Common Orthopedic Conditions of the Hip

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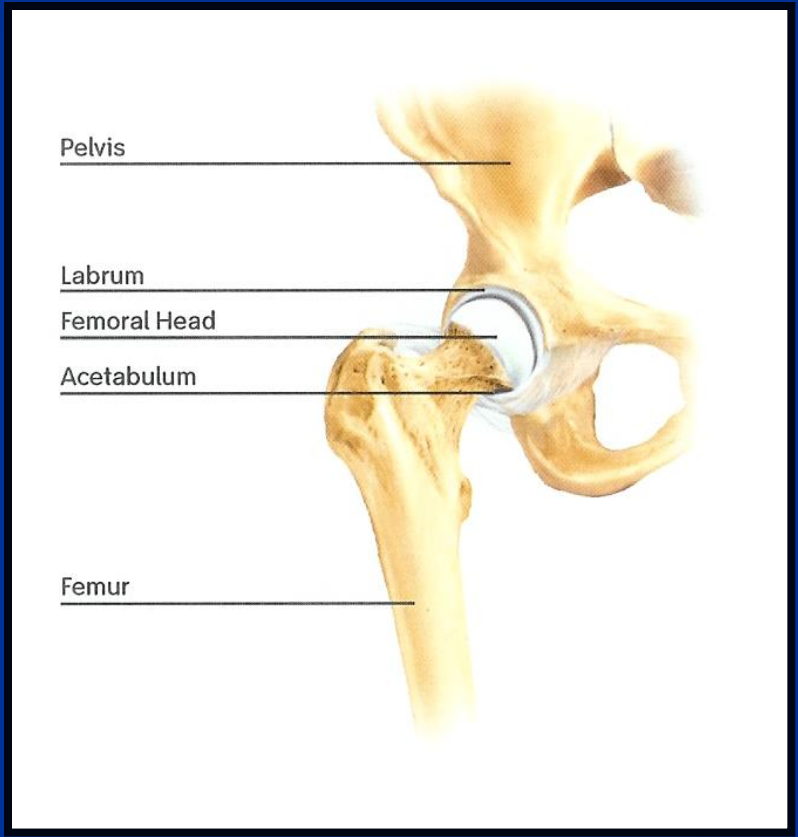
Disclosures

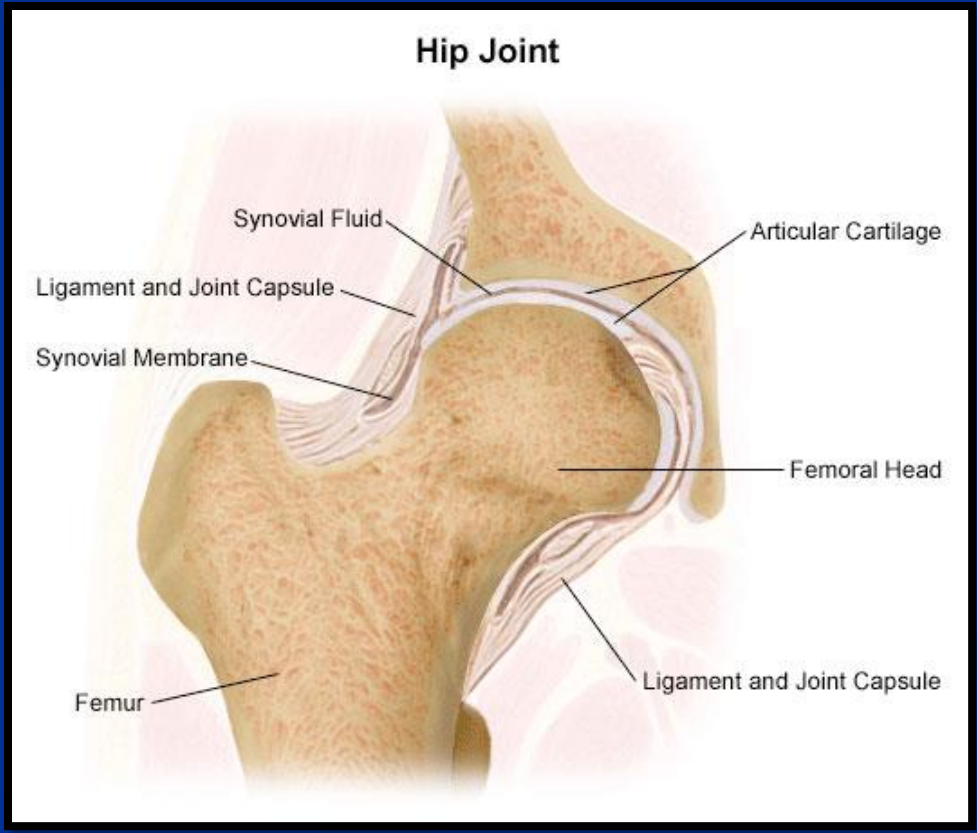
- none

Objectives

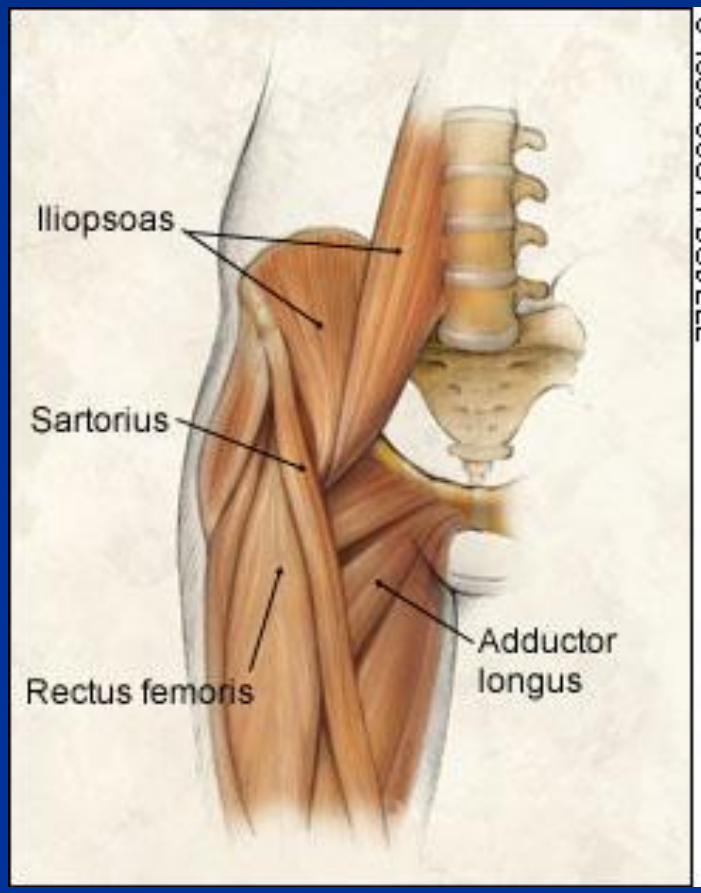
- Brief overview of anatomy
- Sources of hip pain
  - Stress Fracture
  - Osteonecrosis
  - Avulsion Fracture
  - Hamstring Avulsion
  - Femoroacetabular impingement (FAI)
  - “Snapping Hip”

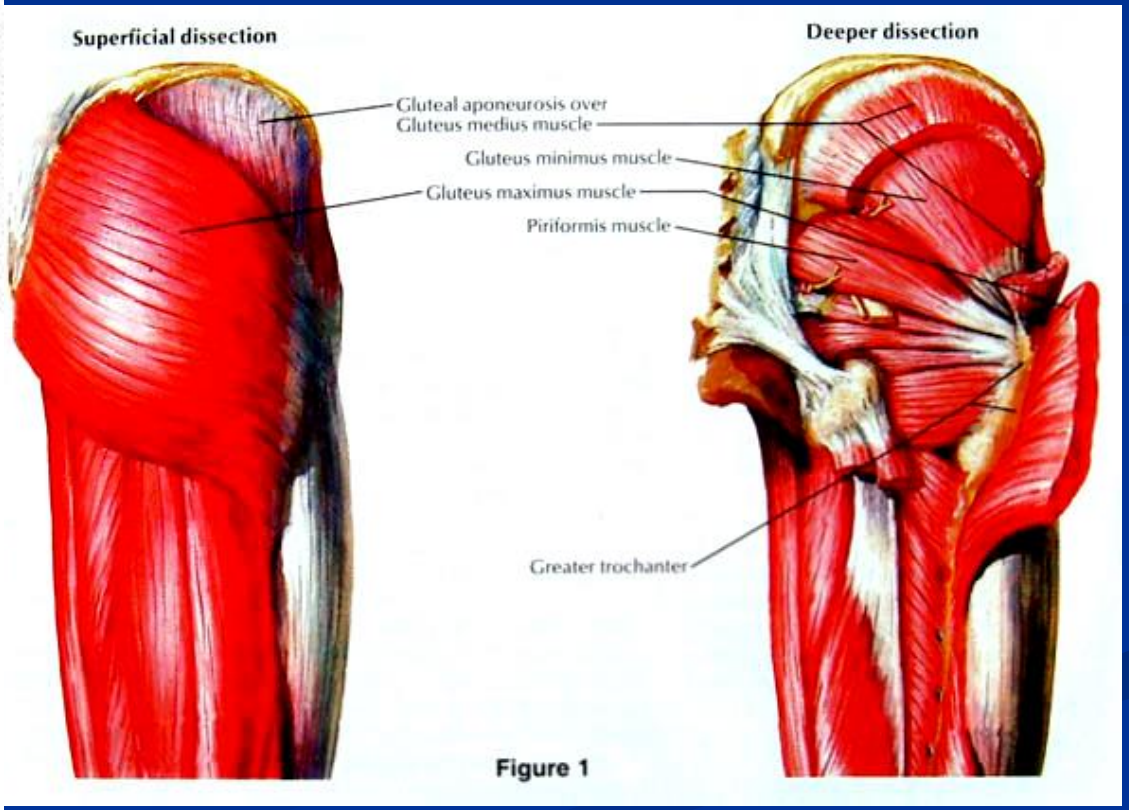
Hip Anatomy


Pelvis
Labrum
Femoral Head
Acetabulum
Femur


Hip Joint
Synovial Fluid
Articular Cartilage
Ligament and Joint Capsule
Synovial Membrane
Femoral Head
Femur
Ligament and Joint Capsule

Hip Anatomy





Hip Pain

- Extraarticular
  - Trochanteric bursitis
  - Snapping IT band
  - Snapping Psoas
  - Avulsion fx
    - ASIS- sartorius
    - AIIS- Rectus fem
    - Ischial Tuberosity- Hamstrings
  - Flexor tendonitis
  - Adductor Syndrome
  - Hip Pointer
  - Stress fracture
  - Piriformis syndrome
  - Hernia/ athletic pubalgia
  - Hamstring injury
- Intraarticular
  - Synovitis
  - Labral tear
  - Articular Cartilage Injury
  - Loose Bodies
  - Ligamentum Teres Injury
  - Femoroacetabular Impingement
  - Osteonecrosis
  - Transient Osteoporosis
  - PVNS
  - Synovial chondromatosis

Stress Fracture/ Reaction

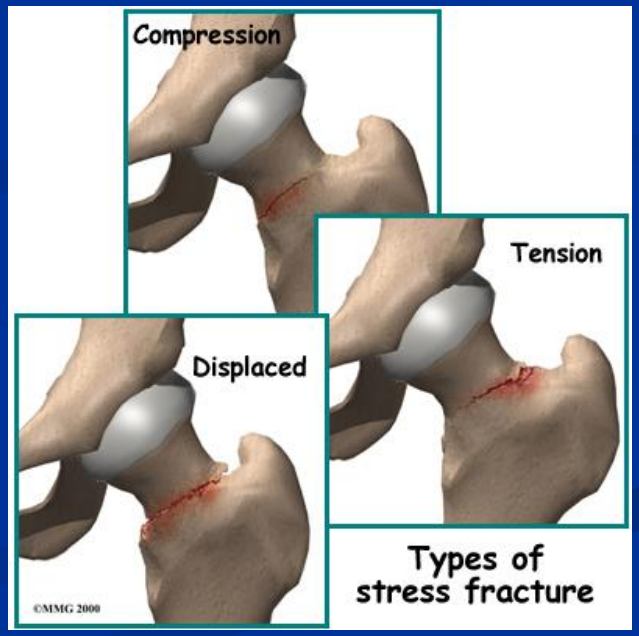
- Recognize risk factors for REDS (relative energy deficiency in sport)
  - Endurance athlete
  - Body image sport (dance, gymnastics)
  - Overtraining/ caloric restriction
  - Irregular menstrual cycle

Stress Fracture

- Acute vs subacute onset groin pain with impact/weightbearing/jumping/longer workout
  - Can be inner thigh pain if subtroch based at the lesser trochanter
- Psoas dysfunction common

Stress Fracture

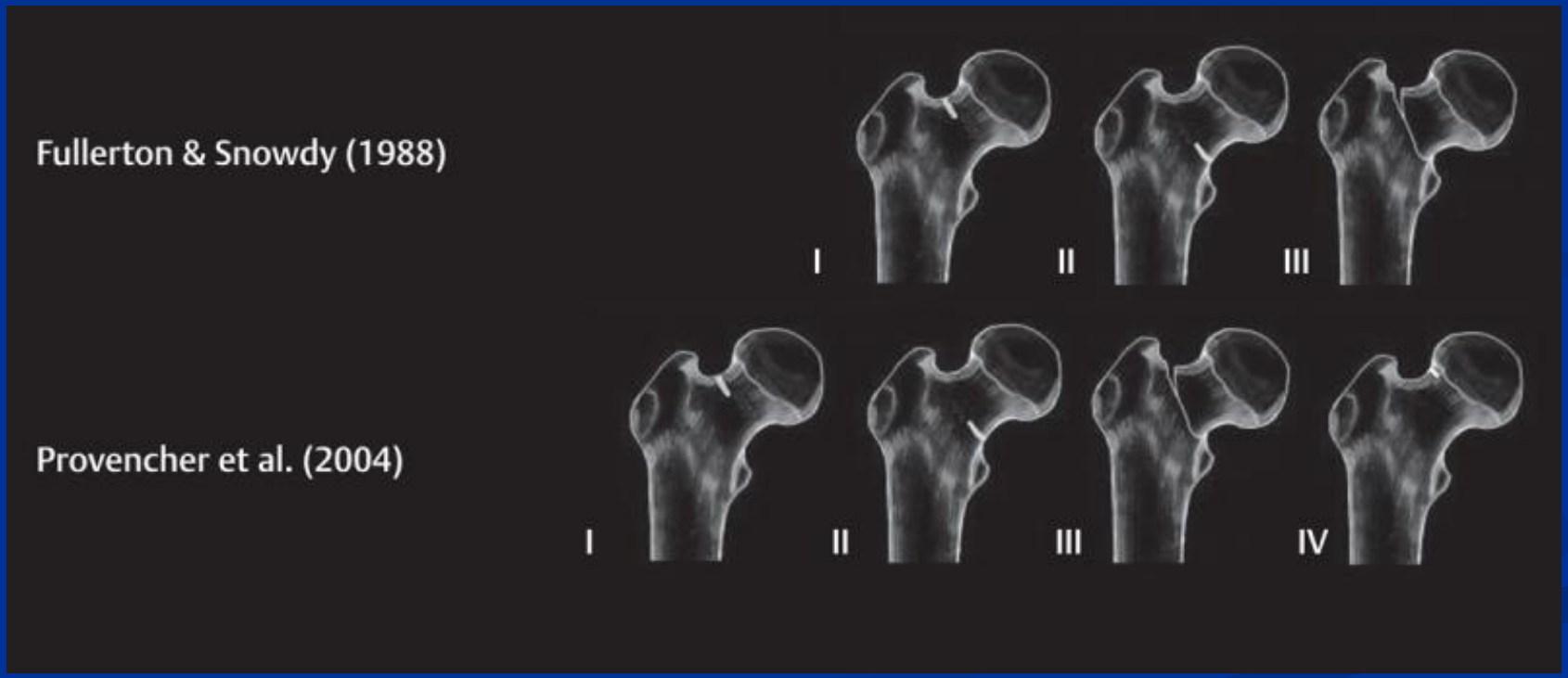
- PE:
  - Pain with log roll
  - Pain with end range of motion
  - Pain with straight leg raise



Stress Fracture

- Labs: Vit D (25 hydroxy Vit D) nl>30
- Xrays- AP pelvis, frog lat or shoot through lateral if very symptomatic
- MRI- urgent non contrast MRI of the hip
- +/- endocrine, nutritionist, psychologist

Stress Fracture: Classification



MRI Classification

Table 2. RADIOLOGIC GRADING OF STRESS FRACTURES

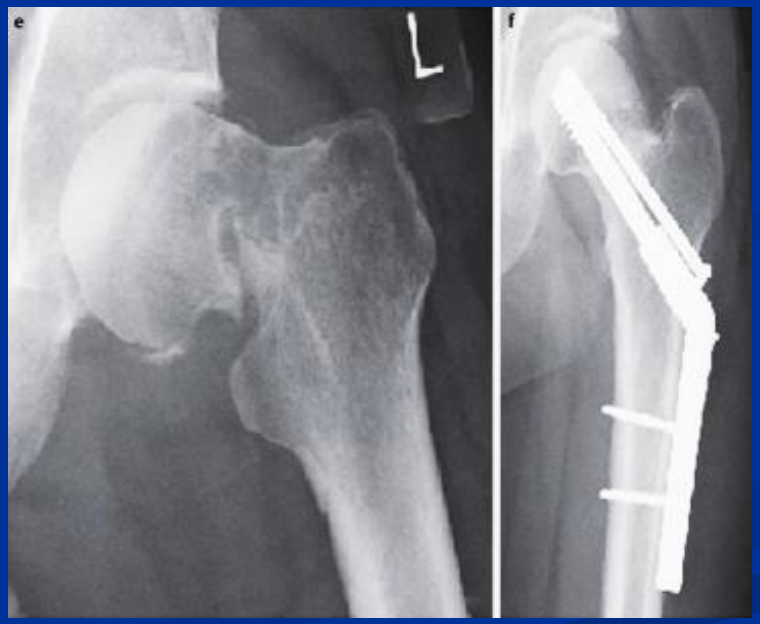
	X-Ray	Bone Scan	MR Image	Treatment
Normal	Normal	Normal	Normal	None
Grade 1	Normal	Poorly defined area of increased activity	Positive STIR image	3 weeks rest
Grade 2	Normal	More intense but still poorly defined	Positive STIR plus positive T2	3–6 weeks rest
Grade 3	Discrete line (?); discrete periosteal reaction (?)	Sharply marginated area of increased activity focal or fusiform	Positive T1 and T2, but without definite cortical break	12–16 weeks rest
Grade 4	Fracture or periosteal reaction	More intense transcortical localized uptake	Positive T1 and T2 fracture line	16+ weeks rest

Arendt et. al: *Clin Sports Med 1997*

Management

	No fracture line/ Positive T2 reaction	Incomplete <50% width	Complete >50% width	displaced
Compression	Conservative	3 screws	DHS	DHS plus derotation screw
Tension	Conservative vs. Surgery	DHS	DHS	DHS plus derotation screw

Femoral Neck Stress Fracture



Treatment

- Touch down WB X 6 weeks then progression based on fracture pattern.
- Avg time to return to sport 4-12 months
- Vitamin D repletion to > 30.
  - 50,000IU weekly X 6-8 weeks then daily 1000-2000 IU (other regimens exist)
- Endocrine/nutrition/psych/sports psychology consults as needed

Osteonecrosis

- 30-50 yo patient
- Groin, buttock and occasionally knee pain
- Achy constant pain

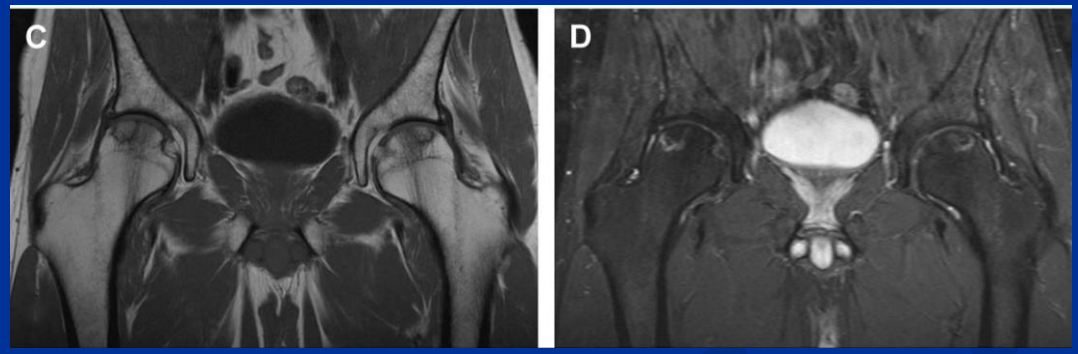
Etiology

- Mechanical arterial disruption/ trauma
- Corticosteroid induced-
  - >20mg prednisone/ day or IV doses
  - Fat accumulation in the marrow
- Alcoholism
- Blood dyscrasia/ intravascular occlusion
  - Sickle Cell Disease, polycythemia vera, hemophilia, hypercoagulable state
- Miscellaneous
  - Lupus, Caisson dz, HIV

Diagnosis

- Xray
  - Cresent sign
  - Collapse

- MRI
  - Low signal intensity on T1 and high on T2



Classification

- Ficat and Arlet
- University of Pennsylvania/Steinberg
- Association Research Circulation Osseous (ARCO)
- Japanese Orthopaedic Association

Ficat Arlet

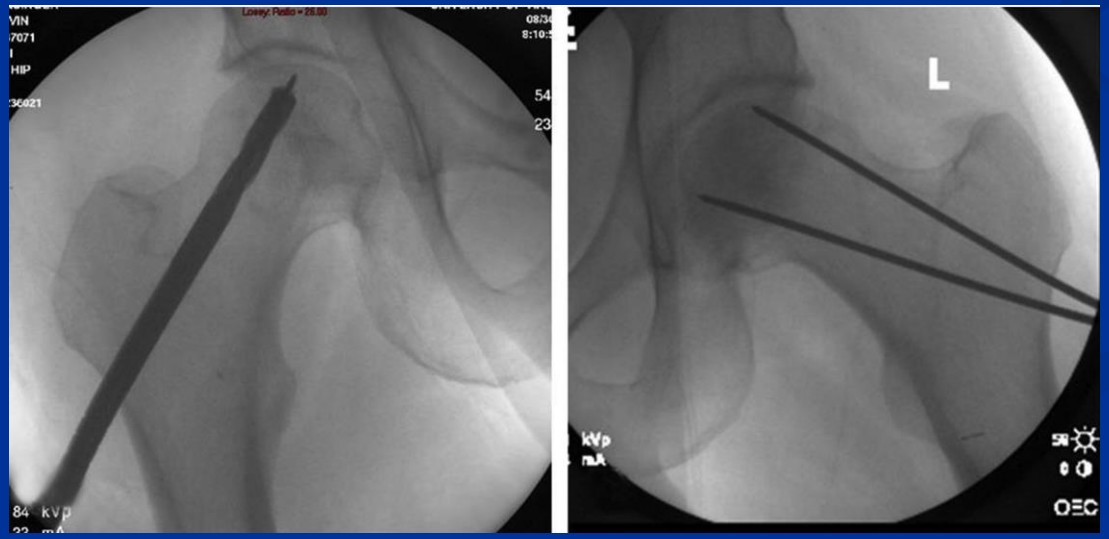
- Stage 0= preclinical, no radiographic findings
- Stage 1= preradiographic, positive pain, increased uptake on bone scan
- Stage 2= sclerosis/cystic head without flattening
- Stage 3= flattening or cresent sign, preserved jopintspace
- Stage IV= Femoral head flattening and arthritis

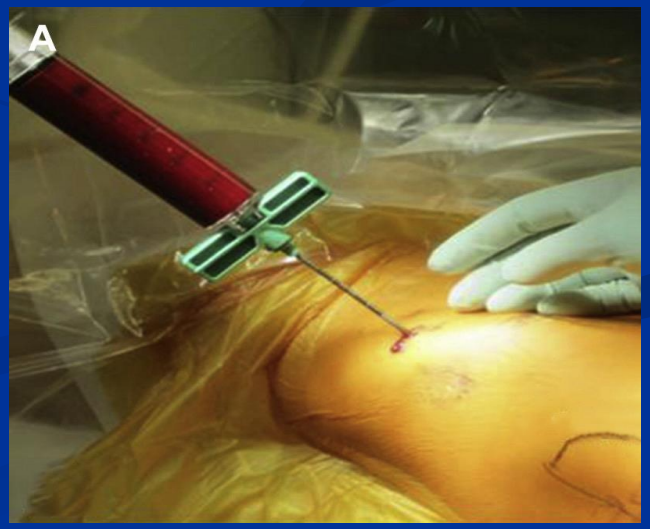
Treatment

- Nonoperative
  - WBAT- no effect on outcome
  - Anticoagulant and vasodilator (animal studies)
  - Statins (early possible data to support)
  - Extracorporeal shock wave therapy
  - Electrical stimulation
  - Hyperbaric oxygen

Treatment: Surgical

- Core Decompression
- With or without MSC's from iliac aspirate, PRP, BMP

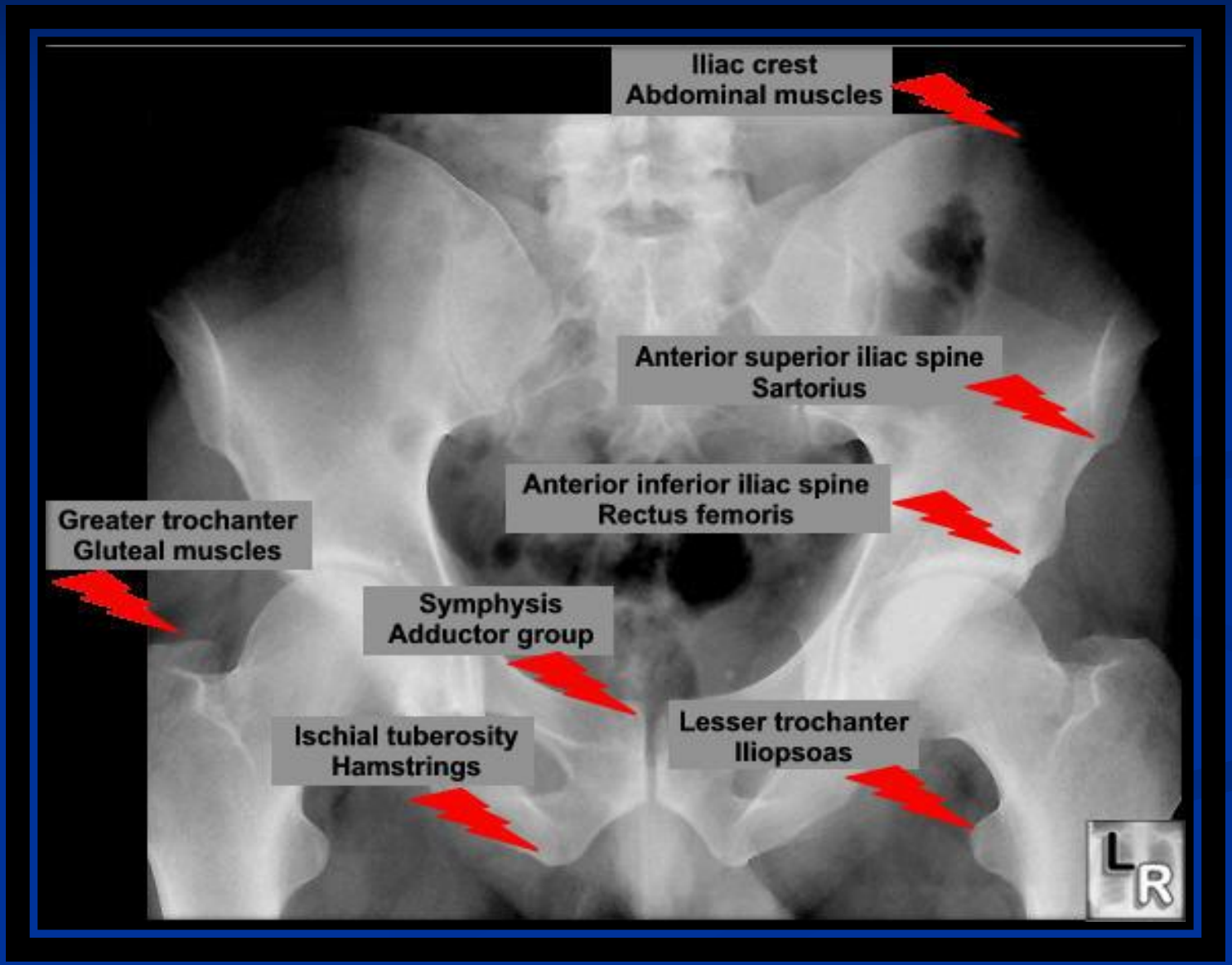




Treatment: Surgical

- Bone grafting- nonvascularized allo or autograft
- Vascularized Bone Graft
- THR

Avulsion Fractures



Avulsion Fractures

- Fracture fragment is pulled from its parent bone by forceful contraction of a tendon or ligament
- Most common in younger individuals engaging in athletic endeavors
- In the pelvis, secondary centers of ossification, the ***apophyses***, formed during adolescence, are the most likely portions of the bone to avulse

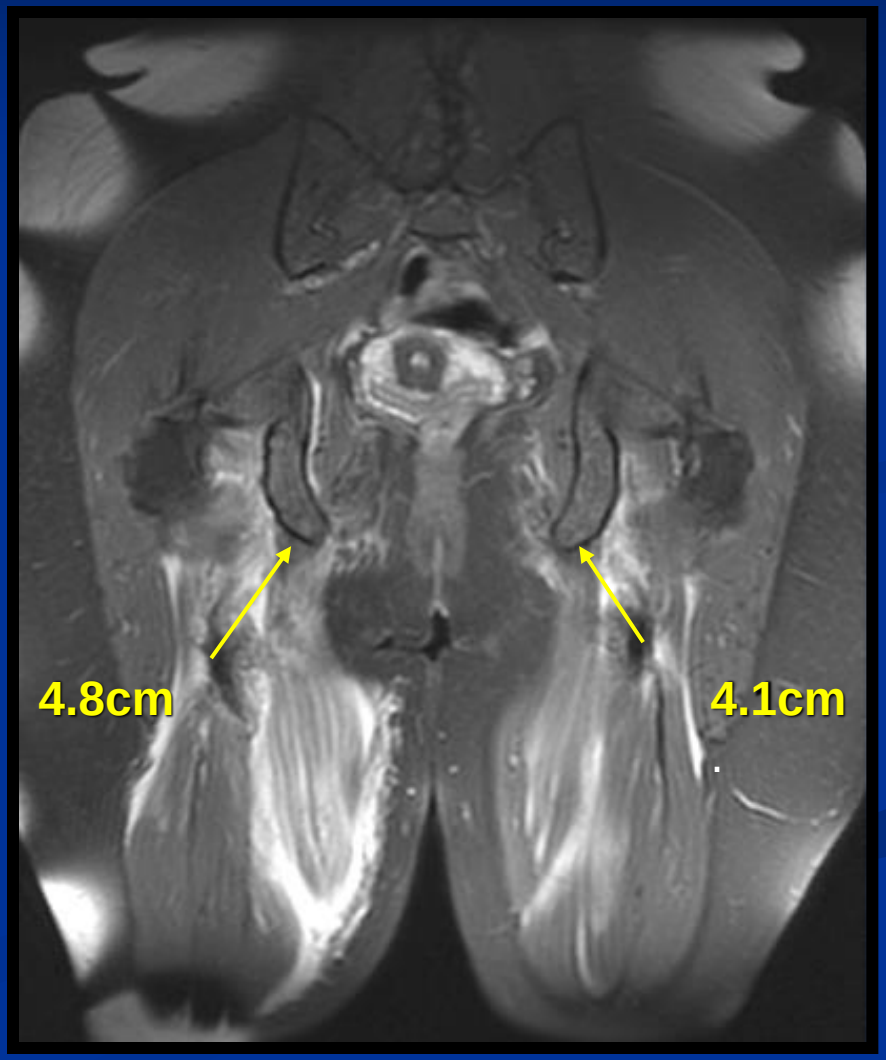
Avulsion Fractures

- Uncommon injuries, seen almost exclusively in adolescent athletes with a 2:1 male to female preponderance
- Hurdling, sprinting, soccer, tennis
- Most common to avulse:
  - ischial tuberosity
  - anterior inferior iliac spine (AIIS)
  - anterior superior iliac spine (ASIS)
- Treatment is controversial

Adult Hamstring Avulsion

- Important to distinguish from a muscle belly strain
- Pain at ischial tuberosity
- Lots of bruising posterior thigh (48 hrs later)
- Heard a pop
- Painful to sit
- 2/3 tendons avulsed= SURGICAL URGENCY

MRI



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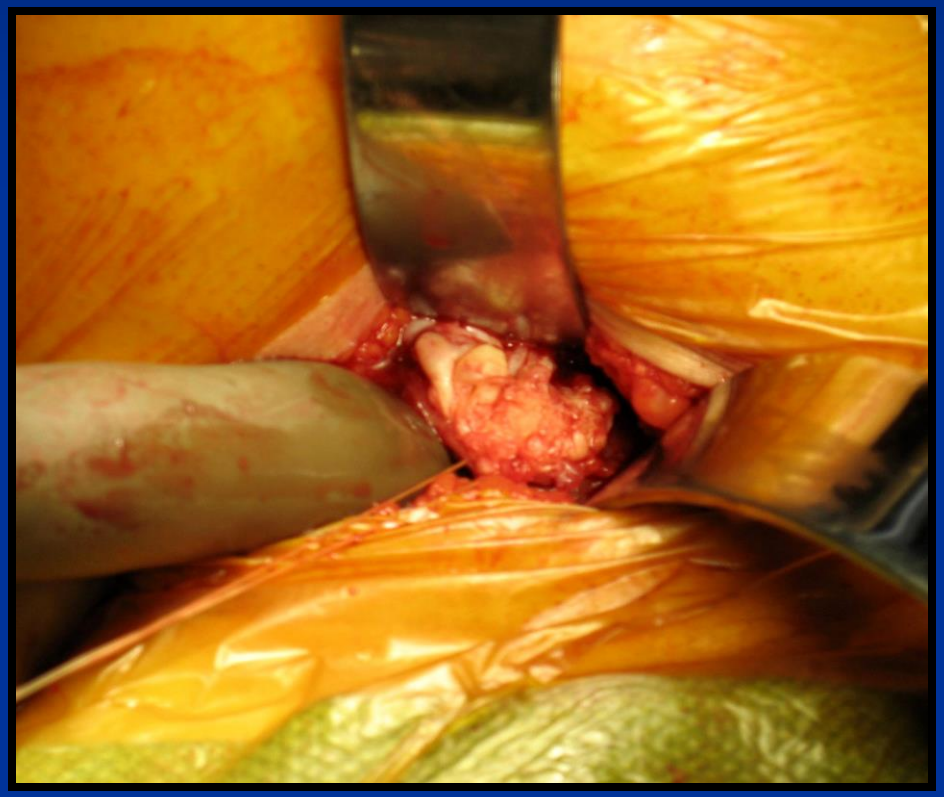

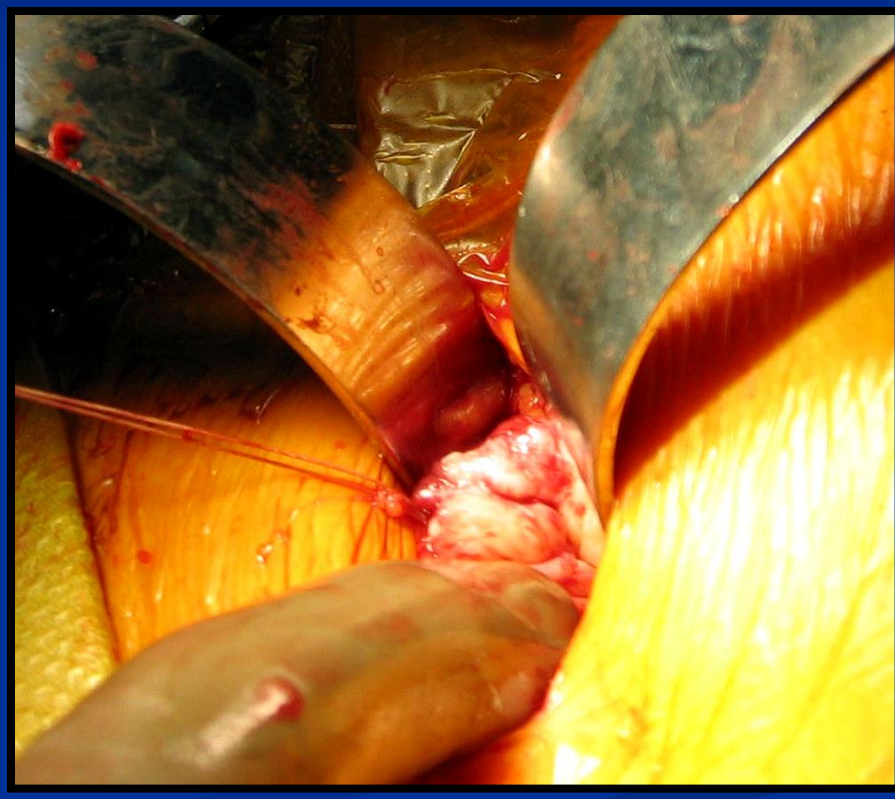

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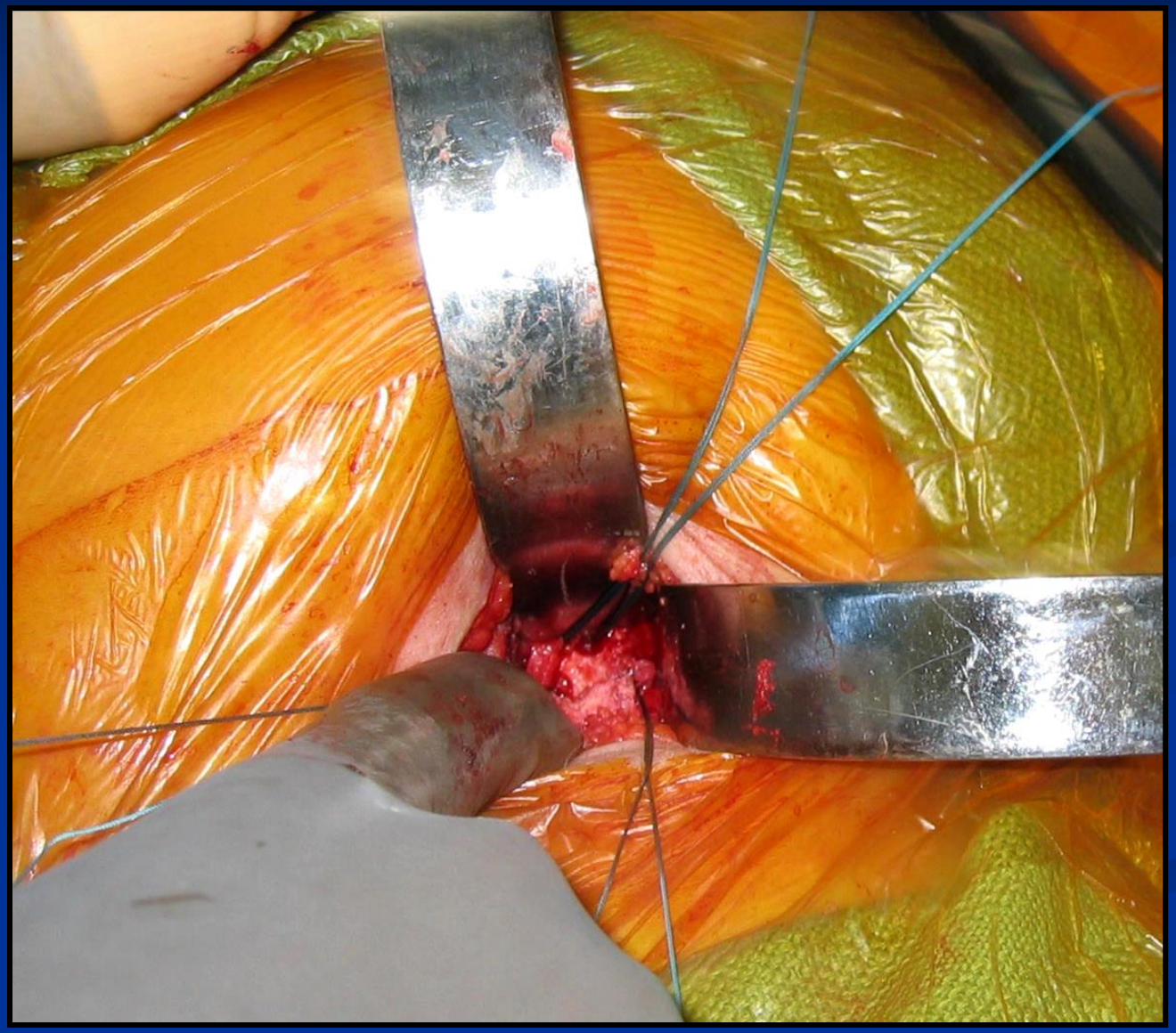


Hip Pain

- 60% intra-articular pathology misdiagnosed as extra-articular “strain”
- 7 month average treatment for misdiagnosed “strain”
- Diagnoses:
  - Labral pathology (61%)
  - Chondral damage (52%)
  - Disruption ligamentum teres (25%)

Byrd JWT *Clin Sports Med* 2001

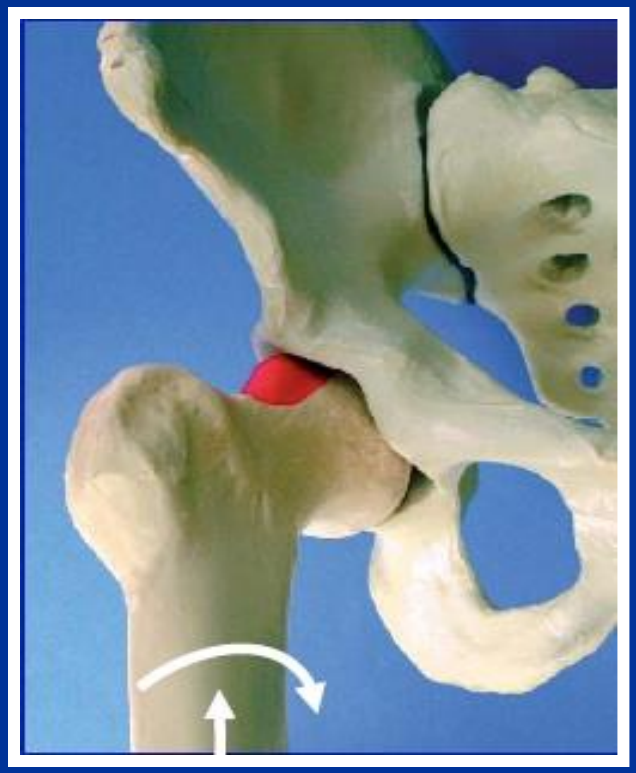
Intra-articular source of groin/ hip pain: FAI and chondrolabral pathology

Femoroacetabular Impingement

- Femoroacetabular impingement (FAI) occurs when there is a bony restriction to full range of motion in the hip.

- In other words, the ball bumps into the socket and the result is damage to the labrum and articular cartilage.

Femoroacetabular Impingement: Subtypes: CAM



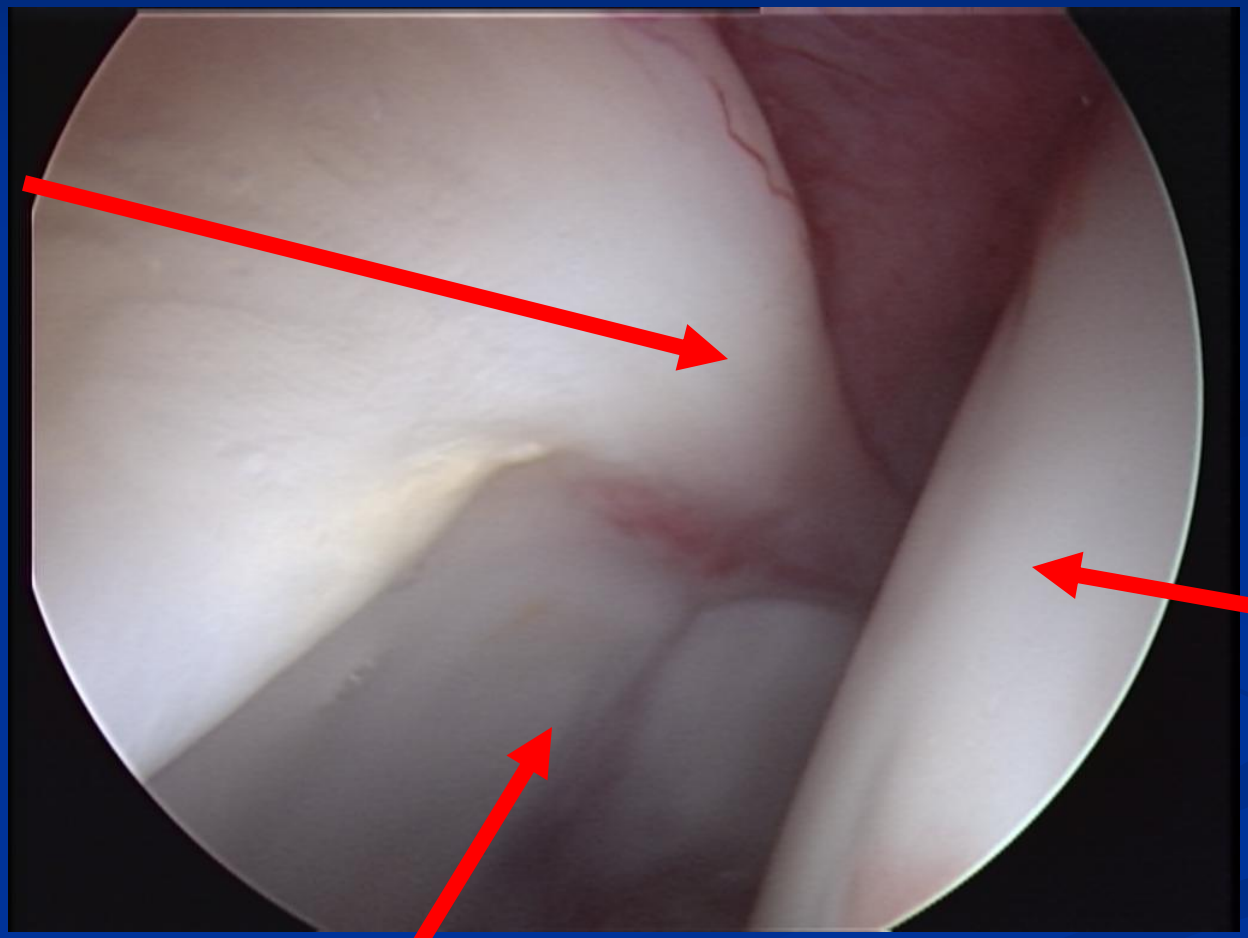
- CAM impingement describes abnormal contact pressure and limitation of range of motion due to extra bone growth on the femoral head.
- The ball is shaped more like an oval and the lack of normal hourglass shape causes the cartilage in the acetabulum to delaminate or peel off of the bone and can also cause injury to the labrum.

CAM FAI

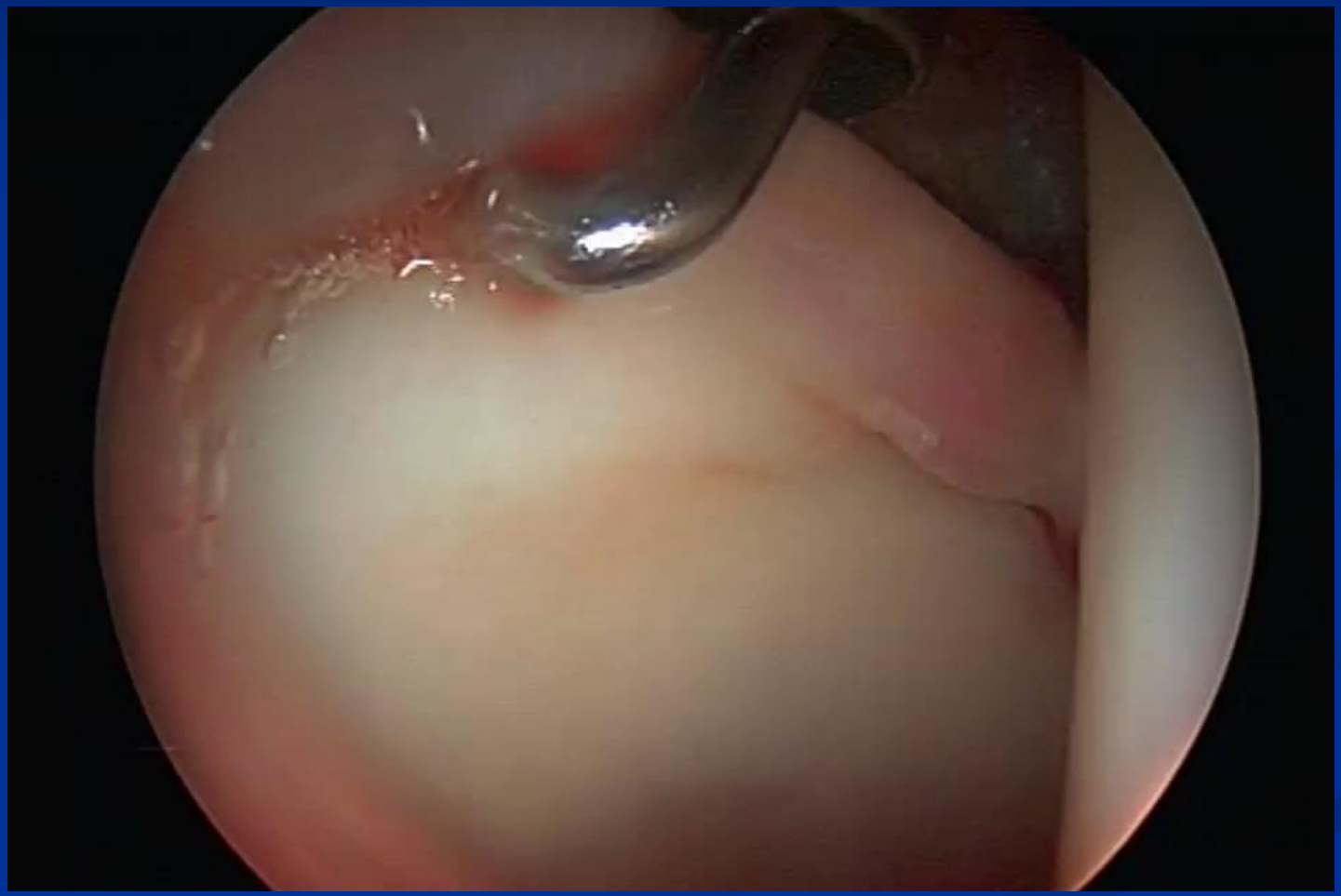
Femoroacetabular Impingement: MRI Arthrogram

- MRI Arthrogram
  - Labral tear
  - Articular injury
  - Alpha Angle

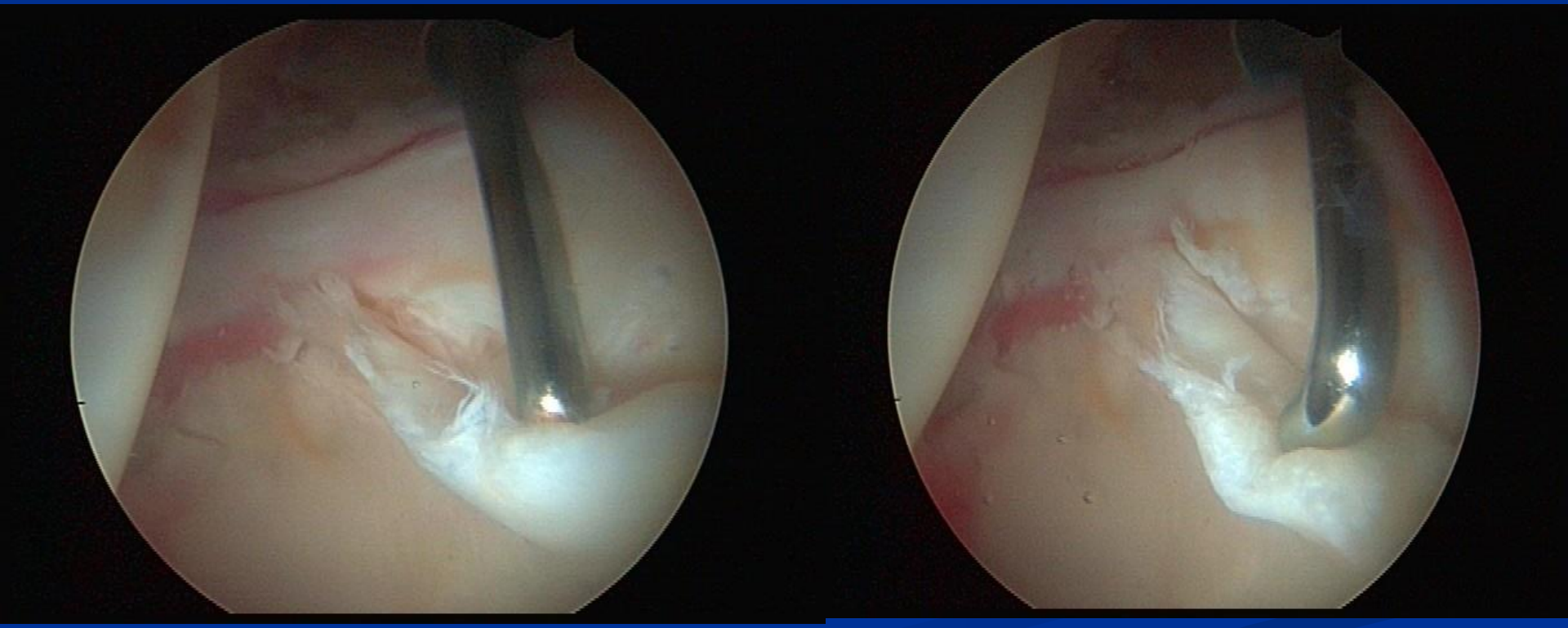
Normal Right Hip



Wave Sign



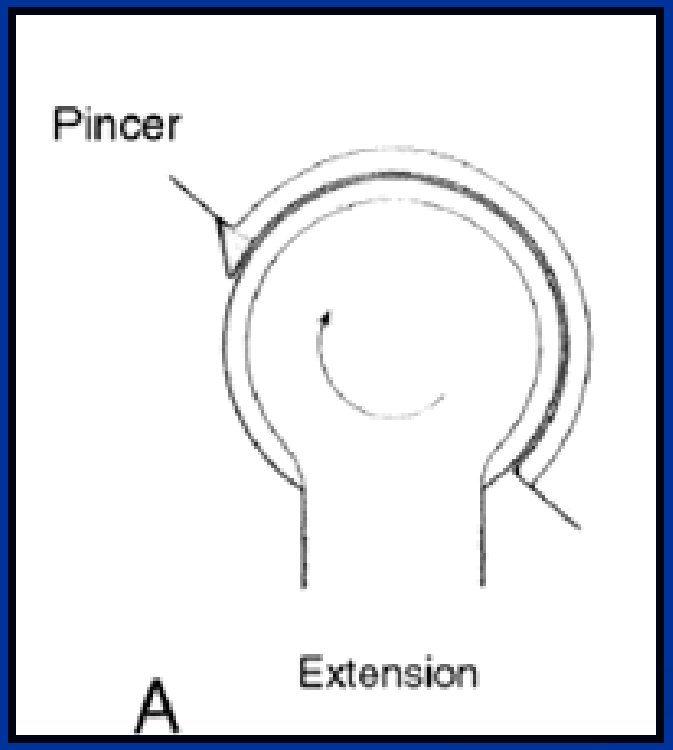
Progressive CAM Pathology

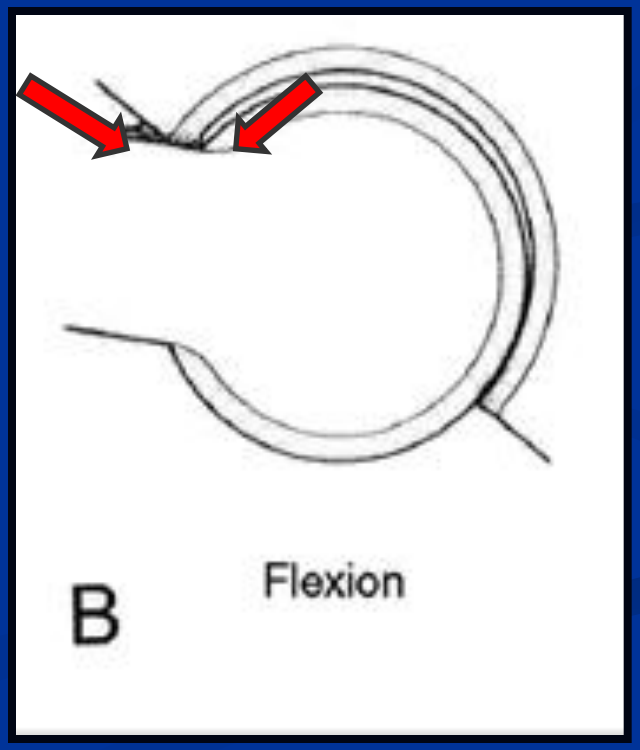


Pincer Impingement

PINCER Impingement: Acetabular Overcoverage

- coxa profunda, acetabular retroversion





Pincer Impingement

- Pincer impingement describes abnormal contact pressure due to overgrowth of the acetabular rim.
- This occurs when the socket is circumferentially deep (coxa profunda) or rotated back (retroverted).
- This causes labral injury and adjacent damage to the cartilage.

PINCER

Prevalence of FAI

- Presence of FAI morphology cited in the literature in asymptomatic volunteers varies from ranges from 10-70% depending on the criteria used and the population studied.

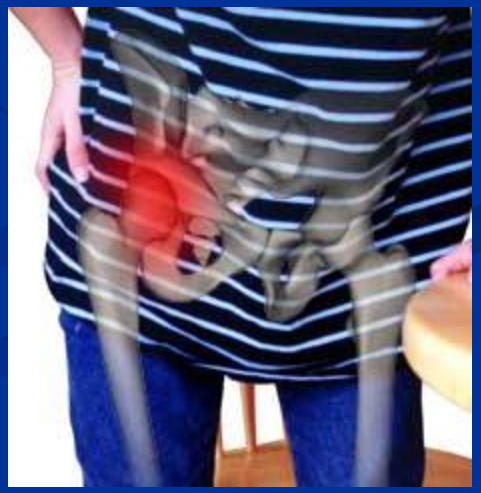
Natural History

- Unclear

Now you understand FAI, so …who are these patients?

Femoroacetabular Impingement: Patient Presentation

- Groin pain
  - Activity dependent at first
  - Sharp stabbing pain in the groin crease with pivot or twist
  - Achy pain after exertion
  - Catching
  - Responds to NSAIDs at first
- Active young patient (13-50 yo)
- Acute or insidious onset
- Often follows minor trauma
- Clicking and popping in the groin
- Hip pain with sexual activity (women>men)



Femoroacetabular Impingement: Patient Presentation

- " C " sign
- Pain with prolonged sitting (driving)
- Pain with forward flexion
  - Cycling
  - Horseback riding
- Need to adjust after standing prior to walking
- Difficulty getting in and out of car
- Difficulty sitting Indian Style
- No trouble with shoes and socks
- No pain with cough or sneeze
- Usually straight ahead is OK

Diagnosis

- A diagnostic intra-articular hip injection can help to differentiate the source of pain
- Especially useful for buttock pain

Femoroacetabular Impingement: Physical Exam

- Hip ROM
- Supine Log Roll
  - Most specific for intraartic injury but not sensitive
- Anterior Impingement Test
  - FF/IR/ADD- anterolat path
- Abd/ IR and ER
  - Superolateral pathology
- Posterior Impingement Test
  - Ext/ ER
- FABER
  - Fist heights off table

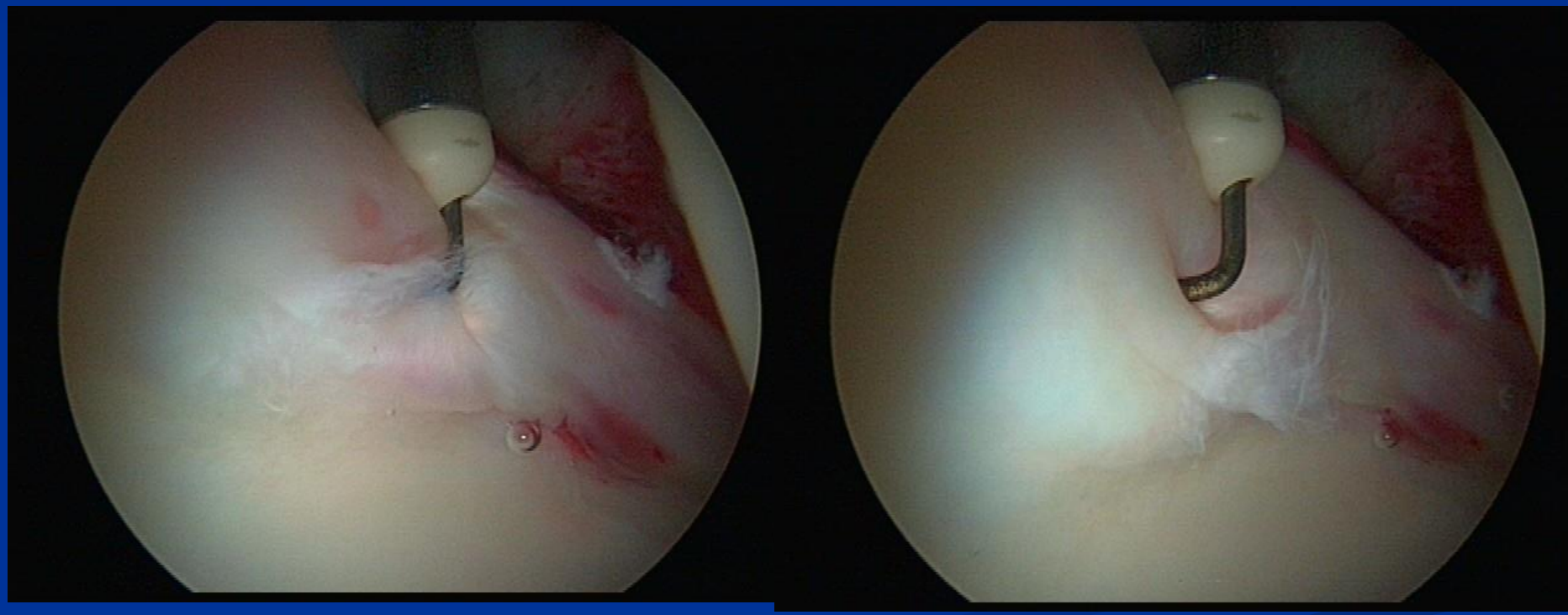
Femoroacetabular Impingement: Nonoperative Management

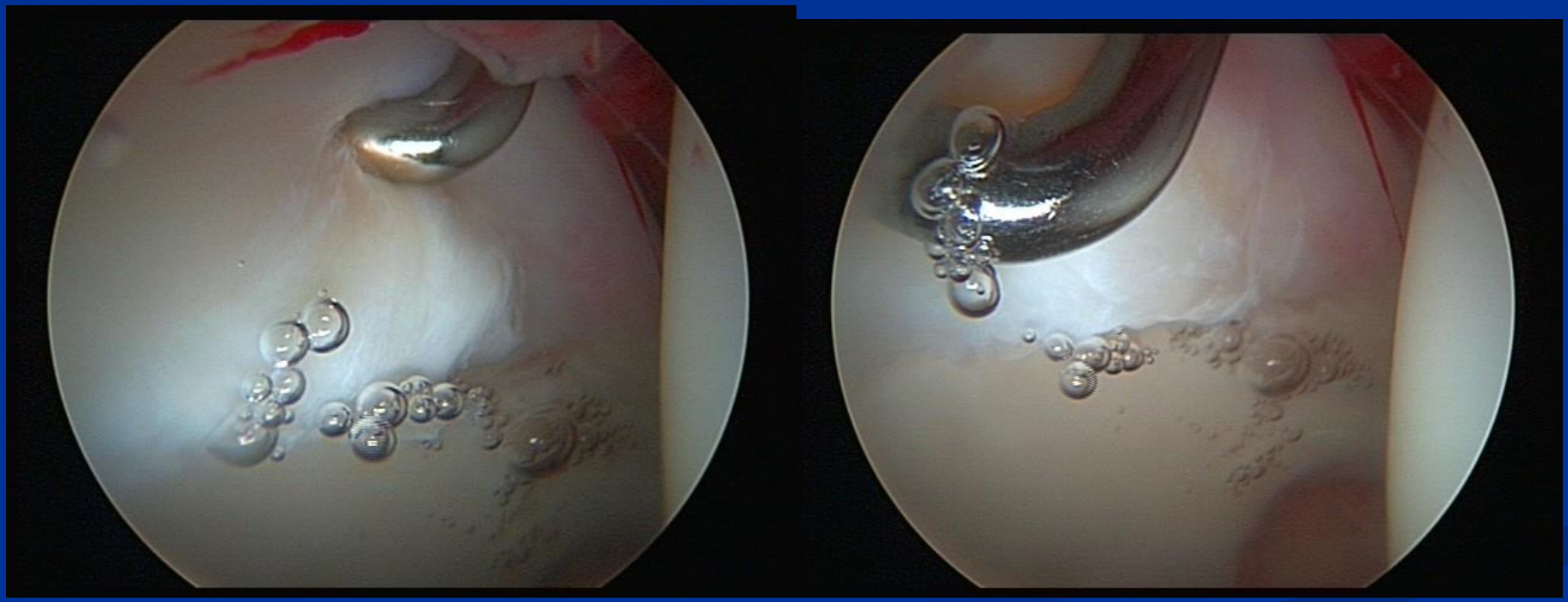
- Physical Therapy
  - No data to support efficacy
- Steroid injection
- Acupuncture
- Massage
- Chiropractic
- Prolotherapy injections
- PRP injections

Femoroacetabular Impingement: Surgical Management

- CAM:
  - Femoral Neck Osteoplasty
  - Labral repair
  - Acetabular Chondroplasty vs. rim trimming
  - ? Acetabular Microfracture
- Pincer:
  - Labral debridement vs. Refixation
  - Acetabular rim trimming
  - +/- Femoral neck osteoplasty

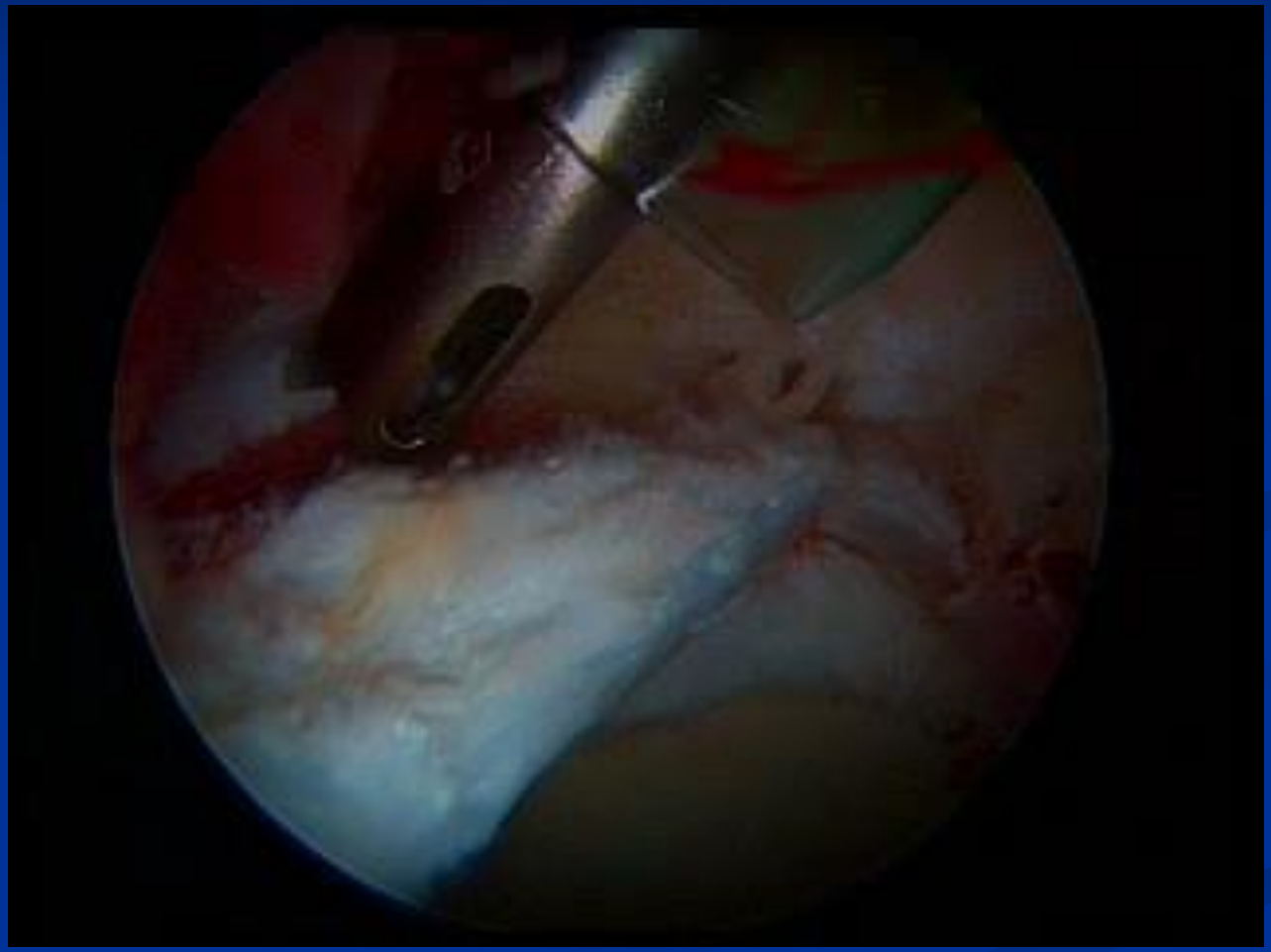
16 yo with combined FAI



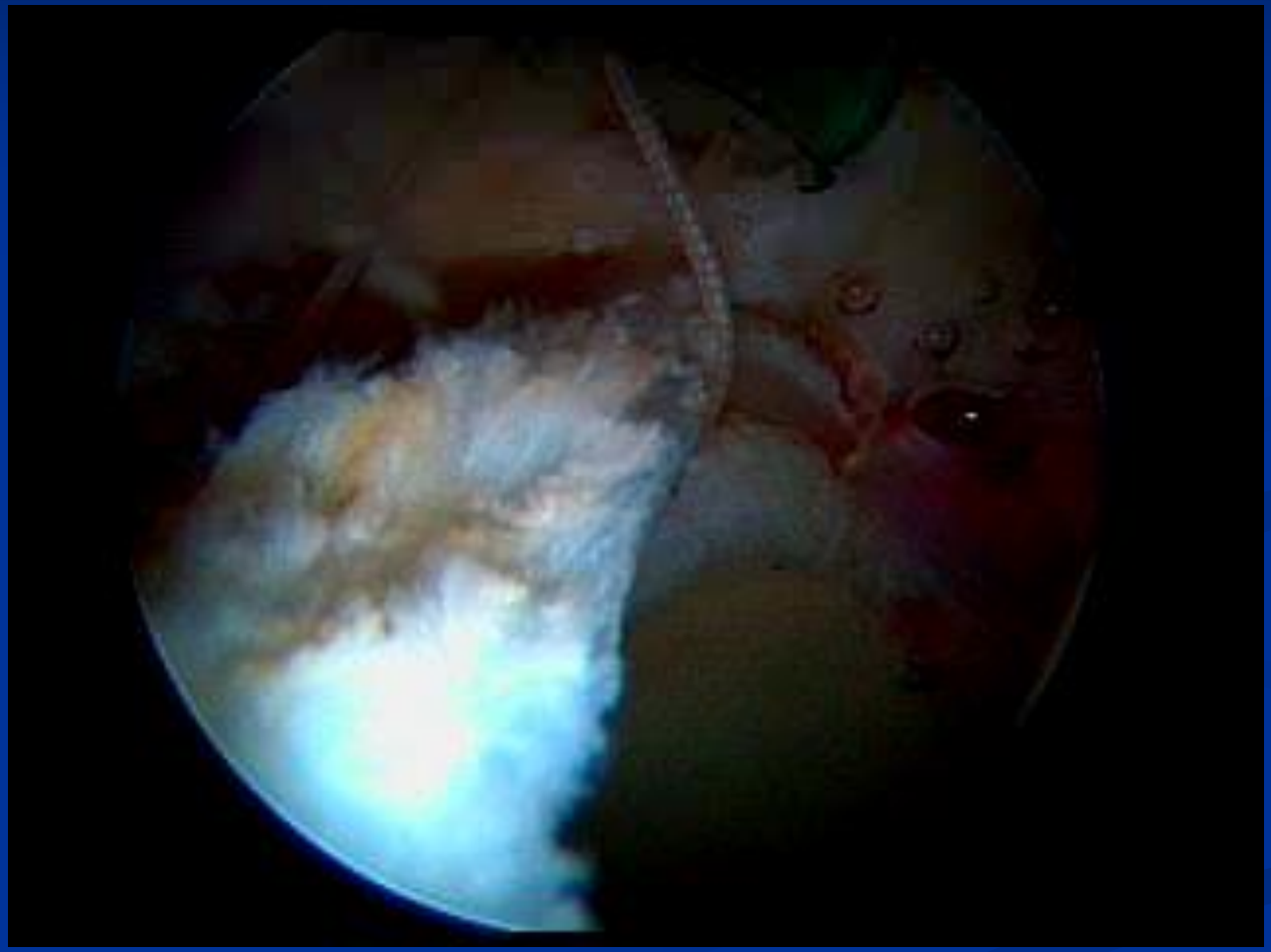


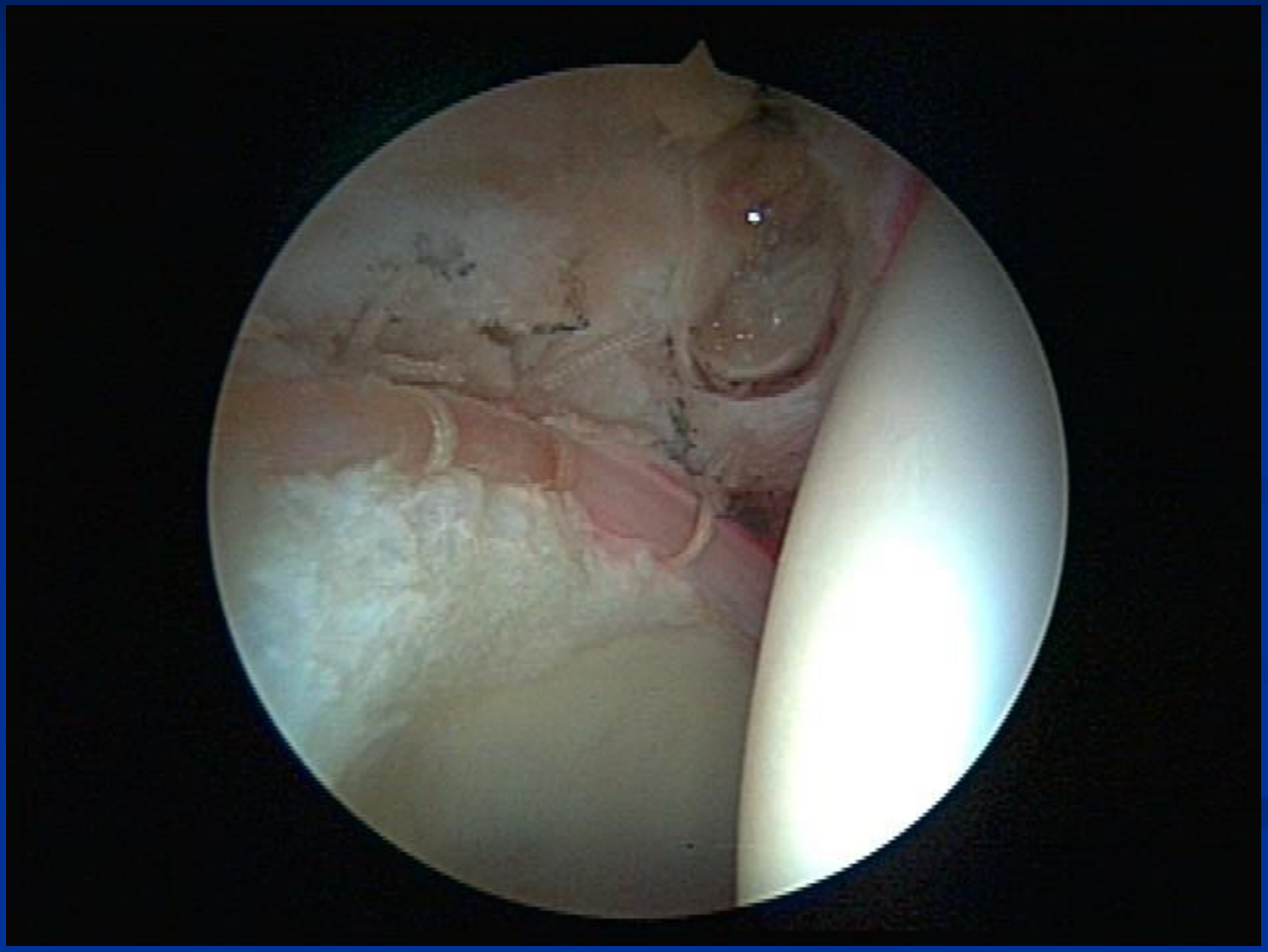
acetabular rim trimming

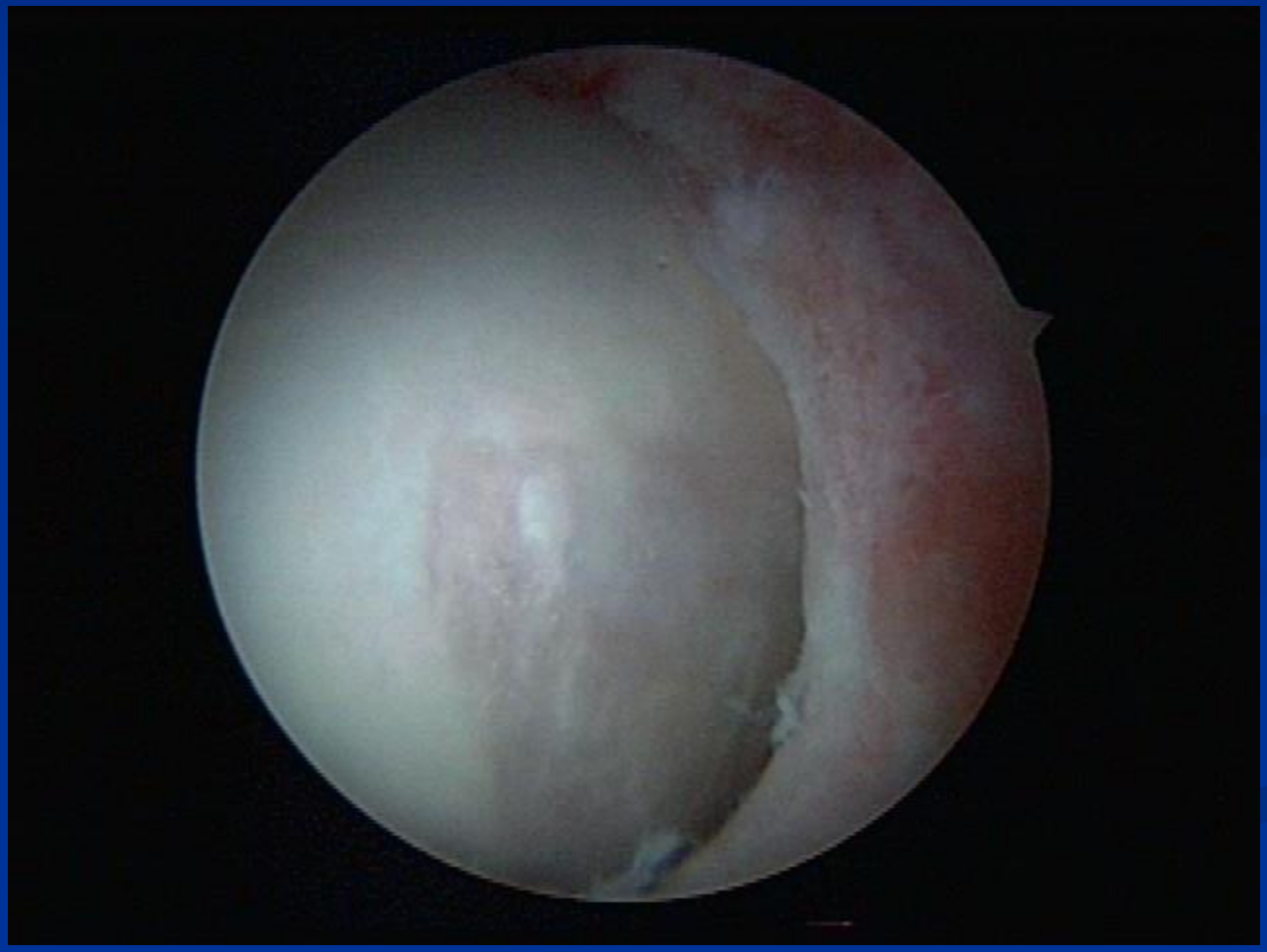
anchor insertion

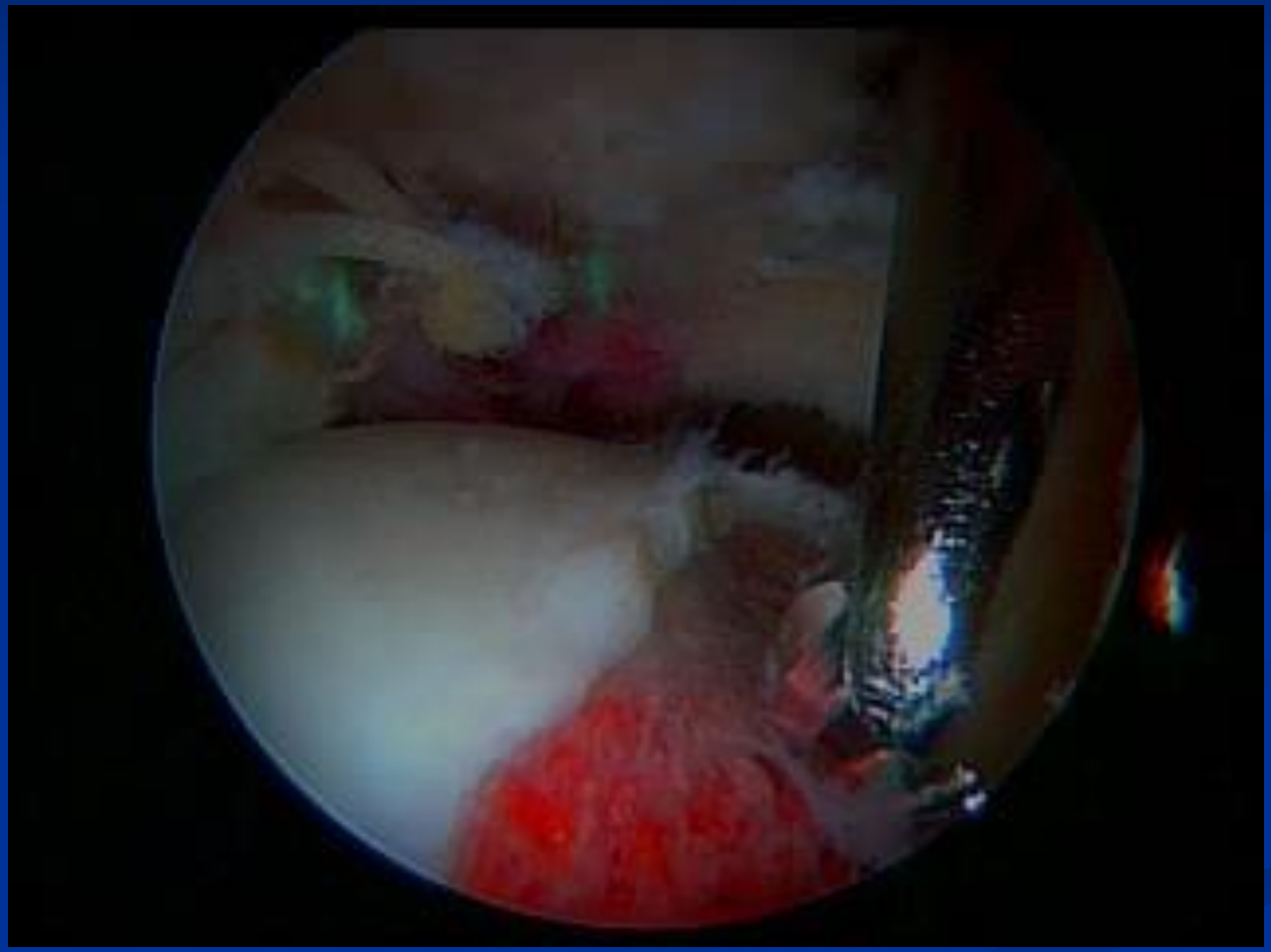


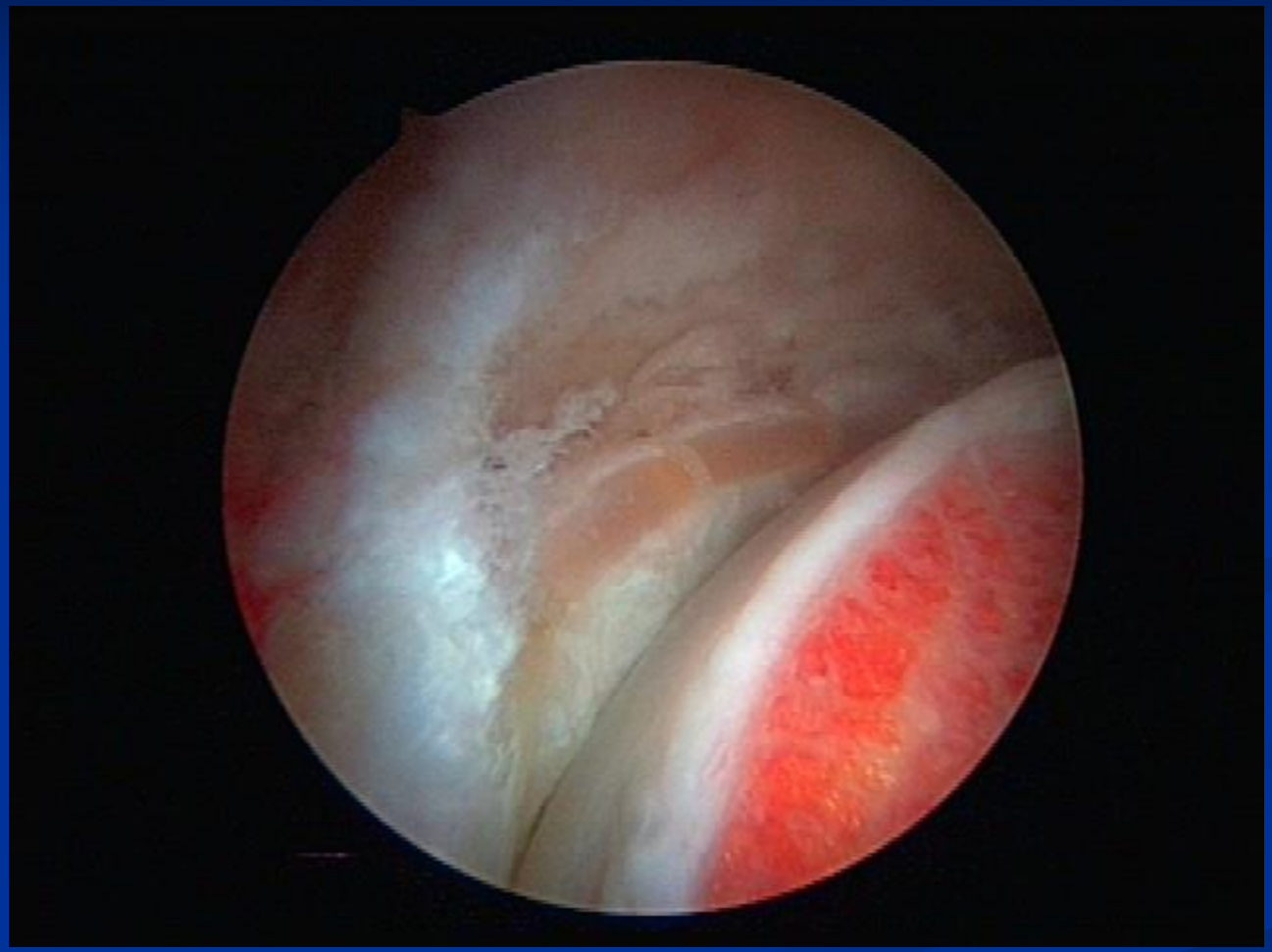
Knot tying

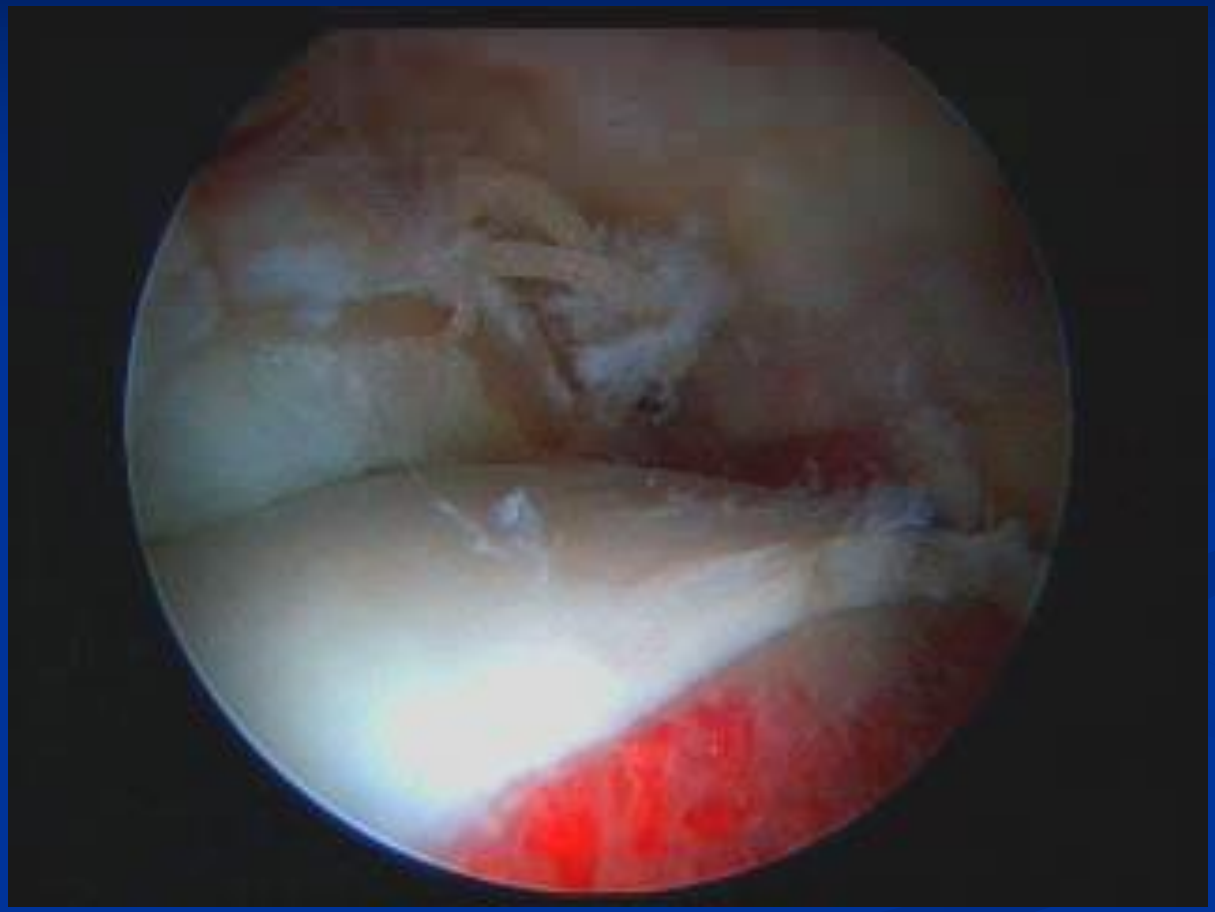




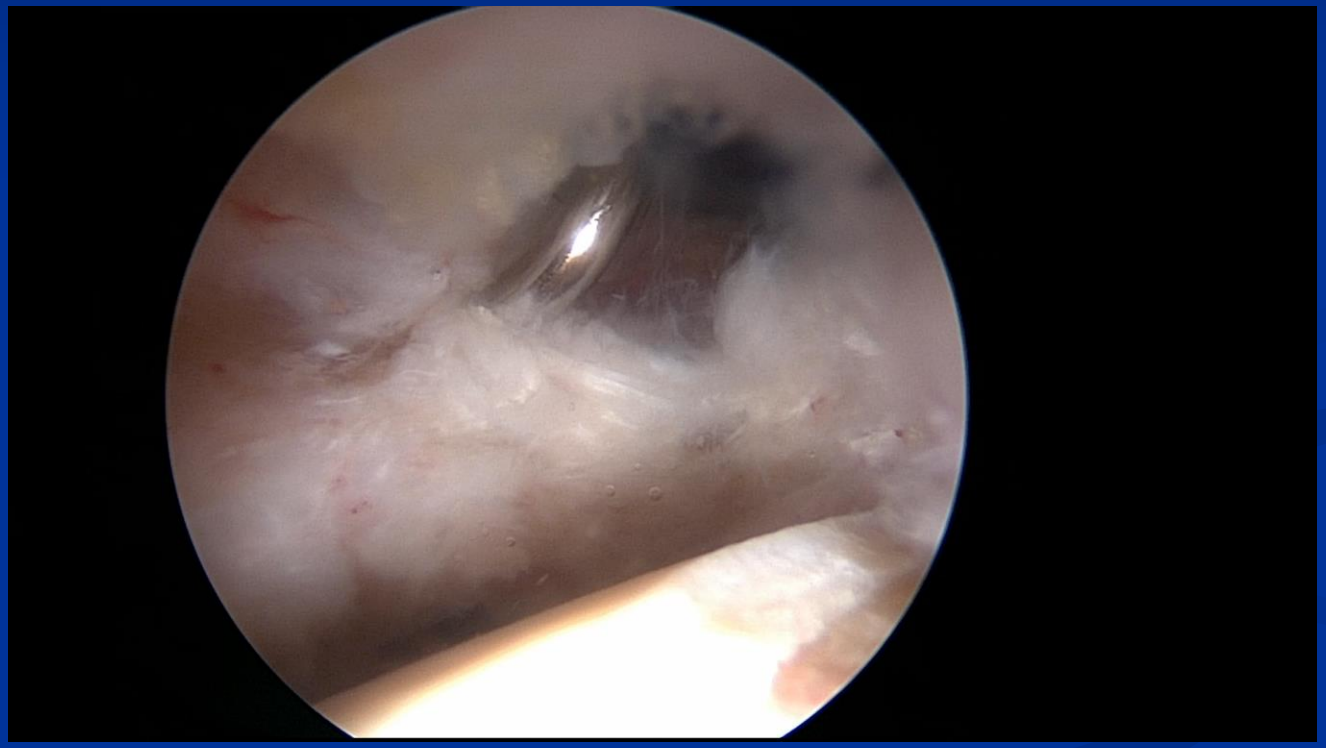






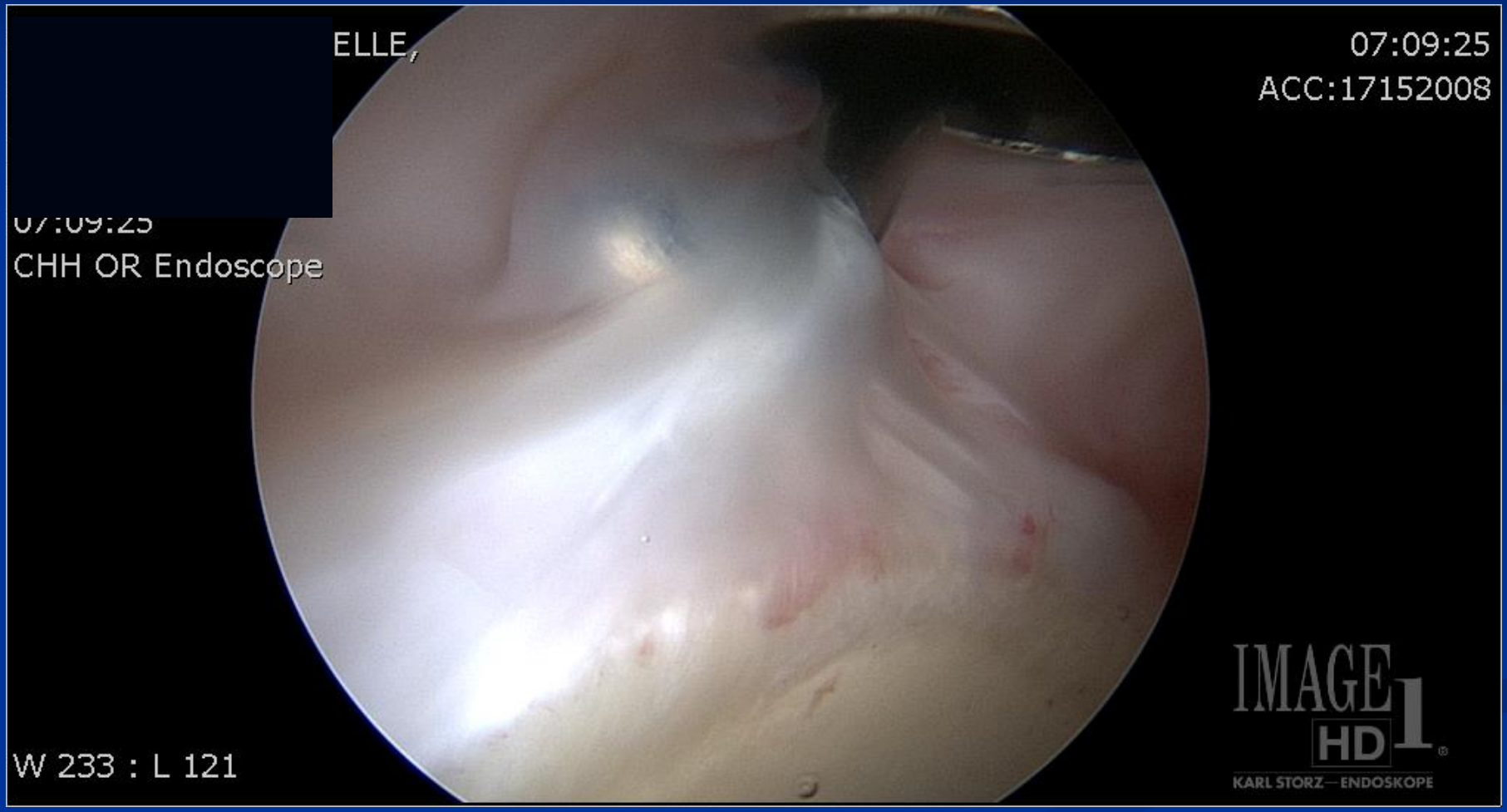


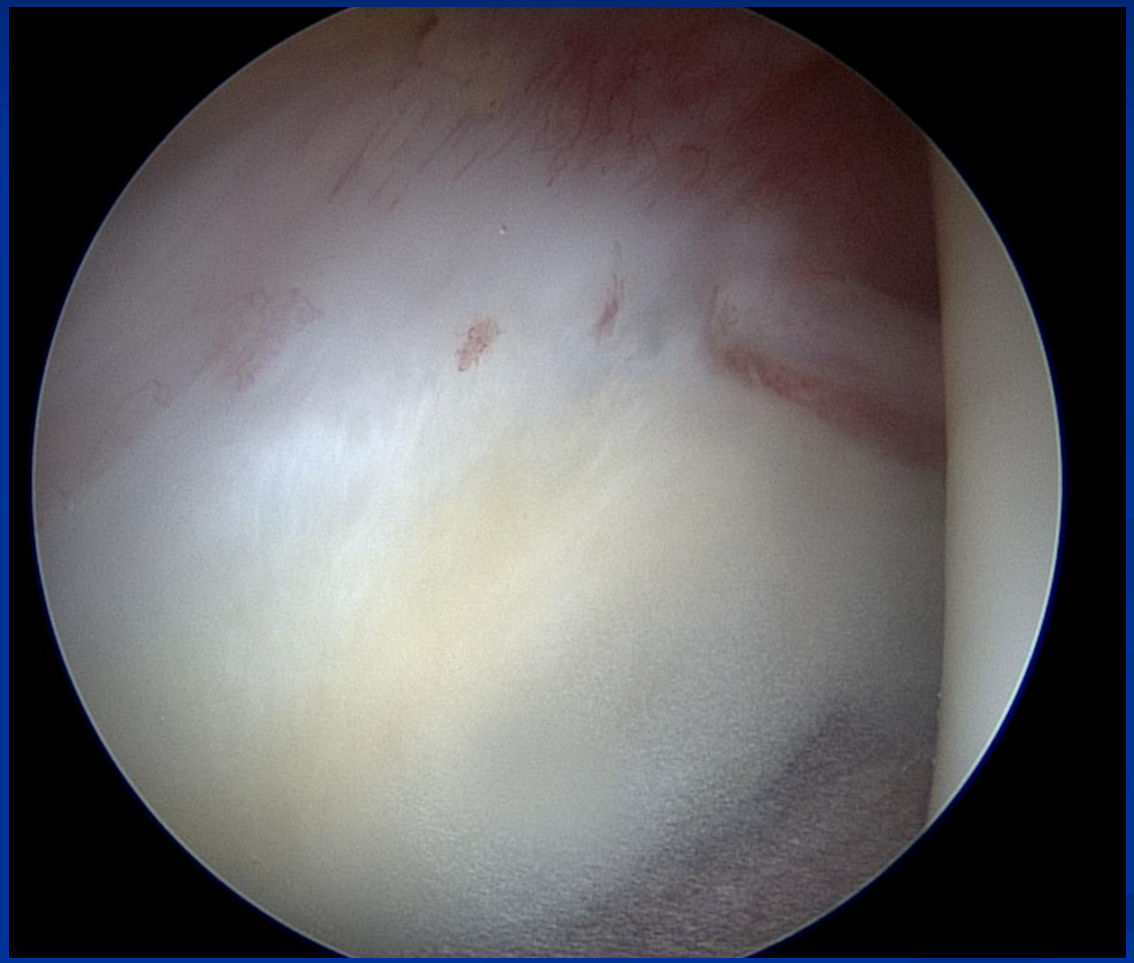
Capsular repair

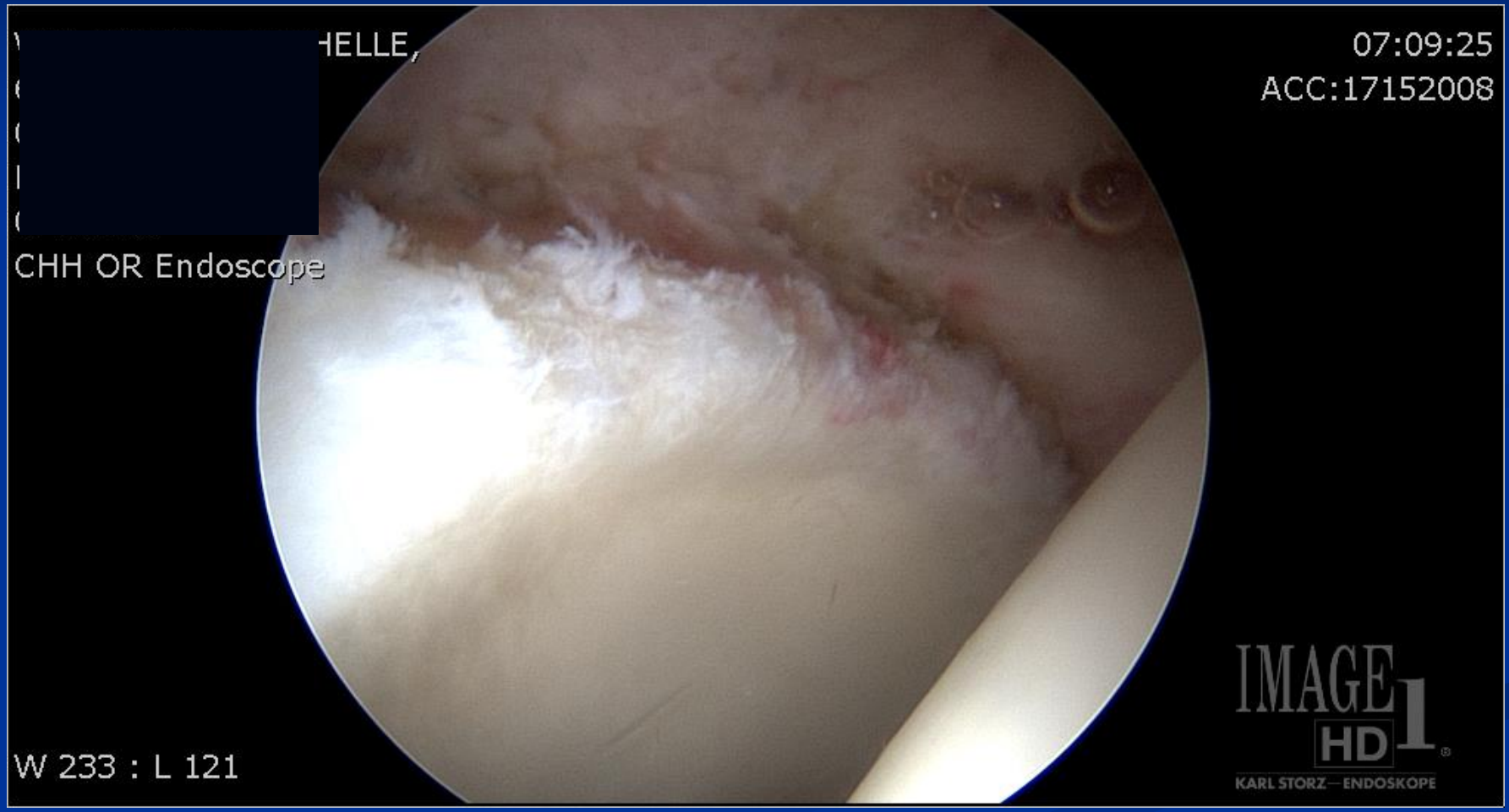


Labral Reconstruction with allograft

s/p labrectomy



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KARL STORZ—ENDOSKOPE

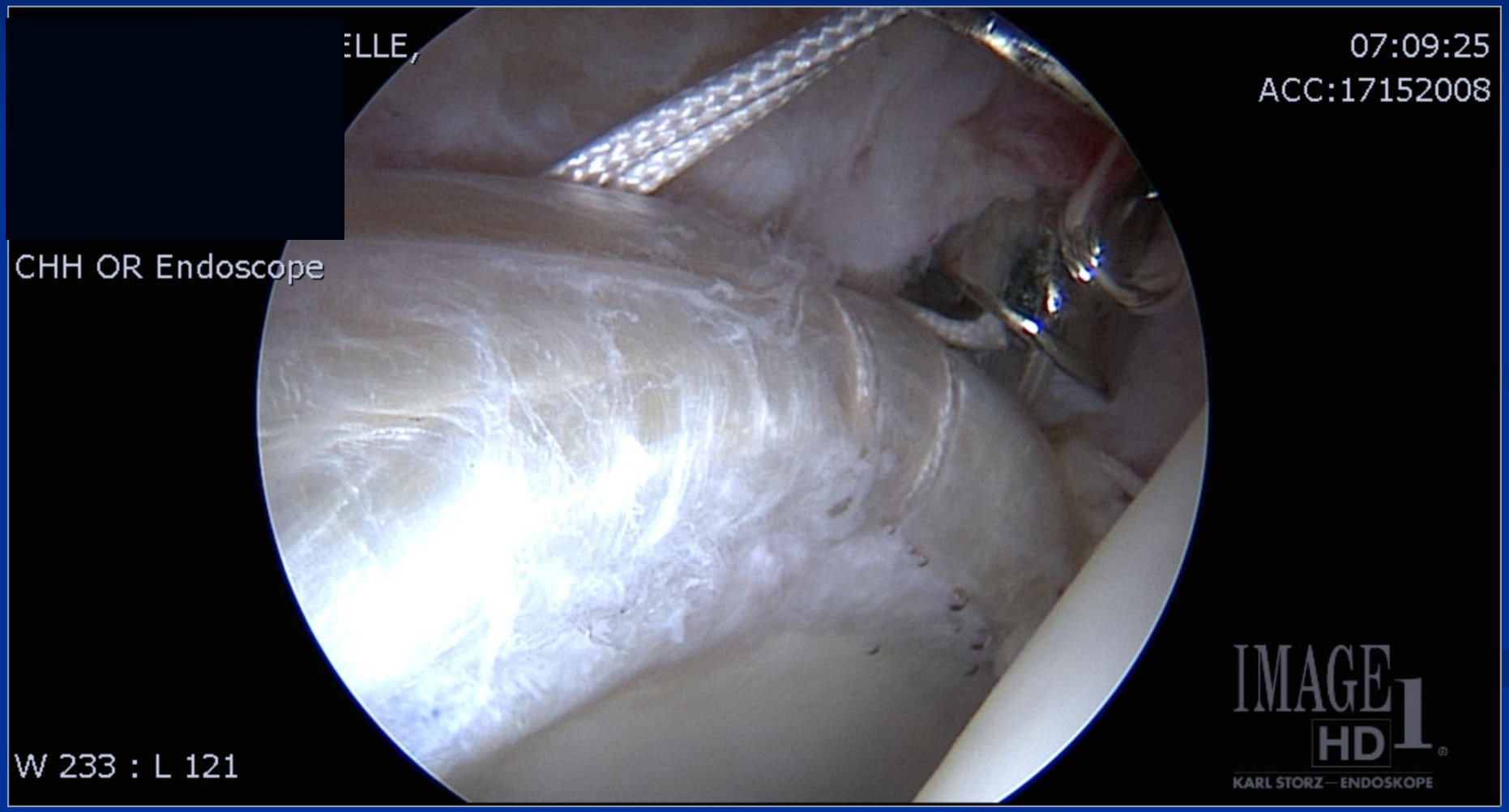
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IMAGE1
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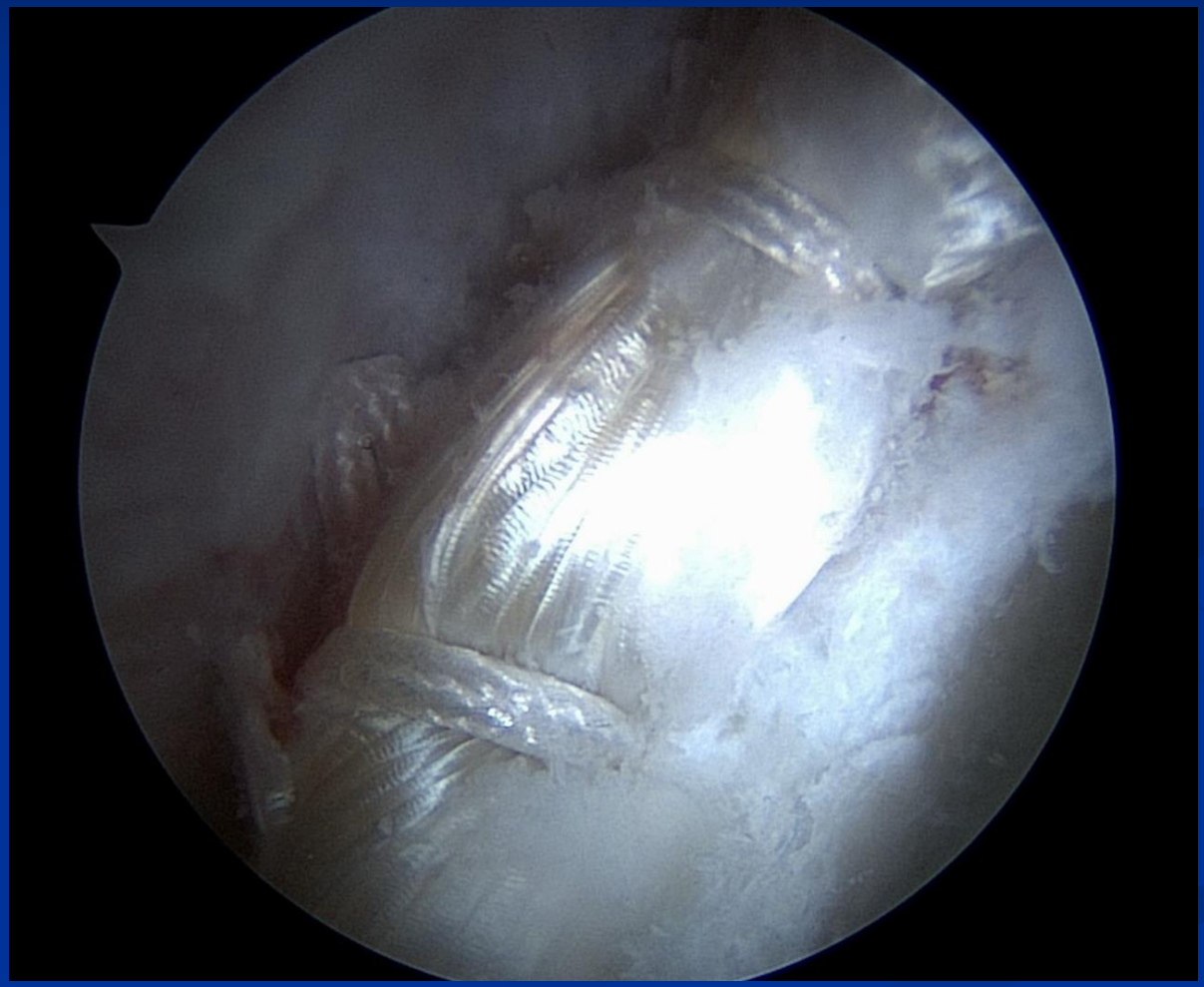

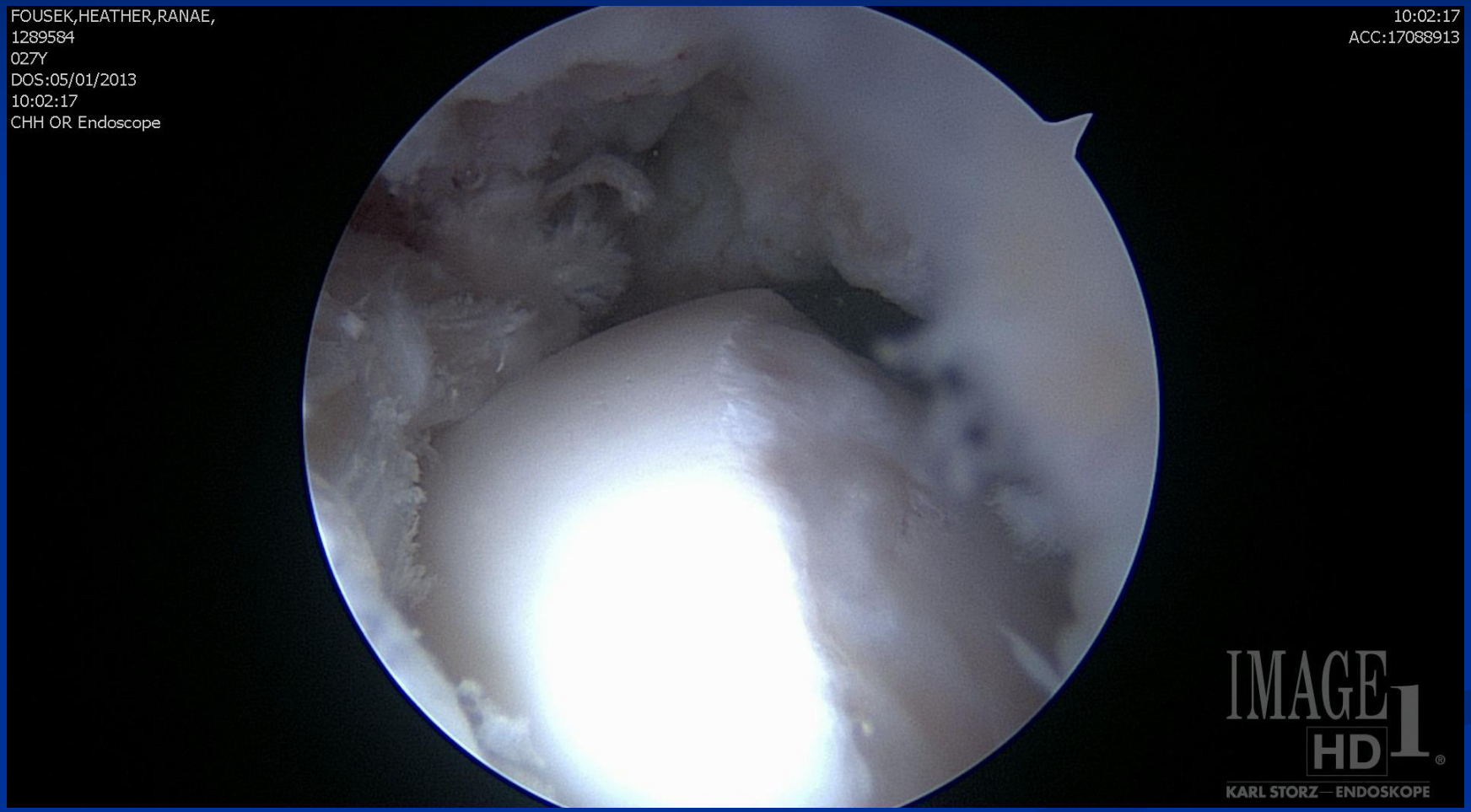
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IMAGE1 HD
KARL STORZ — ENDOSKOPE

Postop Protocol

	dosage	duration	rationale
piroxicam	20mg daily	30 days	Prevent heterotopic ossification
aspirin	325 mg dail	14 days	Prevent DVT
omeprazole	40 mg daily	30 days	Prevent ulcer
oxycodone	5-10mg q 4 hrs PRN	2-5 days	Postop acute pain management
Senna/docusate	8.6/50mg BID	While using oxy	Prevent constipation

- PT 2x/week X 12 weeks starting within 5 days of surgery
- CPM up to 6 hours per day X 2 weeks postop

Postoperative Rehabilitation Following Hip Arthroscopy

- Phases of Care
- What to expect
- Potential obstacles to rehab

What to expect

- Some patient note immediate relief of sharp groin pain
- Others have persistent sharp pain and increased clicking and popping in the first 6 weeks
- Some get FABER quickly
- Others struggle with IR or ER

- **VARIABILITY**

Expectations

- Improvement by 12 weeks postop
- More good days than bad at 12 weeks
- Improved sitting tolerance at 12 weeks
- Full ROM and ability to sit criss cross by 6 months
- Complete loss of pinch in impingement positions- 6-12 months

Potential obstacles in rehab

- Iliopsoas tendonitis
- TFL tendonitis
- Trochanteric bursitis
- Stiffness in FABER
- Adductor overuse and insertional tendonitis (instability)
- Hamstring symptoms

question

- A 16 year old cross country athlete presents to clinic with right groin pain that intensifies with activity. She has trialed running less and stretching but her pain is persistent and returns every time she tries to jog further. Her BMI is 19. Her Xrays are normal. What is your best management choice?

A. Trial 2 weeks of crutches
B. PT for gluteal strengthening and anterior hip opening stretches
C. Urgent MRI
D. Urgent MRI and crutches
E. CT of the hip

Thank You