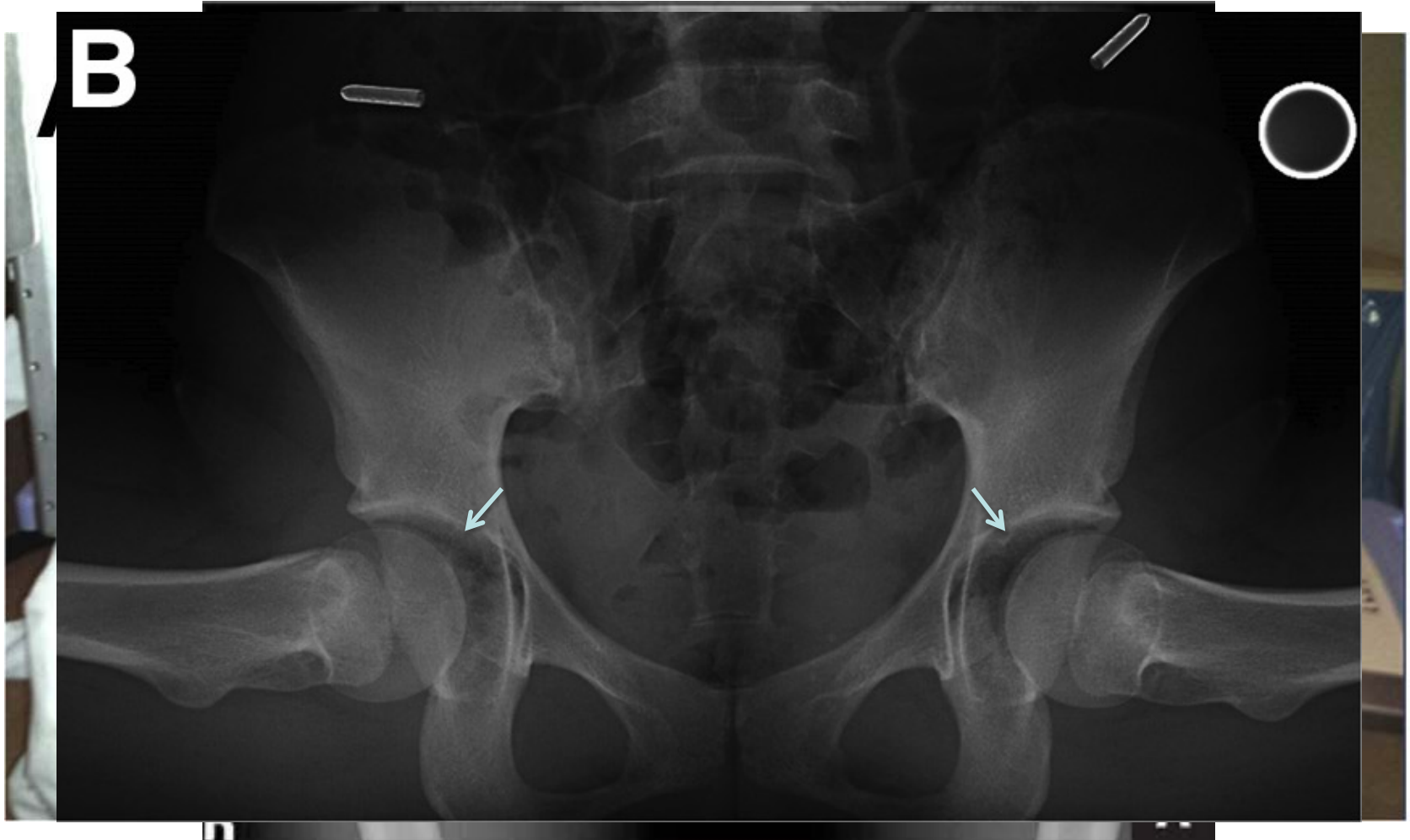
## Treatment:

Hip arthroscopy labral refixation,  
capsular plication  $\pm$  FAI

Duthon et al. Arthroscopy 2013.

Charbonnier et al. AJSM 2011.

# Atraumatic Hip Instability



## Complications and Reoperations During and After Hip Arthroscopy: A Systematic Review of 92 Studies and More Than 6,000 Patients

Joshua D. Harris, M.D., Frank M. McCormick, M.D., Geoffrey D. Abrams, M.D., Anil K. Gupta, M.D., M.B.A., Thomas J. Ellis, M.D., Bernard R. Bach Jr., M.D., Charles A. Bush-Joseph, M.D., and Shane J. Nho, M.D., M.S.

**4 Hip dislocations out of 6,134 cases**

**Table 3.** Complications After Hip Arthroscopy

Parameter	n (%)
Nerve injury	87 (1.4%)
Temporary	86 (99%)
Pudendal	34 (40%)
Lateral femoral cutaneous nerve	18 (21%)
Sciatic	15 (17%)
Common peroneal	15 (17%)
Femoral	4 (4.7%)
Permanent	1 (1%)
Sciatic (partial)	1
Iatrogenic	
Chondral injury	241
Labral injury	54
Perineal skin damage	10
Labia/vagina	6
Scrotum	4
Infection	8
Superficial (antibiotic treatment)	7
Deep (arthrotomy, drainage)	1
Deep vein thrombosis	7
Pulmonary embolus	1
Avascular necrosis	10
Heterotopic ossification	42
Reflex sympathetic dystrophy	3
Broken instrumentation	9
Femoral neck fracture	3
Hypothermia	7
Hip dislocation	4
Extra-articular fluid extravasation	22
Intra-abdominal	19
Intrathoracic	3
Vascular injury	2
Occlusion at ankle caused by traction boot	1
Inferior gluteal artery laceration/pseudoaneurysm	1
Death	2
Unrelated	1
Pulmonary embolus	1

# Hip Dislocation or Subluxation After Hip Arthroscopy: A Systematic Review

Neil L. Duplantier, M.D., Patrick C. McCulloch, M.D., Shane J. Nho, M.D.,  
Richard C. Mather III, M.D., Brian D. Lewis, M.D., and Joshua D. Harris, M.D.

Arthroscopy: The Journal of Arthroscopic and Related Surgery, Vol -, No - (Month), 2016: pp 1-7



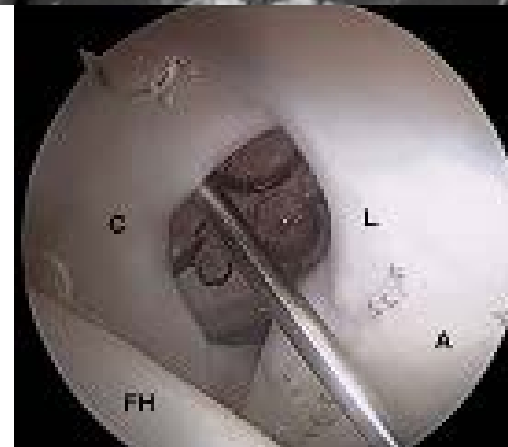
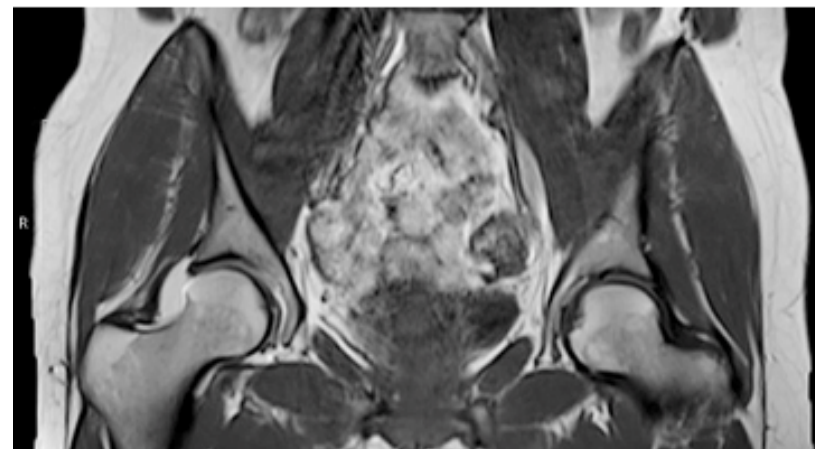
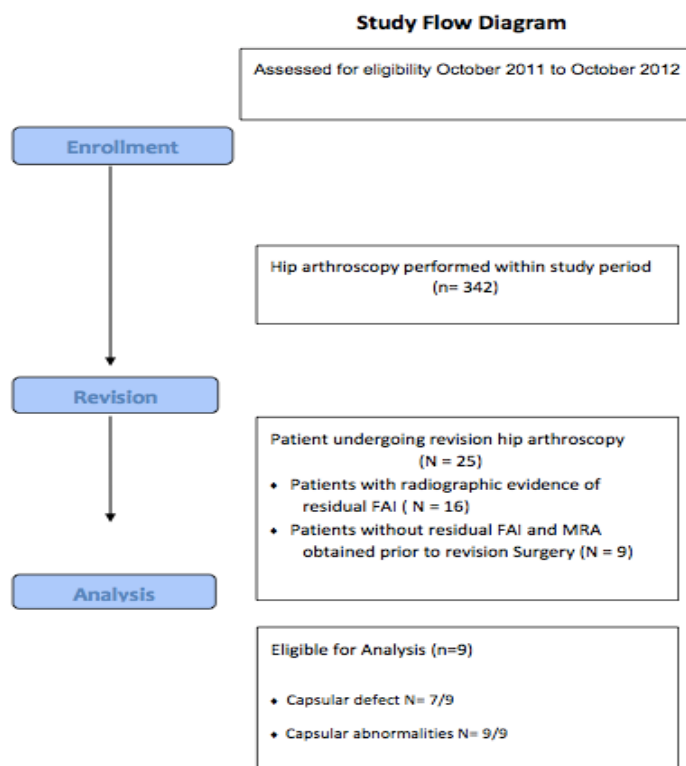
## 11 reported cases on macroinstability after hip arthroscopy

- Benali & Katthagen, Arthroscopy 2009.
- Matsuda, Arthroscopy 2009.
- Ranawat et al. JBJS 2009.
- Mei-Dan et al. Arthroscopy 2012.
- Sansone et al. KSSTA 2013.

Sansone et al. KSSTA 2013.

# Evidence of capsular defect following hip arthroscopy

Frank McCormick · William Slikker III · Joshua D. Harris · Anil K. Gupta ·  
Geoffrey D. Abrams · Jonathan Frank · Bernard R. Bach Jr · Shane J. Nho





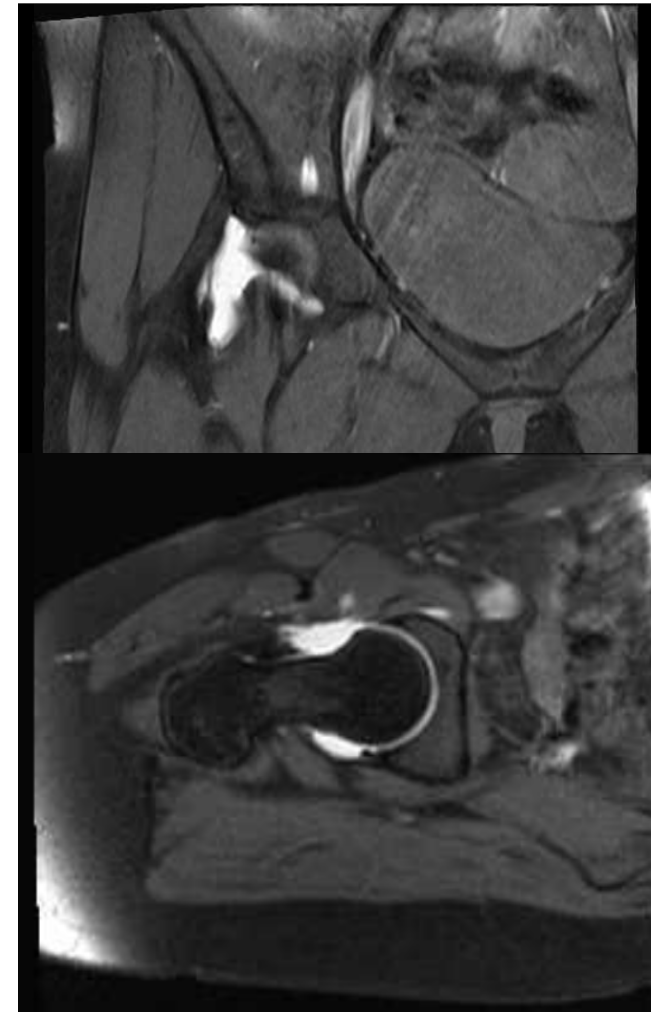
# Why do I close the capsule?

20 yr old woman

- Oct 2011: femoral osteochondroplasty
- Oct 2012: Iliopsoas lengthening

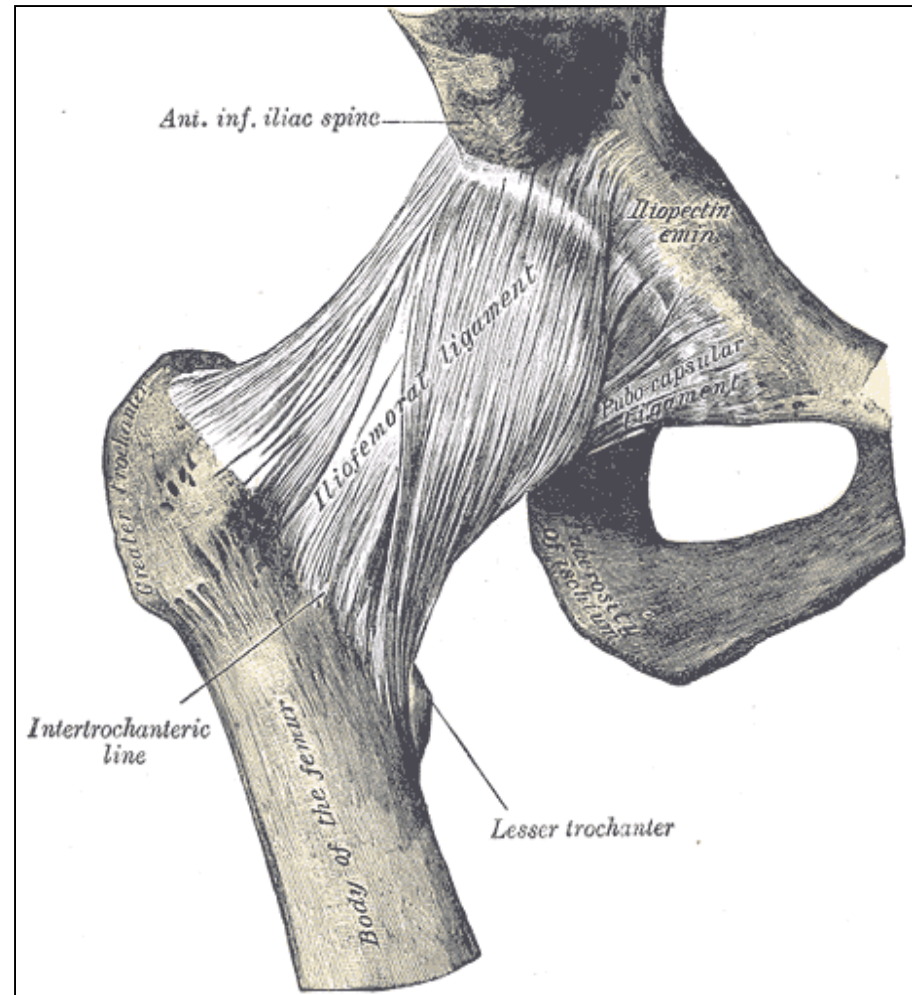
She cannot participate in any recreational activities

Groin pain worse w sitting, shoes and socks, walking on her toes



# Rationale for Capsular Closure

- Understand Anatomy: Structure and Function of the IFL
- Capsulotomy
  - Size & location of Interportal
  - T-Capsulotomy
- Rationale for capsular closure: anatomic repair of the IFL should restore the biomechanical characteristics of the IFL.
  1. Axial strain
  2. Translation
  3. Rotation



# Effect of Capsulotomy on Hip Stability— A Consideration During Hip Arthroscopy

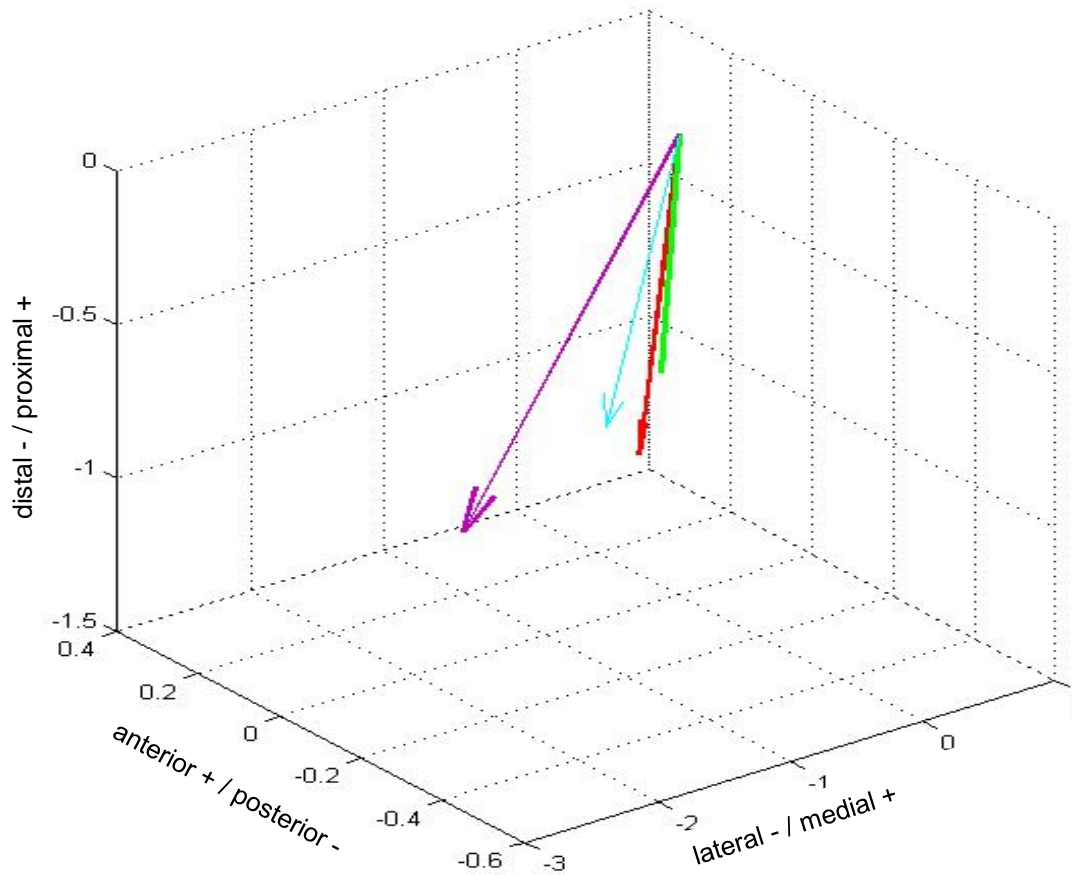
Christopher O. Bayne, MD, Robert Stanley, BS, Peter Simon, MS, Alejandro Espinoza-Orias, PhD, Michael J. Salata, MD, Charles A. Bush-Joseph, MD, Nozomu Inoue, MD, PhD, and Shane J. Nho, MD, MS

Thirteen fresh-frozen  
cadaveric specimens  
Six reflective infrared  
markers (Eagle 4,  
Motion Analysis, Santa  
Rosa, CA)  
4 conditions:  
Intact-Neutral, Intact-  
Flexion, Capsulotomy-  
Neutral, Capsulotomy-  
Flexion  
ER torque 0.588 Nm



Bayne et al. AJO 2014.

# Hip Kinematics



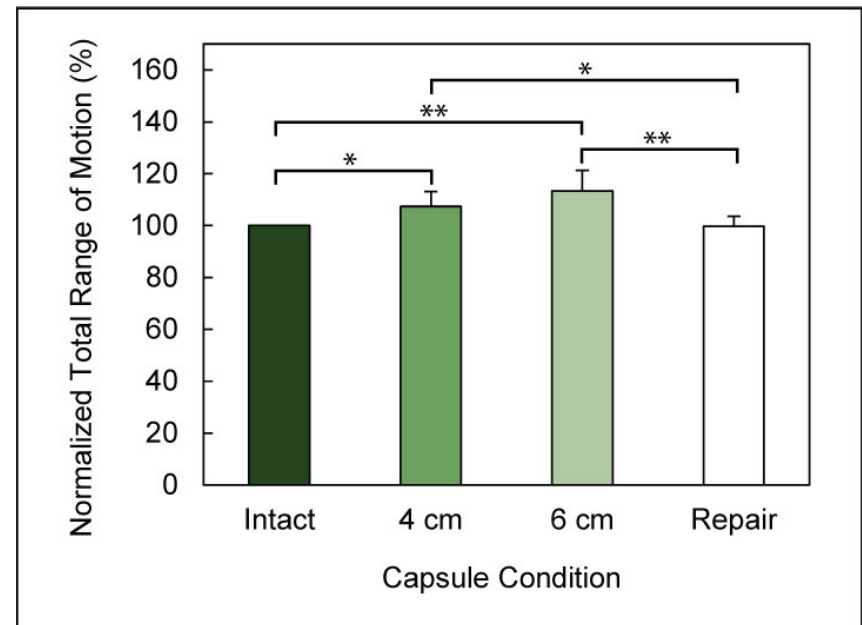
## LEGEND:

- Neutral (intact) - light blue
- Neutral (capsulotomy) - purple
- Flexed (intact) - green
- Flexed (capsulotomy) - red

# 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.

- Prior cadavaric studies in our lab have demonstrated that a interportal capsulotomy increases hip rotation and translation compared to an intact hip
- Increasing the size of the interportal capsulotomy has a dose dependent effect on rotation



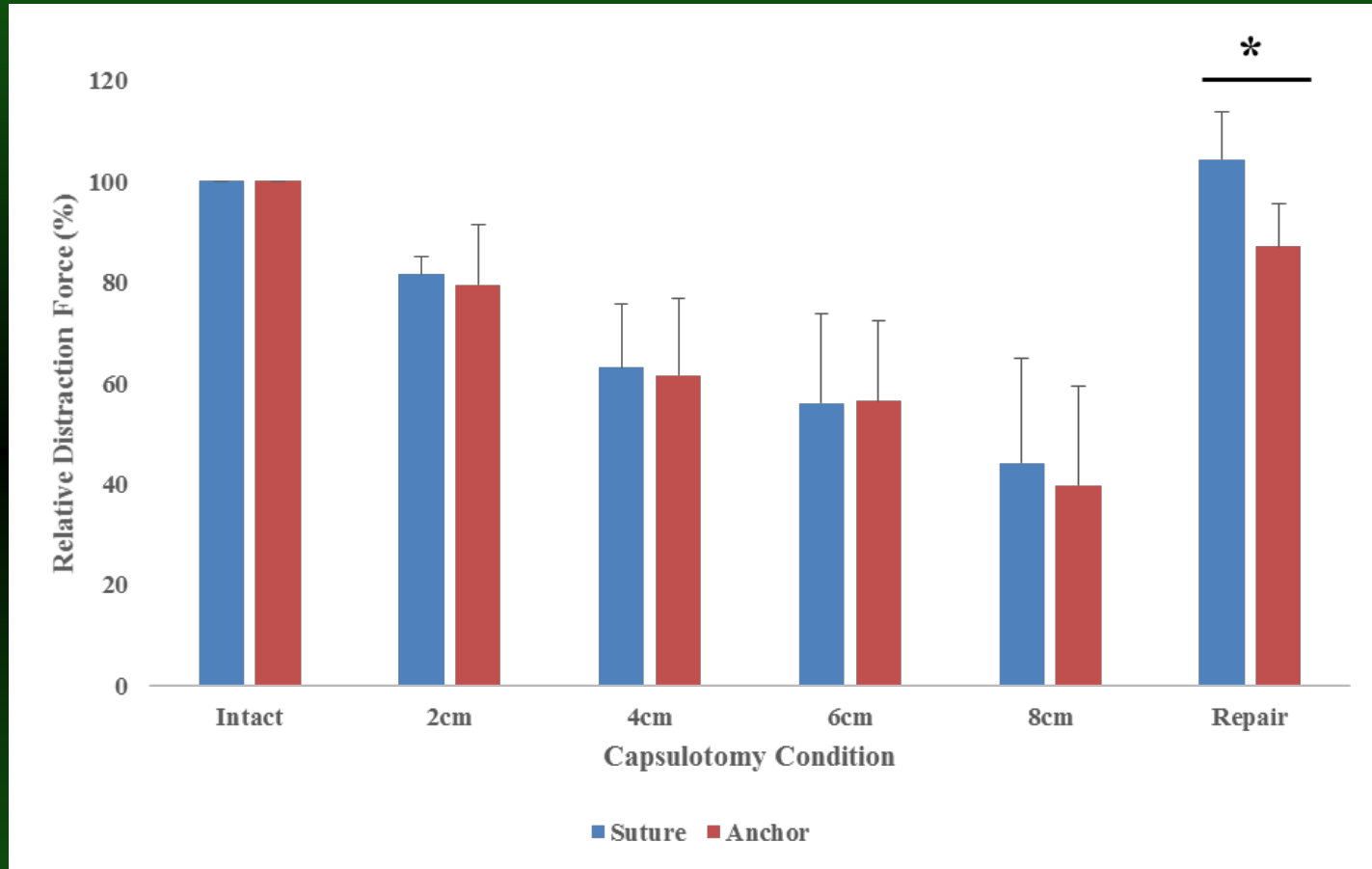


# The Effect of Capsulotomy and Capsular Repair on Hip Distraction

- The primary outcome measure was force required for 6mm of hip distraction tested at a distraction rate of 0.5 mm/sec normalized to the intact state.<sup>13</sup>
- The intact state and 2cm, 4cm, 6cm, and 8cm capsulotomy conditions were tested
- The capsule was then repaired using either the SS (Left) or SA (Right) technique.



# Both SS and SA repair techniques increase the distraction force



Both SS and SA repair techniques increased distraction force to a level consistent with the intact hip.

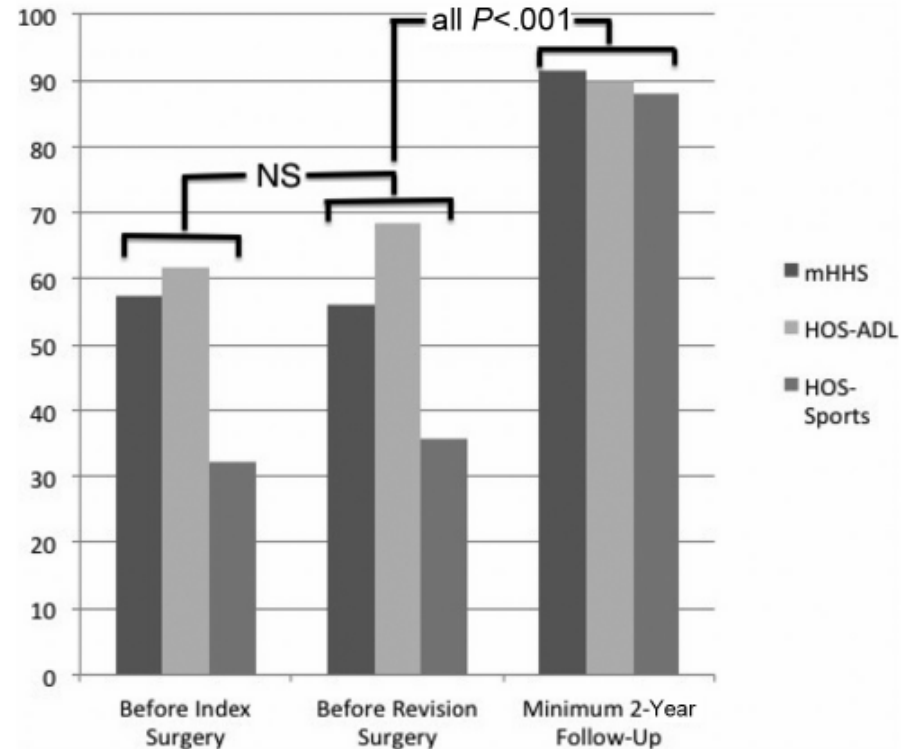
\*SS repair required a higher distraction force to 6mm (104%) than SA repair (87%)

# Arthroscopic Capsular Repair for Symptomatic Hip Instability After Previous Hip Arthroscopic Surgery

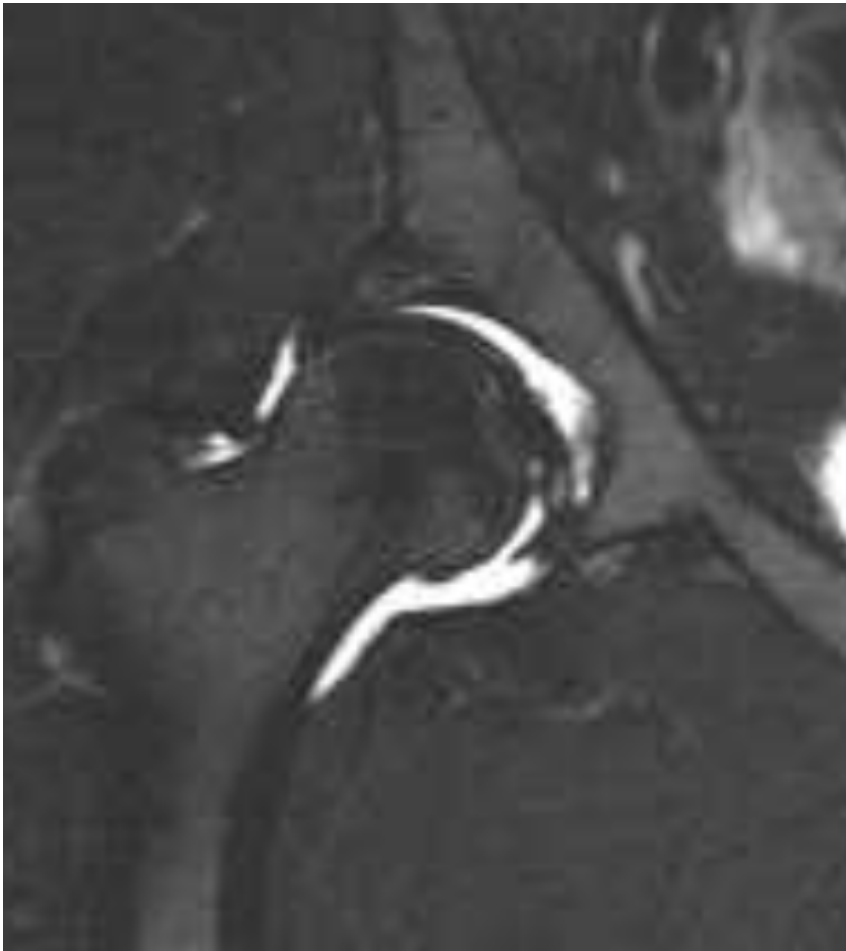
James D. Wylie,\* MD, MHS, James T. Beckmann,<sup>†</sup> MD, MS,  
Travis G. Maak,\* MD, and Stephen K. Aoki,\*<sup>‡</sup> MD

*Investigation performed at the Department of Orthopaedic Surgery,  
University of Utah, Salt Lake City, Utah, USA*

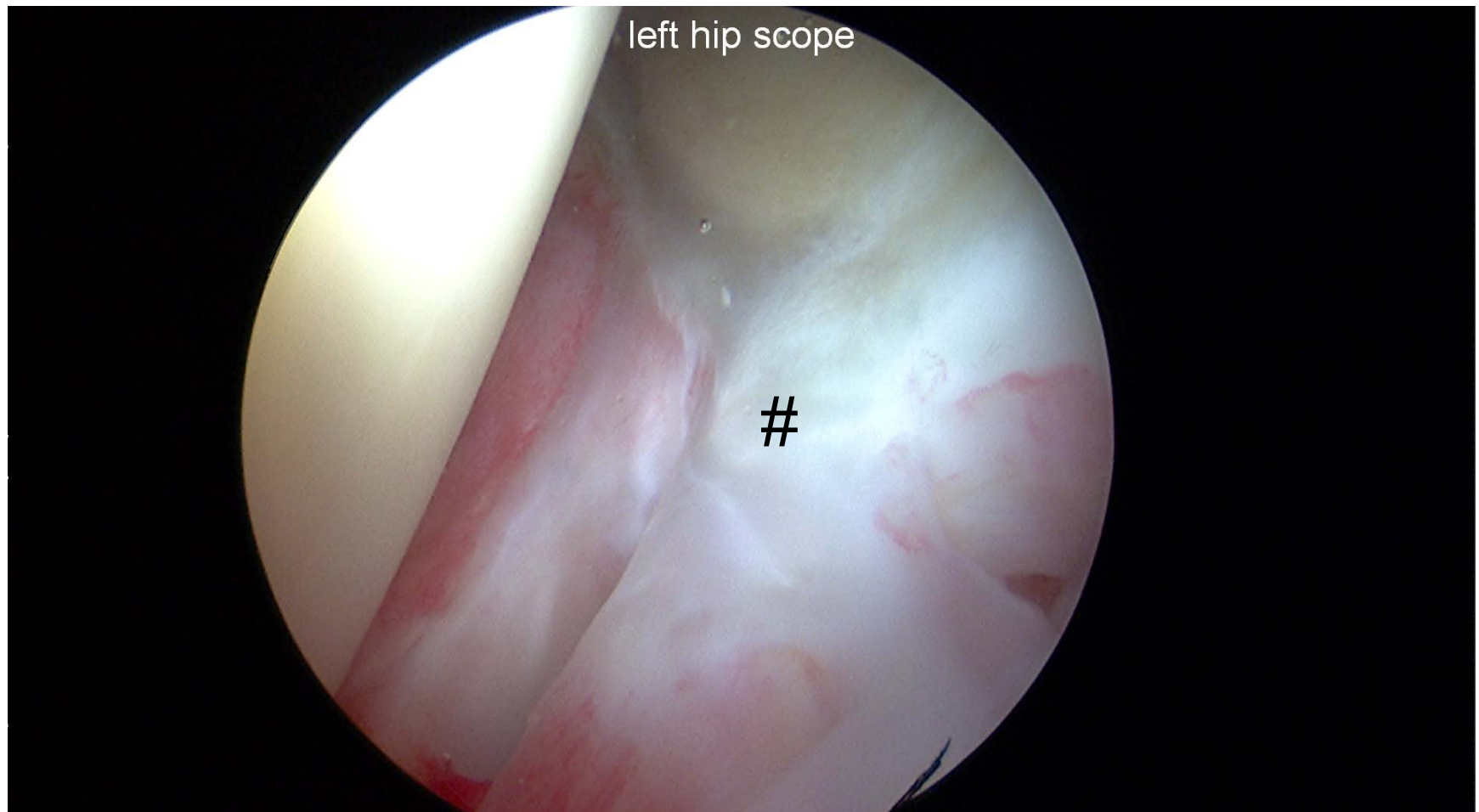
- Out of 1100 cases, 33 patients developed symptomatic instability after HA
- 2 of 33 with hip dislocations
- 31 of 33 with microinstability
- All underwent index HA for treatment of FAI with interportal capsulotomy
- Revision surgery for capsular repair



# Still Not Convinced?



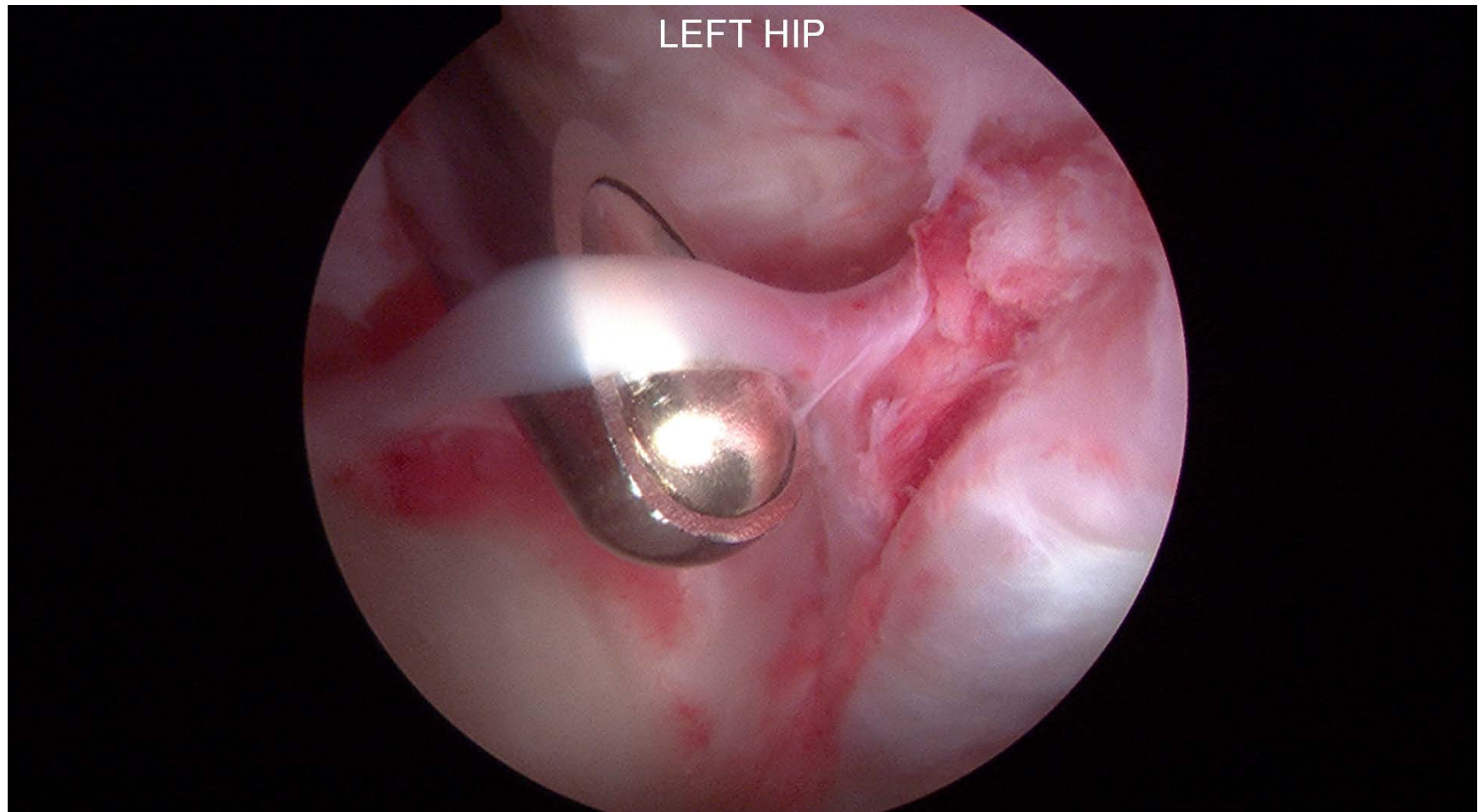
# Capsular Adhesions



Levy et al. Arth Tech 2015.

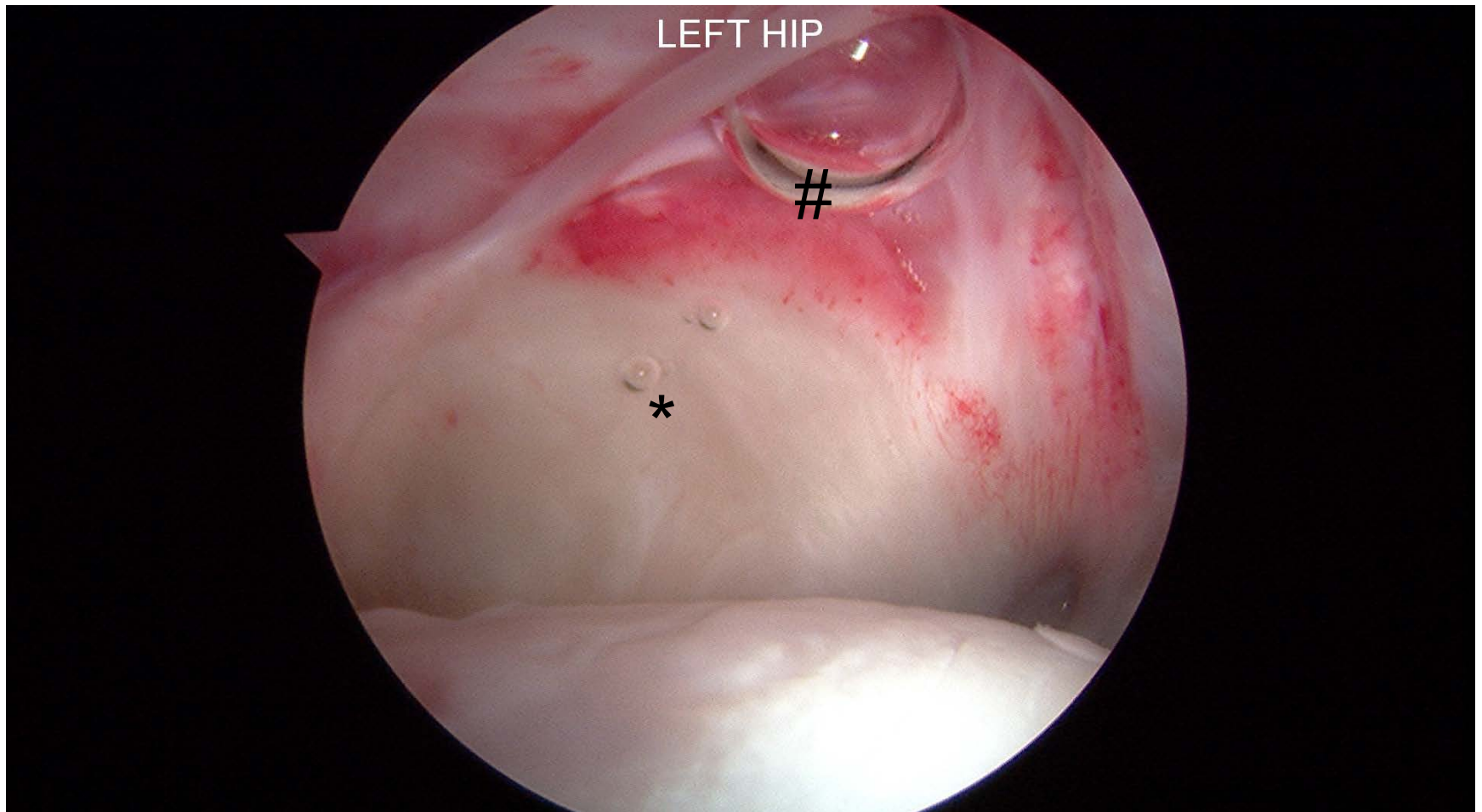


# Drive Through Sign



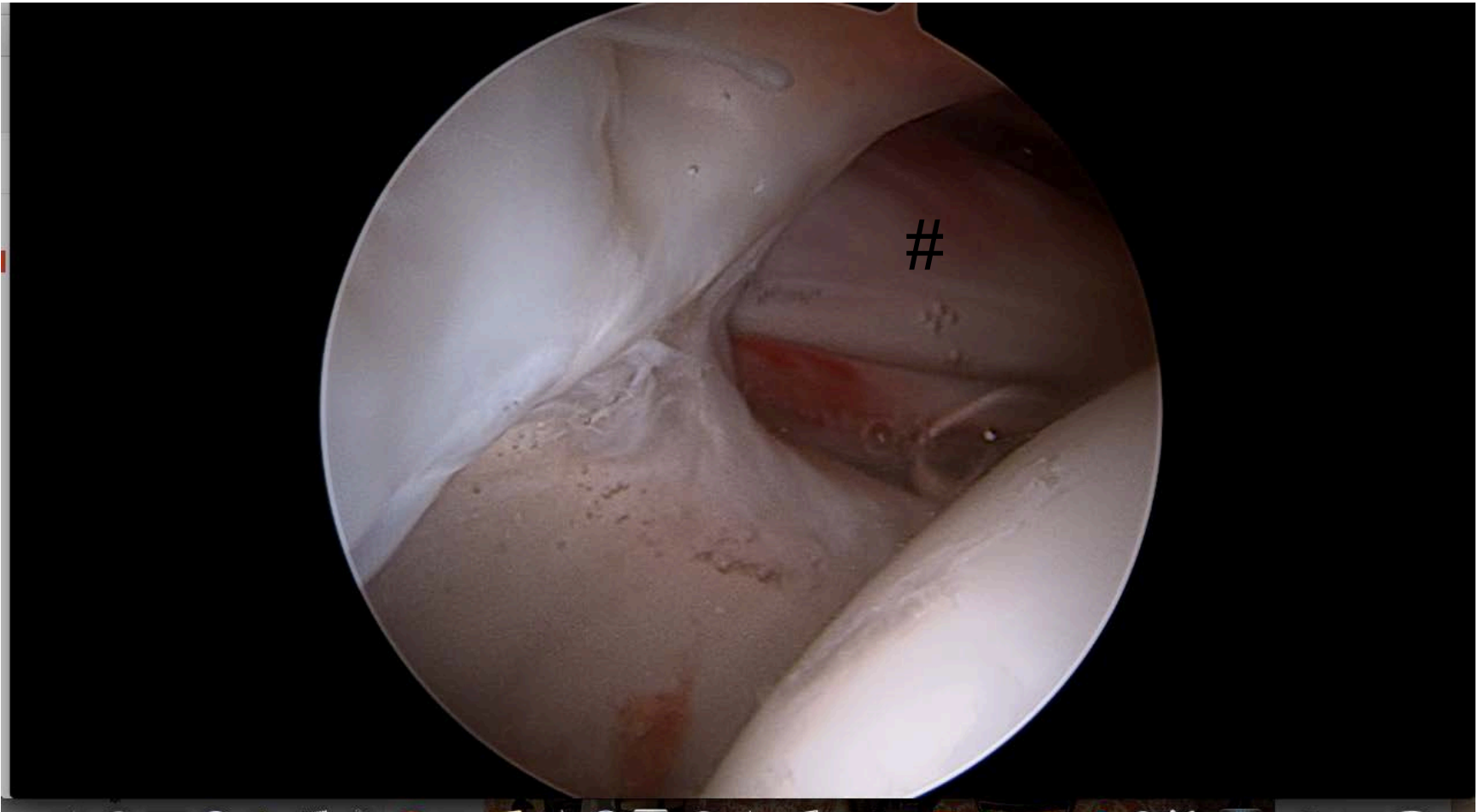
Levy et al. Arth Tech 2015.

# Drive Through Sign



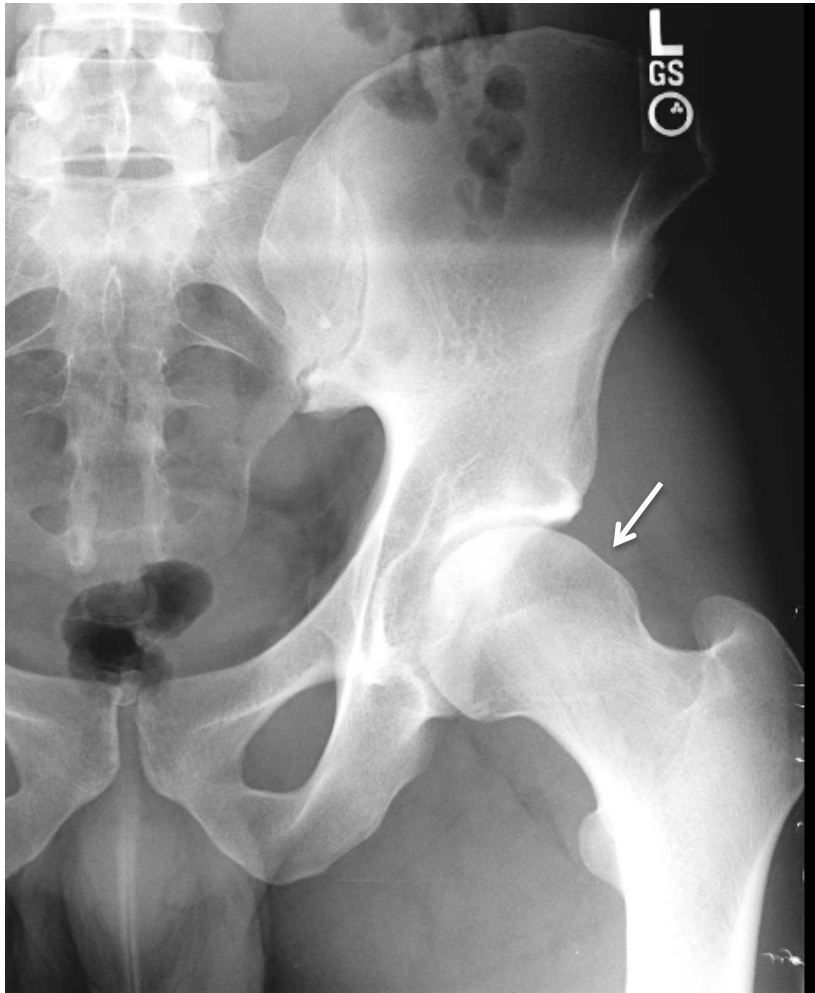
Levy et al. Arth Tech 2015.

# Capsular Defect



Levy et al. Arth Tech 2015.

# Treatment of FAI



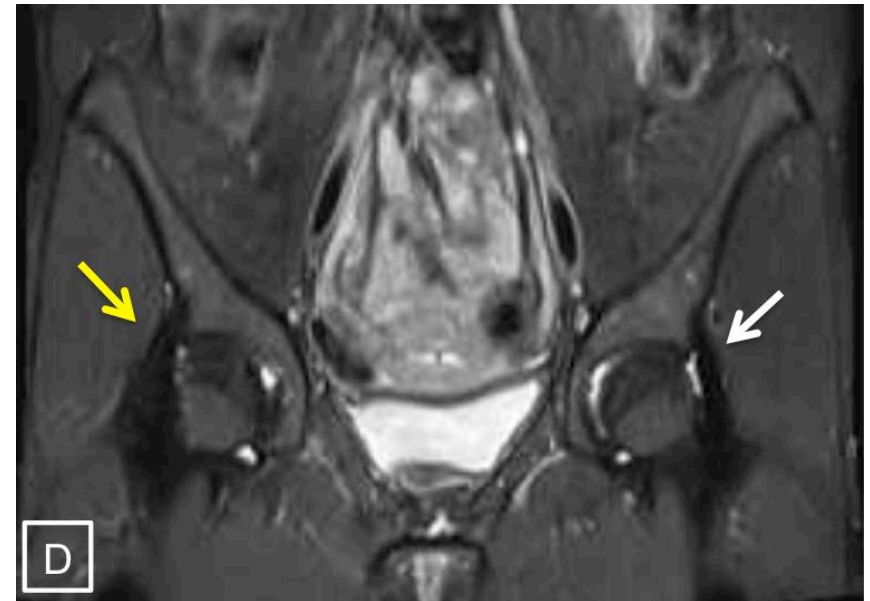


# Capsular Repair Healing

Anatomic repair restores biomechanical characteristics of iliofemoral ligament (strain, rotation, and translation)

- 92.5% Healing after repair

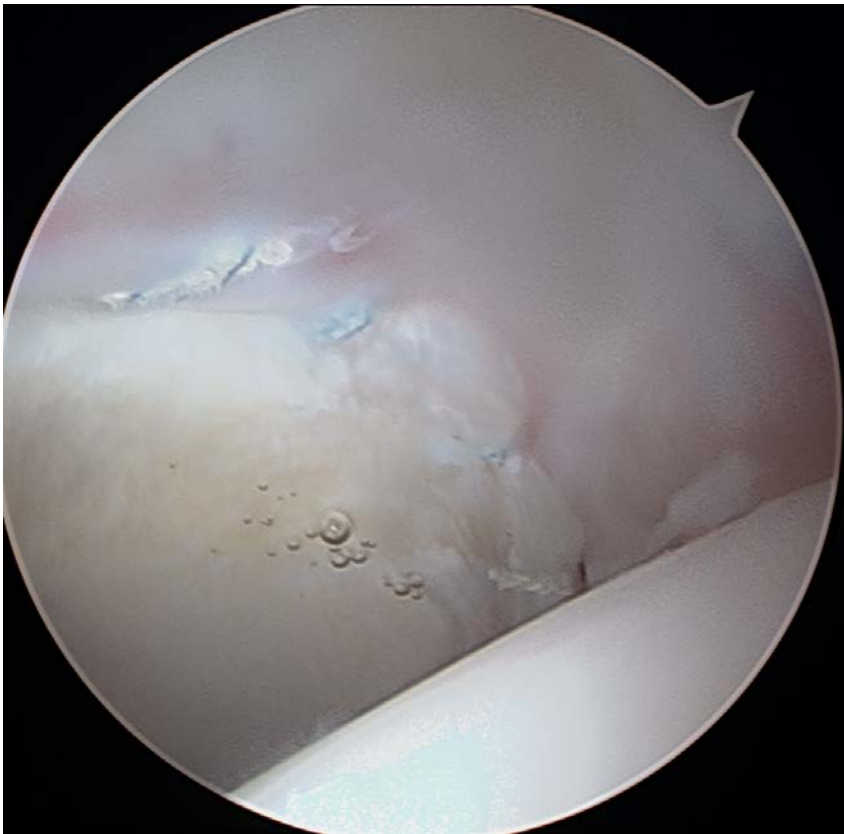
Repaired capsule is thicker compared to contralateral side ( $5.0 \pm 1.2\text{mm}$  vs.  $4.6 \pm 1.4\text{mm}$ ,  $P=0.02$ )



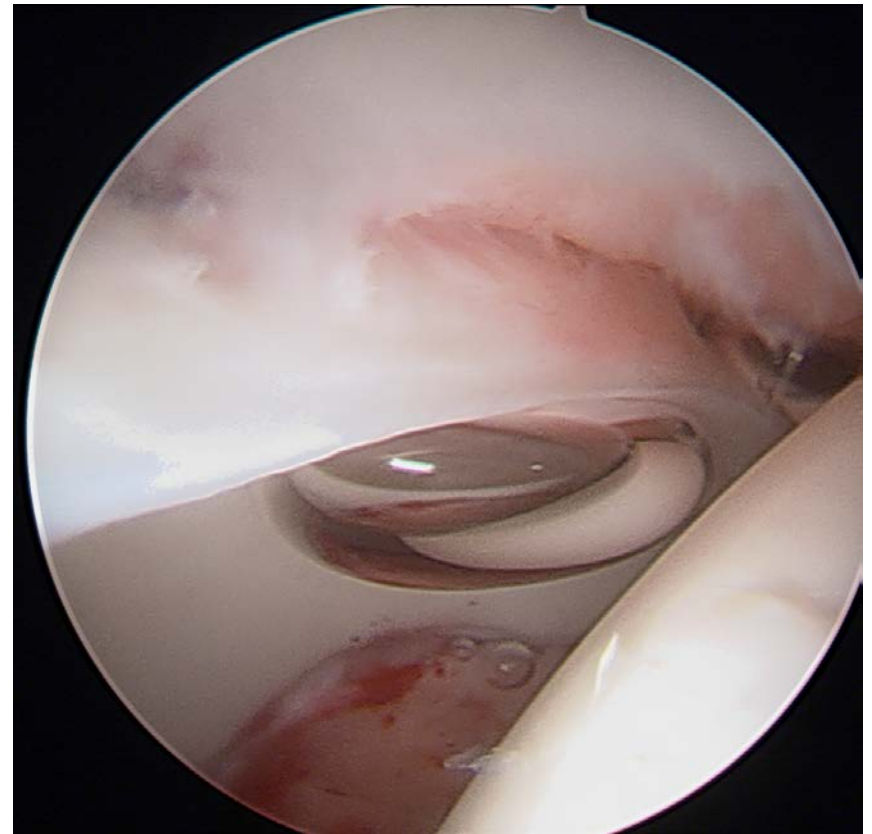


# Second Look after No Repair vs. Repair

**No Capsular Repair**



**Capsular Repair**



# 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

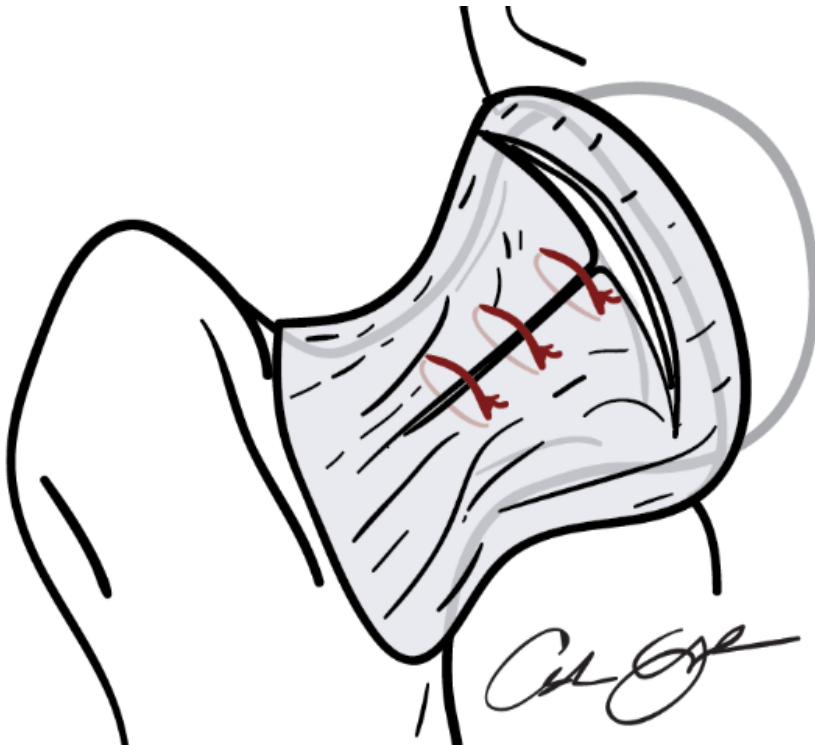
Rachel M. Frank,<sup>\*†</sup> MD, Simon Lee,<sup>†</sup> MPH, Charles A. Bush-Joseph,<sup>†</sup> MD, Bryan T. Kelly,<sup>‡</sup> MD, Michael J. Salata,<sup>§</sup> MD, and Shane J. Nho,<sup>†</sup> MD, MS

*Investigation performed at Rush University Medical Center, Chicago, Illinois, USA*

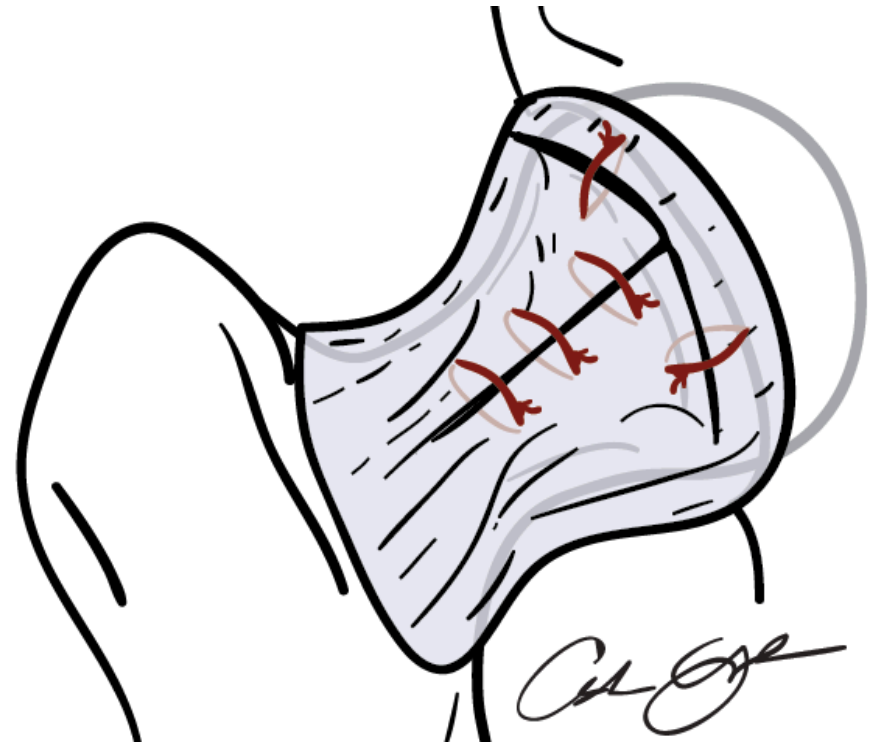
	Partial Closure	Complete Closure
<b>Patients</b>	32	32
<b>Gender</b>		
Male	12	12
Female	20	20
<b>Age</b>	32.87±9.84	32.65±10.16
<b>Side of Surgery</b>		
Left	13	20
Right	19	12
<b>Center Edge Angle</b>	33.27±5.51	34.15±5.57
<b>Alpha Angle</b>	56.91±11.15	59.43±8.27
<b>Follow-up (min-max)</b>	20.63 (12.1-31.73)	15.08 (12.10-19.04)

# Surgical Approach

1. T-capsulotomy with closure of vertical limb only (**Partial Closure**)
2. T-capsulotomy with complete capsular closure (**Complete Closure**)

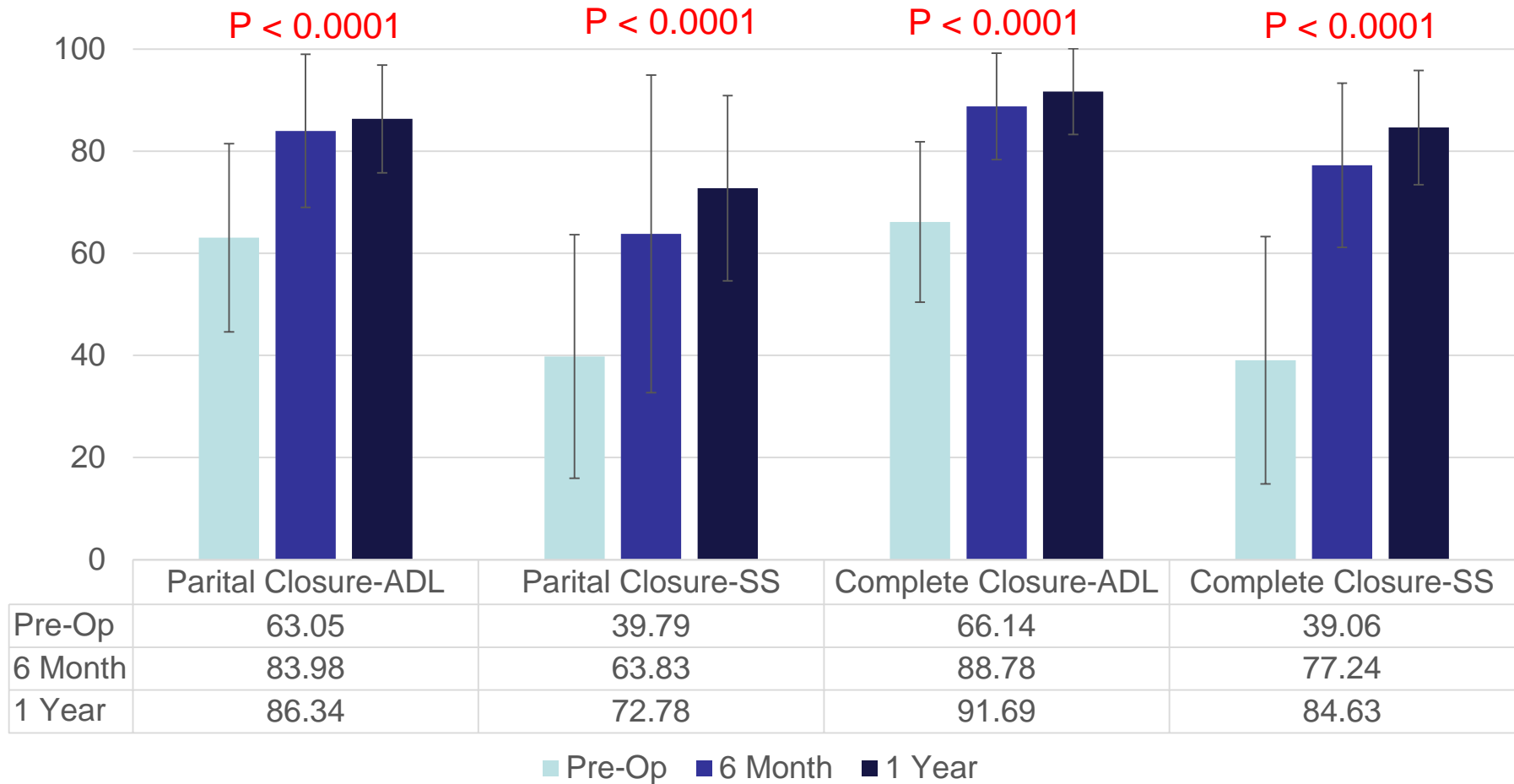


**Partial Closure**



**Complete Closure**

# HOS ADL-SS at Pre-Op/6M/1Y

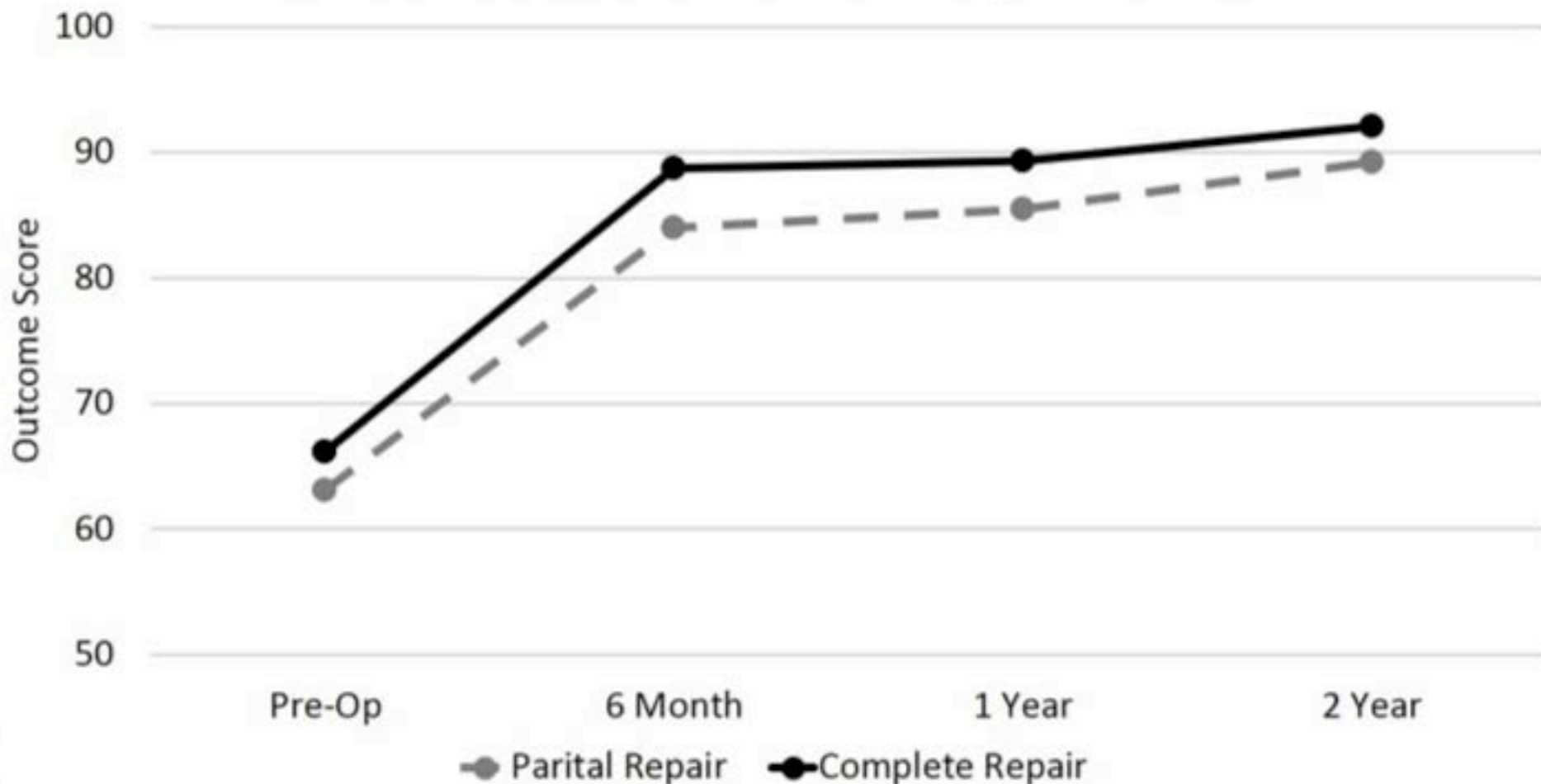


\* 4 Partial Closure Patients Required Revision Surgery

# Partial Closure vs. Complete Closure HOS ADL

**B**

HOS-ADL: Partial Closure vs. Complete Closure

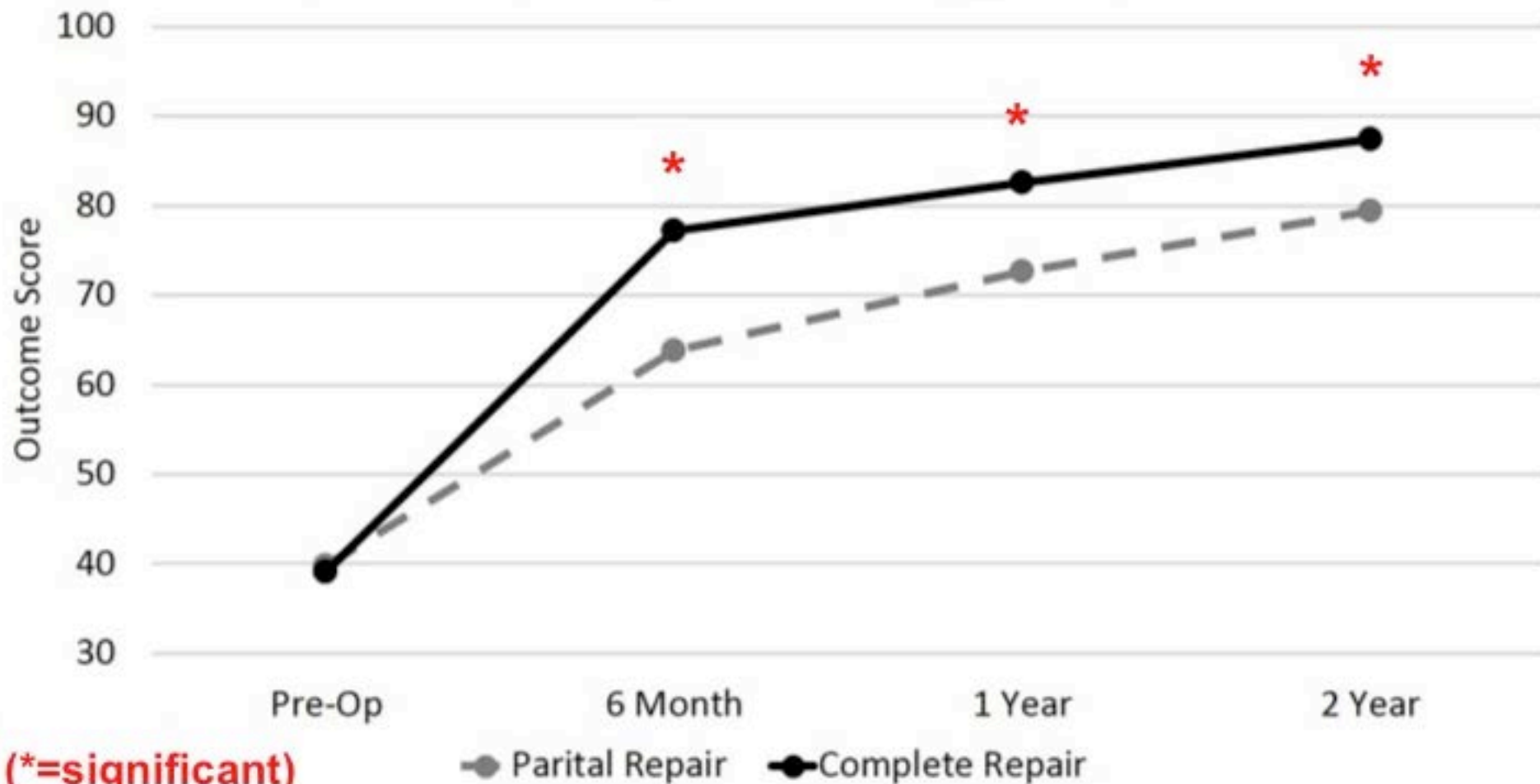




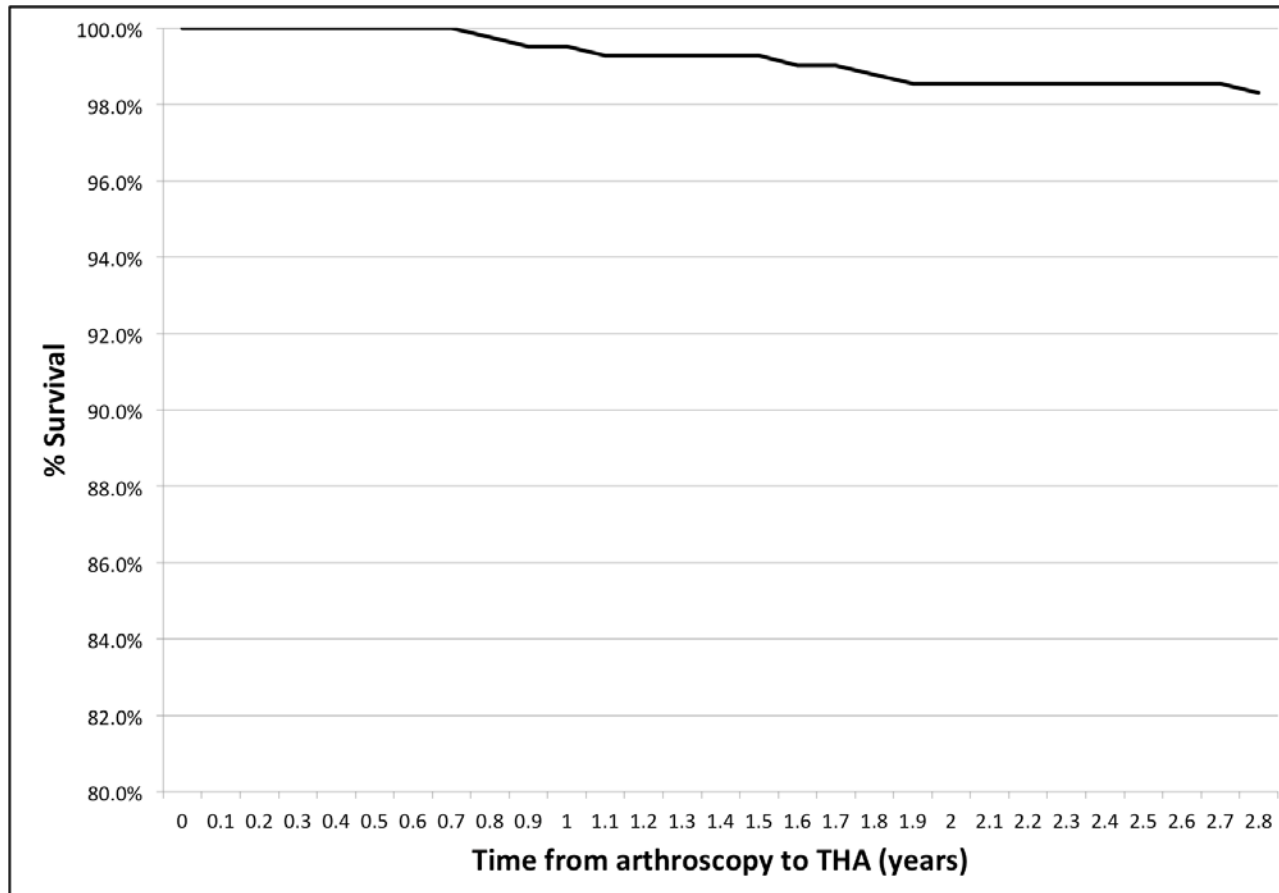
# Partial Closure vs. Complete Closure HOS SS

**A**

HOS-SS: Partial Closure vs. Complete Closure



# Survivorship of Hip Arthroscopy for Treatment of FAI and Capsular Mgt

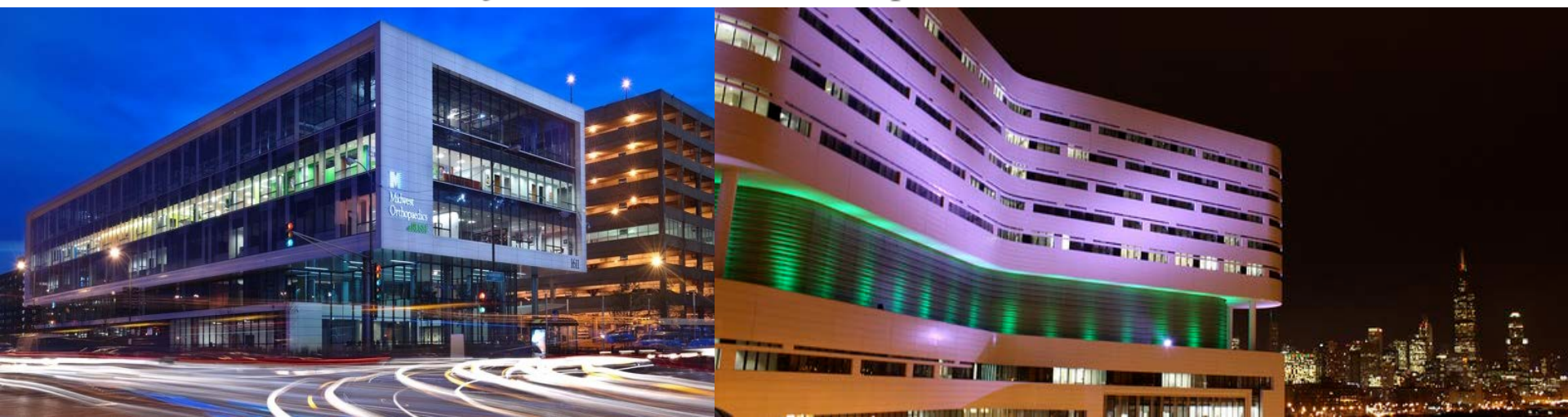


Weber et al. AJSM 2017 (Submitted).

# Clinically Meaningful Improvements After Hip Arthroscopy for Femoroacetabular Impingement in Adolescent and Young Adult Patients Regardless of Gender

*Gregory L. Cvetanovich, MD,\* Alexander E. Weber, MD,\* Benjamin D. Kuhns, MS,\* Charles P. Hannon, MD,\* Dwayne D'Souza,\* Joshua Harris, MD,† Richard C. Mather, III, MD,‡ and Shane J. Nho, MD, MS\**

Division of Sports Medicine, Rush University Medical Center, Chicago, IL  
Journal of Pediatric Orthopaedics 2016



# Patient Demographics

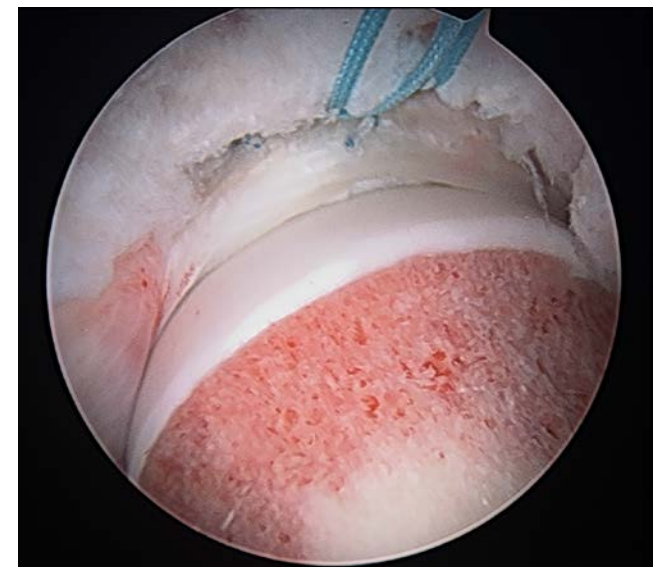
- 408 hip arthroscopies were performed during the study period
  - 54 for patients age 18 or younger
  - 11 excluded (5 revision, 3 history SCFE, 2 diagnosis other than FAI, 1 prior knee surgery)
  - Of the remaining 43 patients, 37 (86%) had minimum 2 year follow-up (average 28+/- 6.2 months)
- Age 17+/-1.4 years
- BMI 21.9+/-2.5 kg/m<sup>2</sup>
- Alpha angle 59.4+/-7.5 degrees
- LCEA 32.2+/-4.8 degrees
- 26/37 (70%) female
- 3/37 (8.1%) open proximal femoral physis





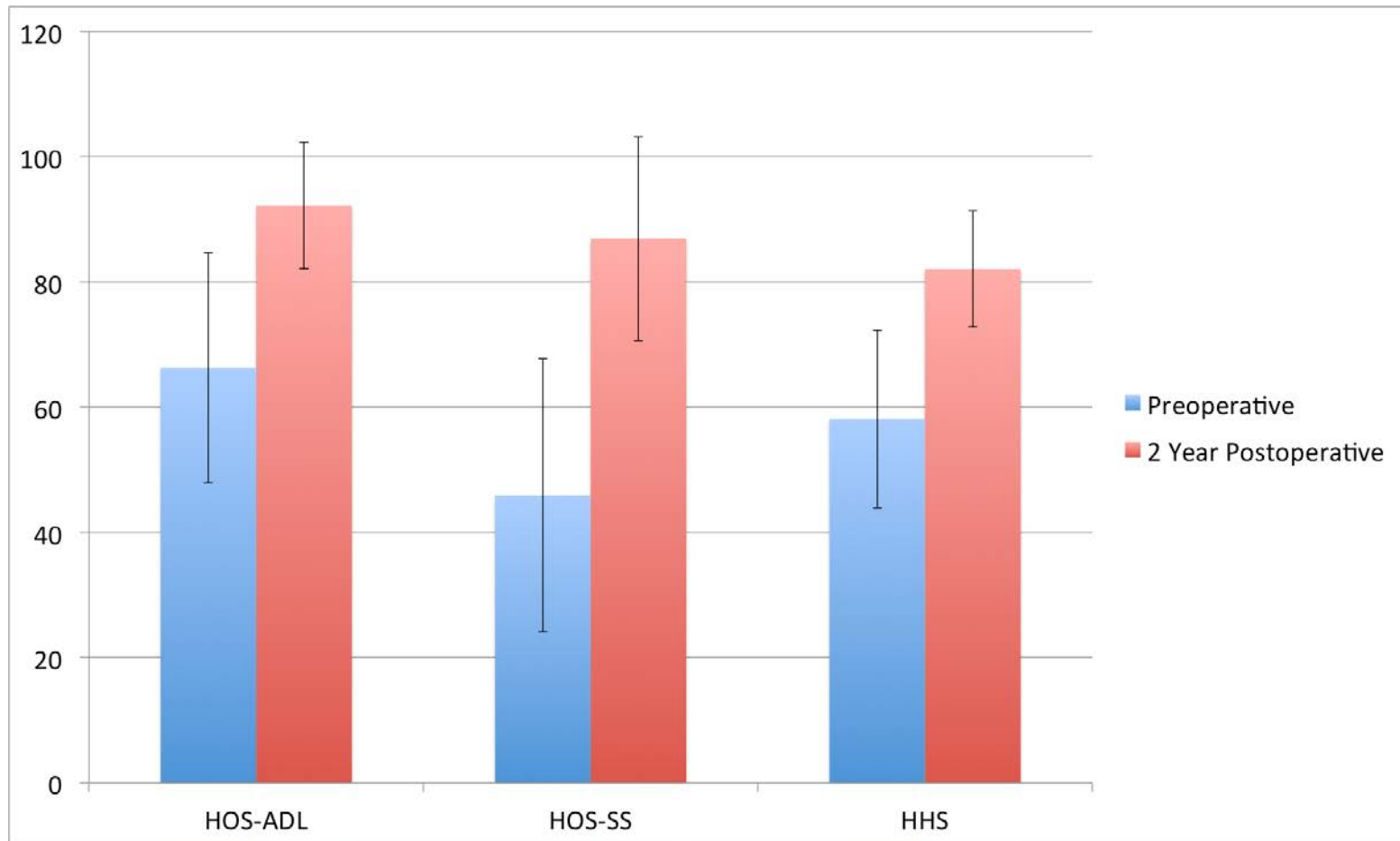
# Intra-Op Procedures

Labral Tear	37 (100%)
Labral Repair	35 (95%)
<u>Synovectomy</u>	35 (95%)
Acetabular Rim Trimming	31 (84%)
Femoral <u>Osteochondroplasty</u>	37 (100%)
Capsular Closure	37 (100%)





# Patient Reported Outcomes



$P < 0.0001$  in all cases

# Return to Sport

## Sports

- N=7. Track/X-country
- N=7,  
Dance/Gymnastics/Figure Skating
- N=4, Soccer
- N=4, Baseball/Softball
- N=3, Football
- N=1, Hockey,  
basketball, lacrosse,  
golf

30/37 (81%) of patients  
involved in sports

- 27 HS
- 3 College

**100%**

100% of athletes returned to  
their sport by final follow-up

- 27/30 (90%) returned to  
sport by 6 months
- Remaining 3 returned to  
sport by final follow-up

## Amateur and Recreational Athletes Return to Sport at a High Rate Following Hip Arthroscopy for Femoroacetabular Impingement

92%

Alexander E. Weber, M.D., Benjamin D. Kuhns, M.S., Greg L. Cvetanovich, M.D.,  
Jeffrey S. Grzybowski, B.S., Michael J. Salata, M.D., and Shane J. Nho, M.D., M.S.

## High Rate of Return to Running for Athletes After Hip Arthroscopy for the Treatment of Femoroacetabular Impingement and Capsular Plication

94%

David M. Levy,\* MD, Benjamin D. Kuhns,\* MD, MS, Rachel M. Frank,\* MD,  
Jeffrey S. Grzybowski,\* MD, Kirk A. Campbell,\* MD, Sara Brown,<sup>†</sup> DO,  
and Shane J. Nho,\*<sup>‡</sup> MD, MS

*Investigation performed at Rush University Medical Center, Chicago, Illinois, USA*

# Physical Therapy

## Phase I:

- 20 FFWB w crutches 2-4 wks
- Hip orthosis and night abduction splint x 4 wks
- Passive ROM and circumduction

## Phase II:

- Gait training
- Core, trunk, and proximal motor control
- Closed chain LE strength

## Phase III:

- Single leg strength
- Plyometrics
- Running



# Case Example

20 yr old male D1 collegiate soccer player with right hip pain. During a game in the beginning of the season, he jumped up with hip flexed and was hit on the lateral hip.

He played the remainder of the season but with moderate pain (6/10)

Worked with ATC and medical staff throughout the entire season.

Jr. Year

6 goals

16 points

Sr. Year (after surgery)

7 goals

19 points

All Conference



# Case Example

19 yr old female  
D1 soccer player  
s/p right hip  
arthroscopy 1.5  
yrs ago and was  
able to RTP.  
She sustained a  
fall c/o recurrent  
pain and  
stiffness.



Pre-Op

Post-Op

# In Season Management

## In Season

If hip is symptomatic, treat with trainer to maintain proper core and NM balance around hip and pelvis.

- RICE
- Use manual techniques / massage
- Modalities
- Manage minutes with practice/games

## Off Season

If athlete is nursing a symptomatic hip, the player can continue to play but may reach one of two endpoints:

- Pain worsens to point of poor performance
- End of the season

If surgery is needed, then perform as soon as the season is done to allow adequate time for rehab and RTP

- If bilateral symptoms, then consider staged hip arthroscopy

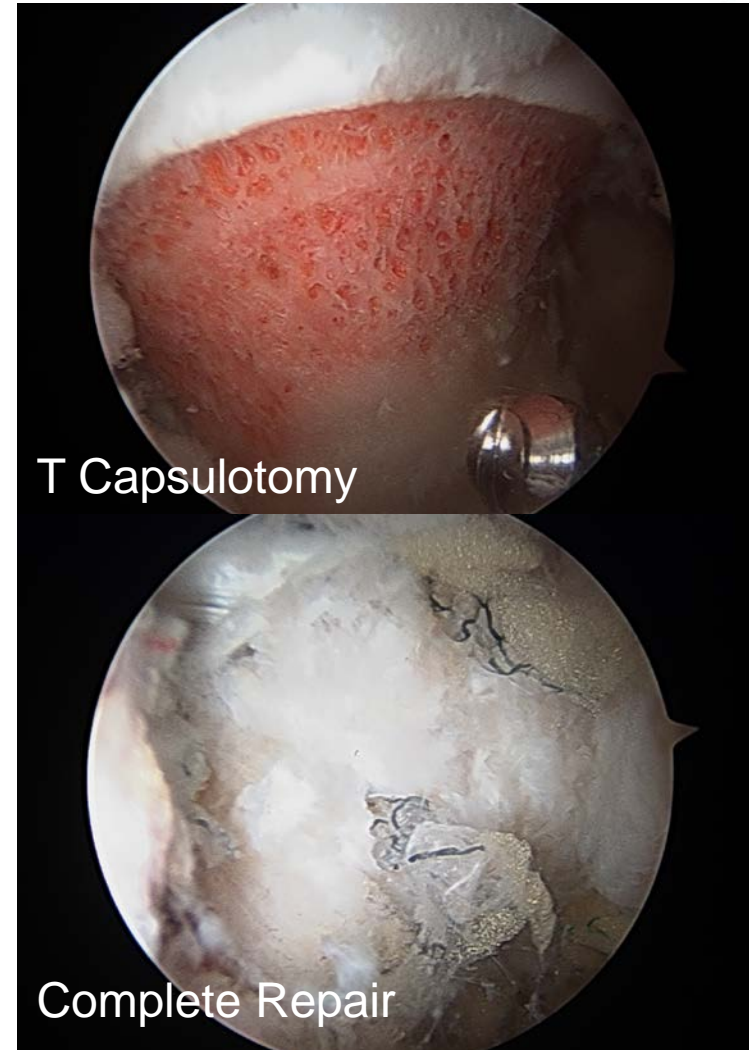
# Conclusions

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



# Hip Pain

## Final Thoughts

- Most hip sprains will resolve in weeks
  - If acute trauma then refer early
- If patients are having pain that is not responding to conservative treatment
- Attempt trial of NSAID and physical therapy
- MRI
- Refer to hip specialist if further evaluation is required.





# Thank You!

**Shane J. Nho, MD, MS**

[Shane.nho@rushortho.com](mailto:Shane.nho@rushortho.com)

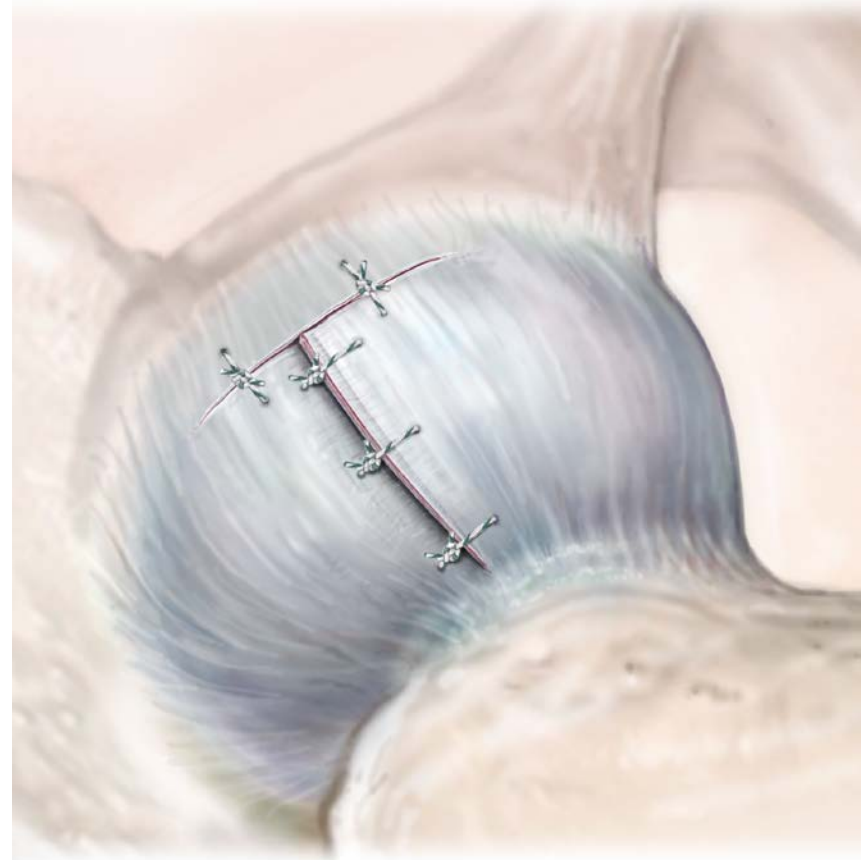




# Arthroscopic Capsular Closure

## Principles for capsular closure

- Routine interportal capsulotomy in line with the joint
- Central compartment procedures can be performed
- Peripheral compartment
  - T capsulotomy between medial and lateral IFL
  - Tensioning
  - Plication stitches
- Restore biomechanical properties of the hip capsule
  - Restrain distraction, extension, ER

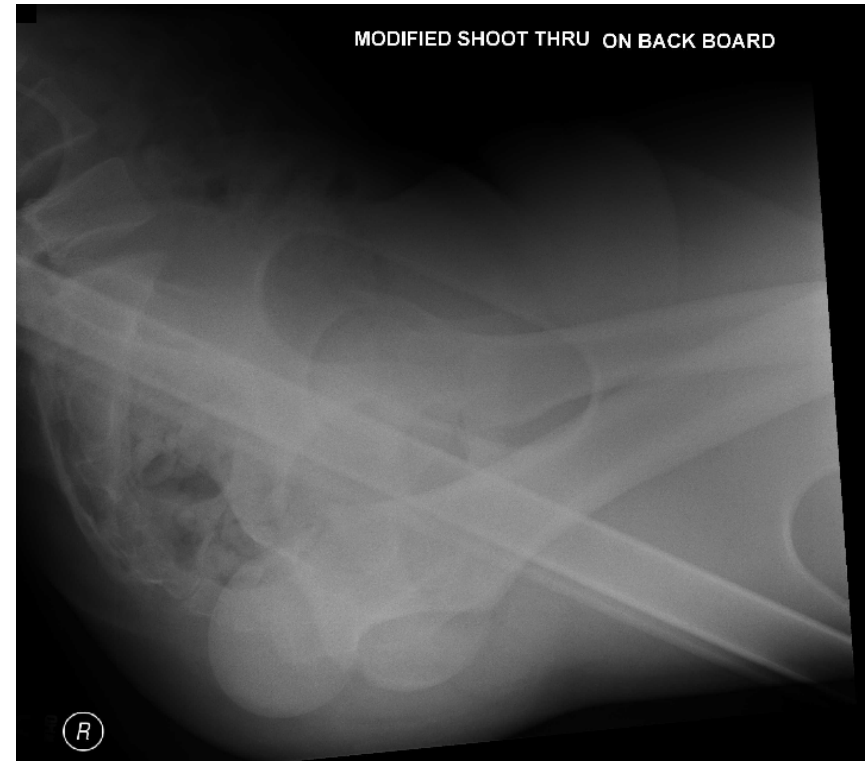


# Case #1

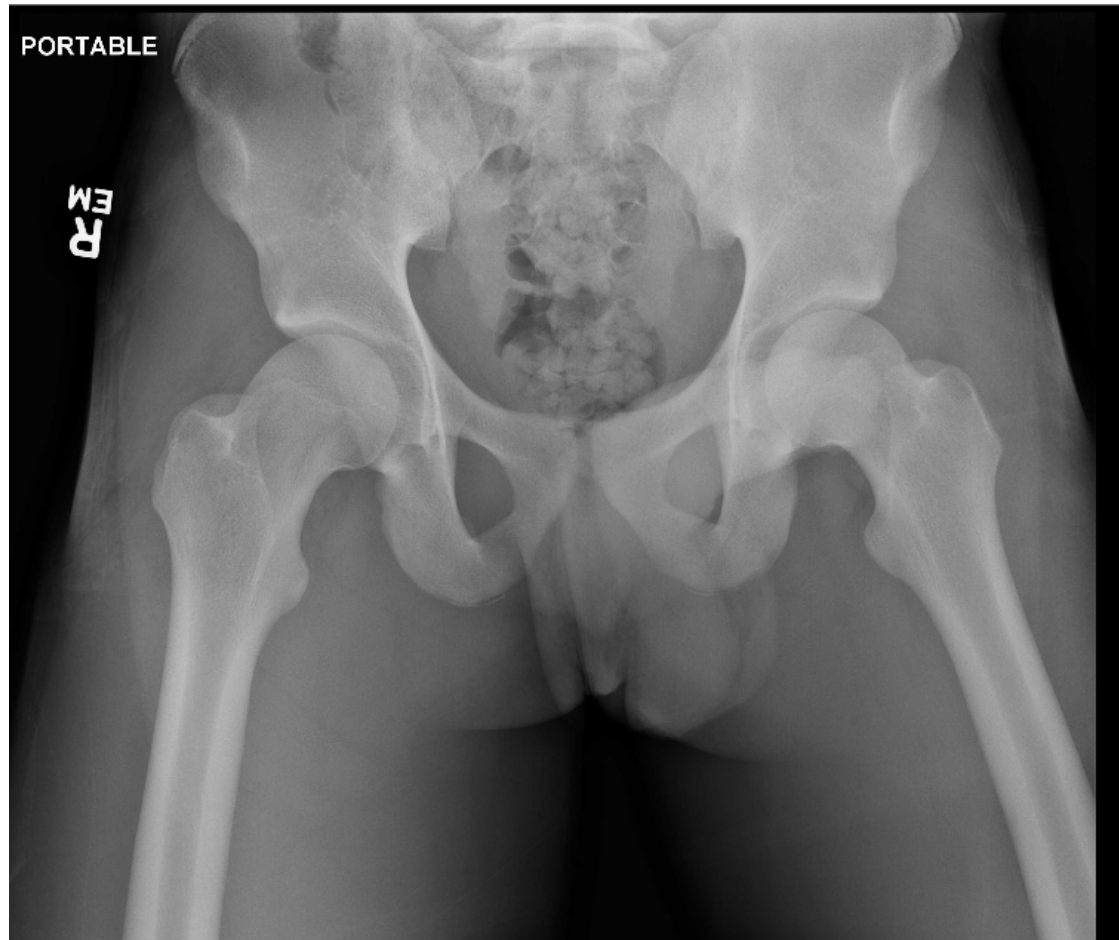
18 year old male playing football who sustained a right hip injury four days ago.

The patient states that he was running to catch passes diving on to the ground and somebody stepped on his heel as he was diving to catch the pass.

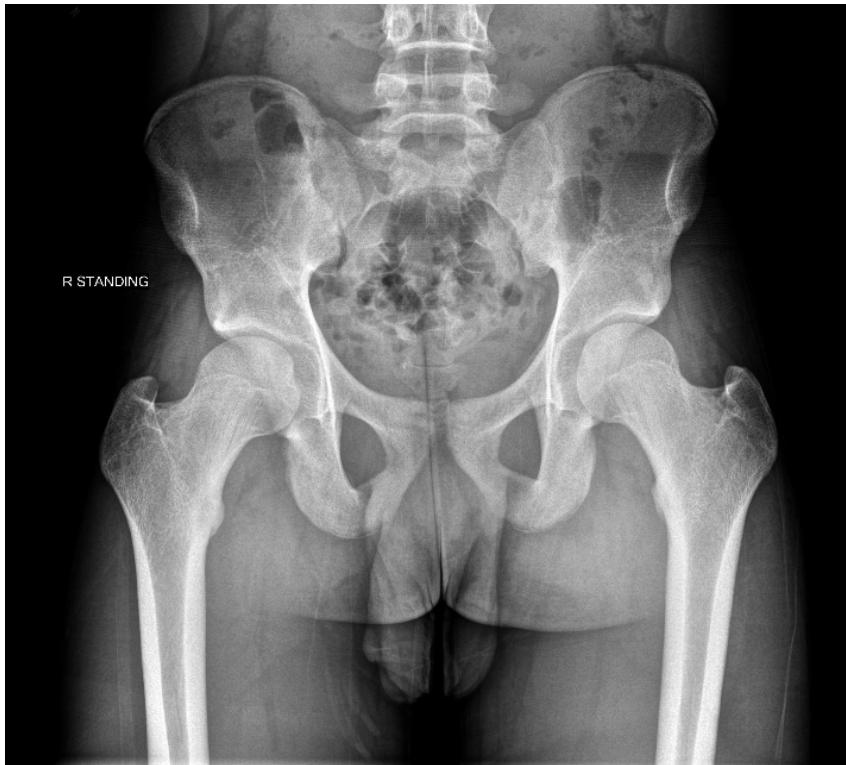
# Plain Radiographs



# Plain Radiographs



# Plain Radiographs

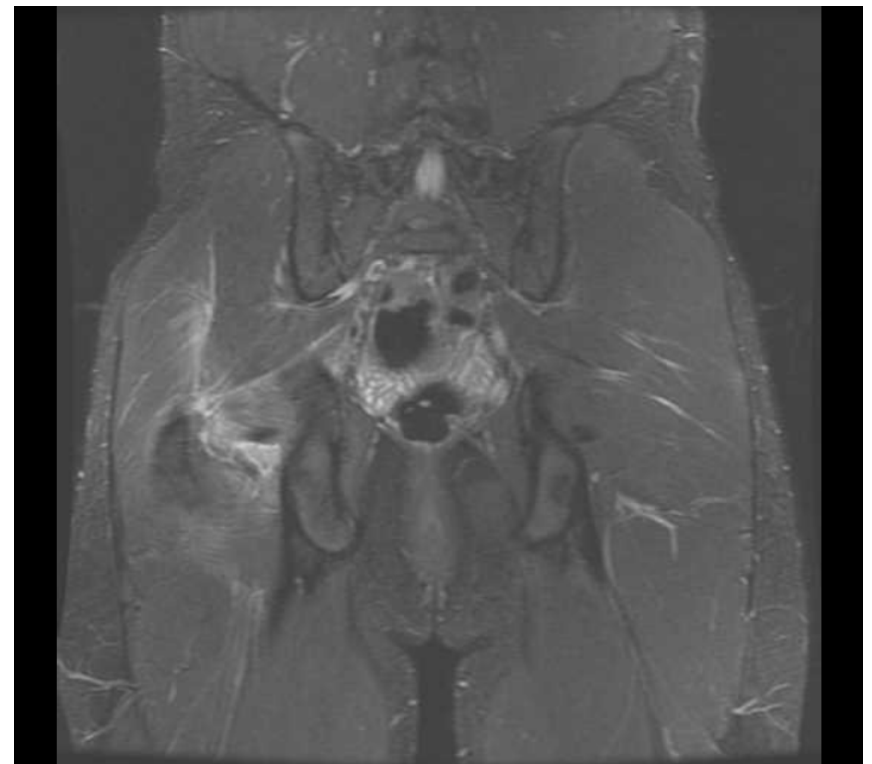
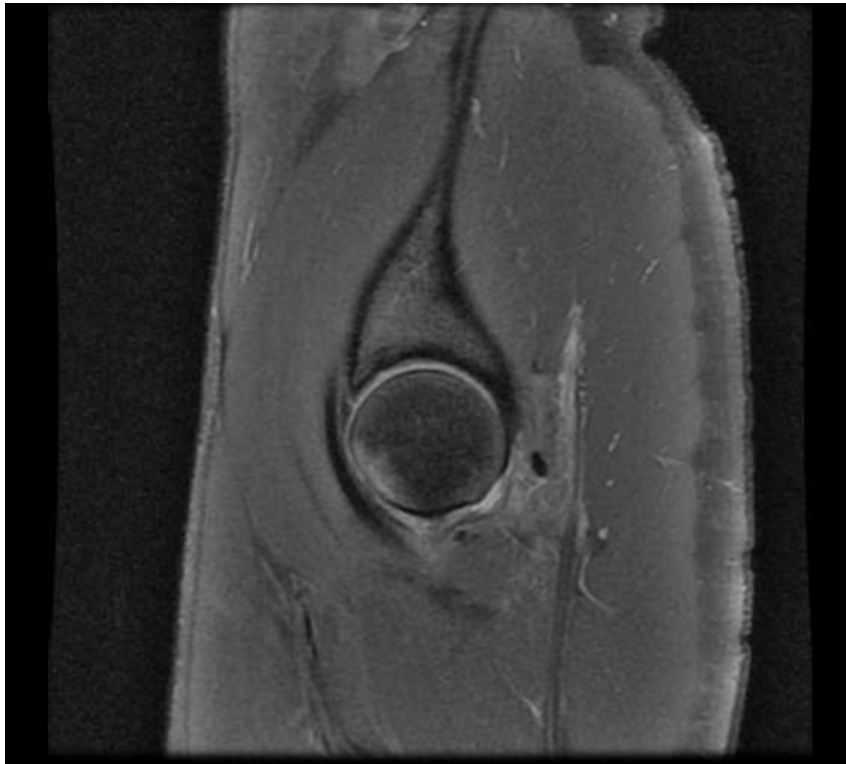




# MRI



# MRI



Capsular interventions were performed in a single specimen sequentially:

- Intact
- Interportal capsulotomy (4 cm)
- T-capsulotomy
- Repaired T-capsulotomy
- Capsulectomy



# Results

