



Femoroacetabular Impingement Syndrome (FAI)

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Presentation Outline



- **Overview of FAI**
 - What is FAI?
 - Causative Factors
 - Classifications/Types
- **Clinical Presentation**
 - Signs & Symptoms
 - Objective Findings
- **Treatment Options**
 - Conservative/Non-Operative
 - Surgical
 - Postoperative Rehabilitation
- **Differential Diagnosis**
- **Available Resources**



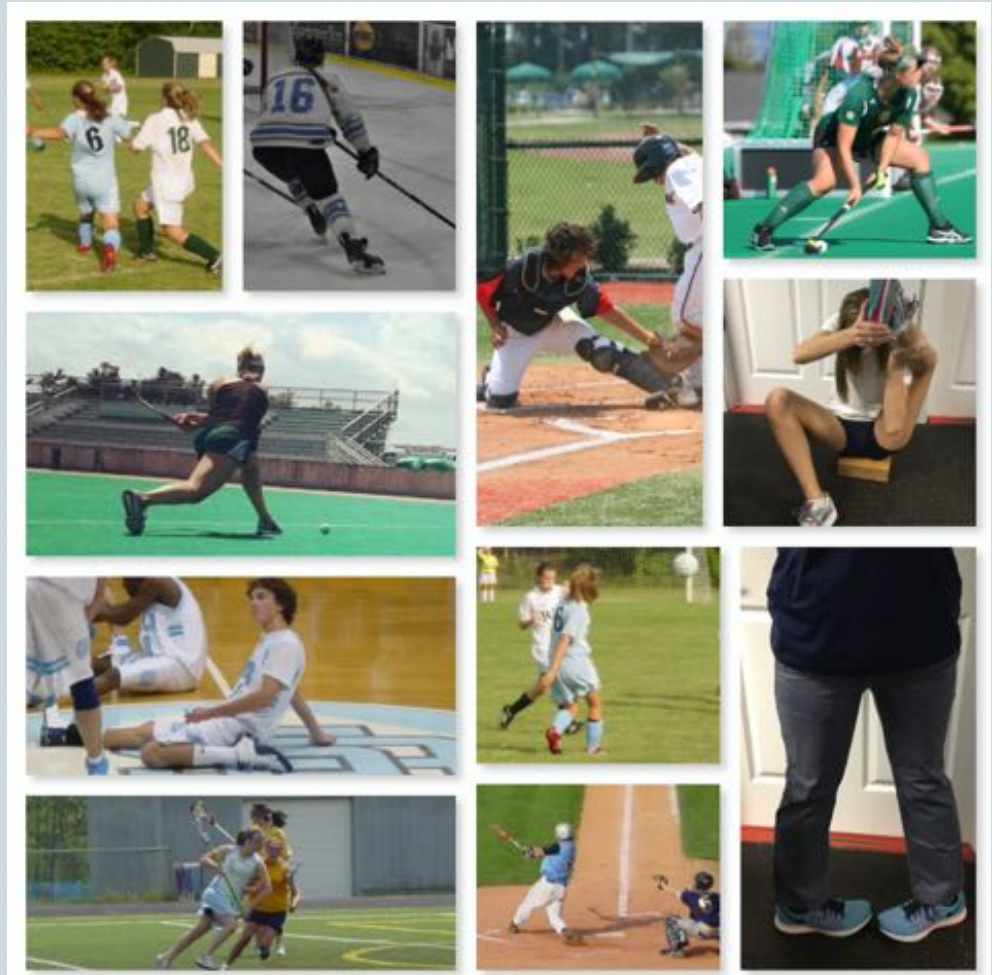
Overview: What is FAI?^{1,2,3,4}



- Morphologic condition → hip/groin pain and dysfunction
- Hip abnormalities → abutment of proximal femoral head-neck junction against acetabular rim or labrum
- Prevalence rate = 23-67% of general population (radiographic confirmation)
- Concern of FAI leading to:
 - Lesions in labrum, chondrolabral junction, and/or articular cartilage
 - Full thickness cartilage delamination
 - Early degenerative joint disease/hip osteoarthritis

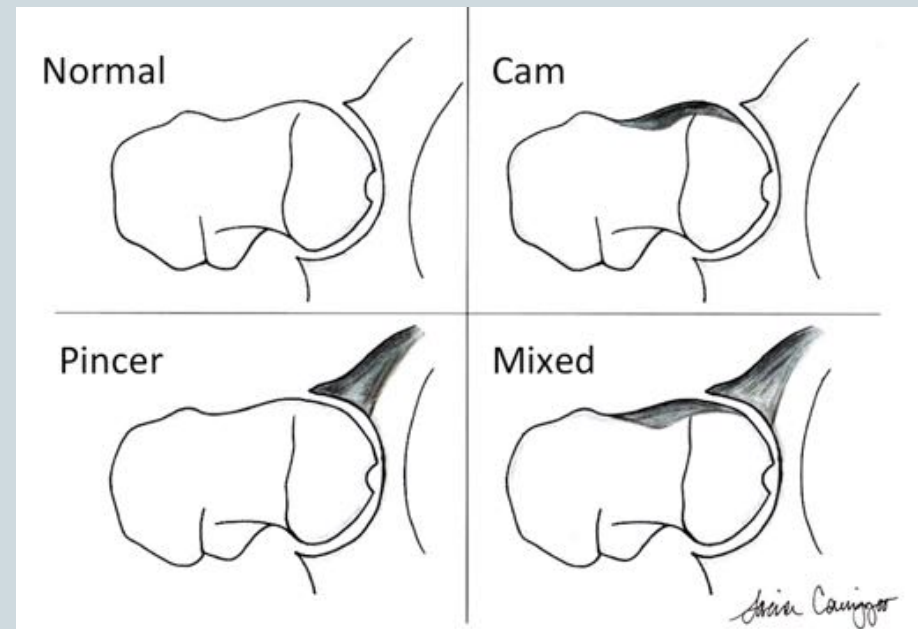
Overview of FAI: Causative Factors^{1,3,5,6}

- Trauma
- Acetabular labral impingement
- Capsular laxity
- Dysplasia
- Degeneration
- Aggressive athletic activities
 - Hockey, soccer, football, baseball, kickboxing, lacrosse
- Genetic factors
- Structural abnormalities in femur or acetabulum



Overview of FAI: Structural Abnormalities^{3,7}

- **Classifications/Types**
 - **Cam Impingement**
 - ✦ Excessive bone growth on femoral head
 - ✦ Aspherical femoral head
 - ✦ 3:1 male to female prevalence
 - ✦ Problematic in young adulthood
 - **Pincer Impingement**
 - ✦ Excessive bone growth on the acetabulum → over coverage of femoral head
 - ✦ Male/female prevalence equal
 - ✦ Symptoms arise in middle age
 - **Combined/Mixed Impingement**



Clinical Presentation^{1,3,5,8}

- Evaluate using “HERE”: History, Examination, Radiology-Laboratory, Expectation of patients

Presentation:

- Onset: gradual or precipitated by acute event
- Unilateral anterior hip or groin pain – may radiate to medial thigh
 - “C” sign to describe deep interior hip pain: hand cupping above greater trochanter, fingers gripping anterior groin
- Activity-dependent pain
 - Climbing stairs, prolonged sitting
 - Pain with turning, twisting, pivoting, or lateral movements on symptomatic lower extremity
- (+) mechanical symptoms: catching, locking, clicking, giving way



Clinical Presentation: Objective Findings^{3,5}



- “Trademark” = restricted internal rotation (IR)
- Testing:
 - (+) FADIR: pain, limited IR with hip flexion
 - (+) Scour Test: pain from impingement
 - (+) Log Roll Test: pain or clicking moving femur into IR
 - (+/-) FABER: may have limited range of motion (ROM) and pain

Special Tests



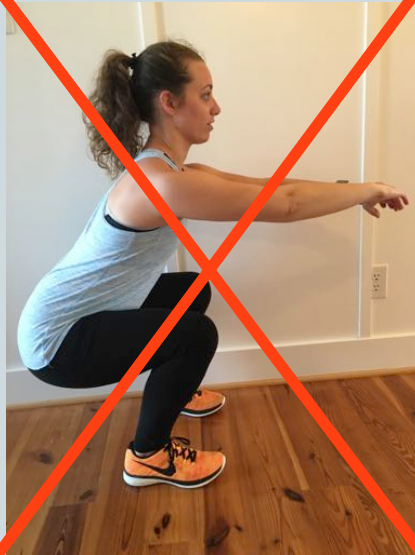
Clinical Presentation: Objective Findings^{3,5}

- **Muscle inflexibility**
 - Tight hip flexors
 - Tight lumbar extensors
- **Strength imbalances**
 - Weak gluteal muscles
 - Weak abdominal muscles
- **Imaging**
 - Radiographic imaging: anteroposterior view and lateral view
 - Magnetic Resonance Imaging (MRI): used with gadolinium contrast for increased sensitivity
 - Computed Tomography (CT): provides 3D view; clearest image



Treatment Options: Conservative/Non-Operative^{3,4,5,6,8}

- Demonstrates effectiveness for symptomatic patients for 8-12 years
- Recognize early
- Manage pain
- Modify activity
- Manual therapy
- Patient education
- Avoid loaded hip rotation, extended sitting, crossing lower extremities, deep squats, cycling with deep hip flexion



- Address biomechanical impairments
- Emphasize proper hip alignment
- Balance length and strength of hip and core musculature
 - Improve flexibility
 - Strengthen hip abductors, gluteus maximus, iliopsoas, and hip external rotators; periarticular musculature; core musculature
- Improve neuromuscular control and postural balance in dynamic environments
- Invasive step: intra-articular anesthetic injection (for pain relief and/or diagnostic indications)

Treatment Options: Surgical^{3,6}



- Address mechanical factors and intra-articular pathology

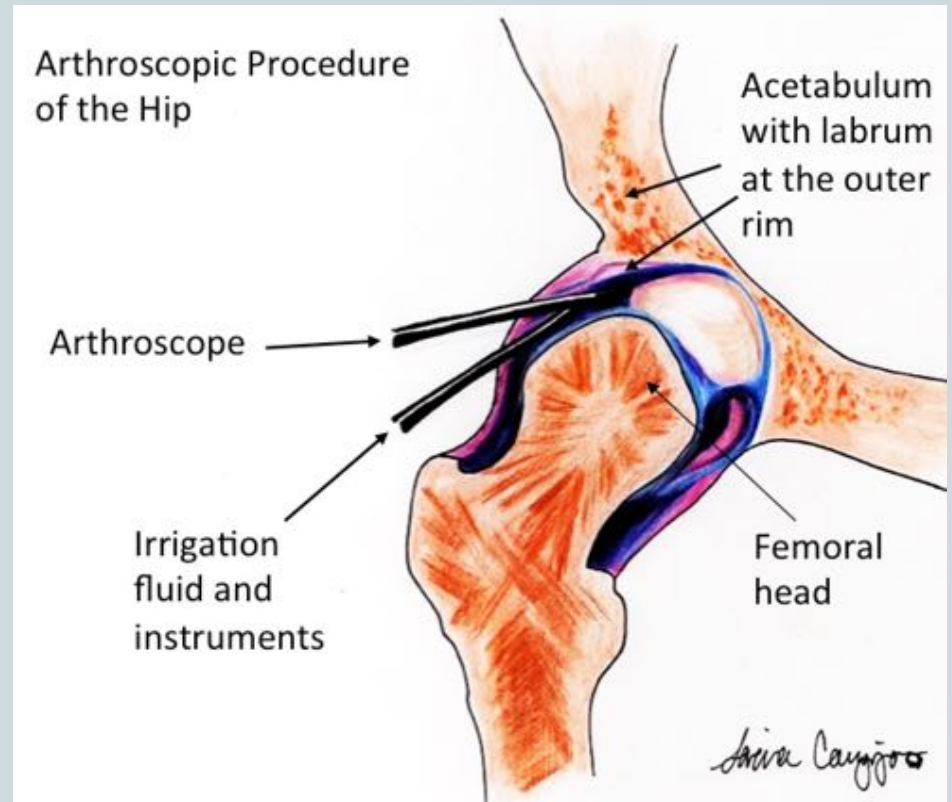
- **Goals:**

- Relieve pain
- Improve function
- Return patient to sport/activity
- Prevent further joint degeneration



Treatment Options: Surgical^{3,6,9}

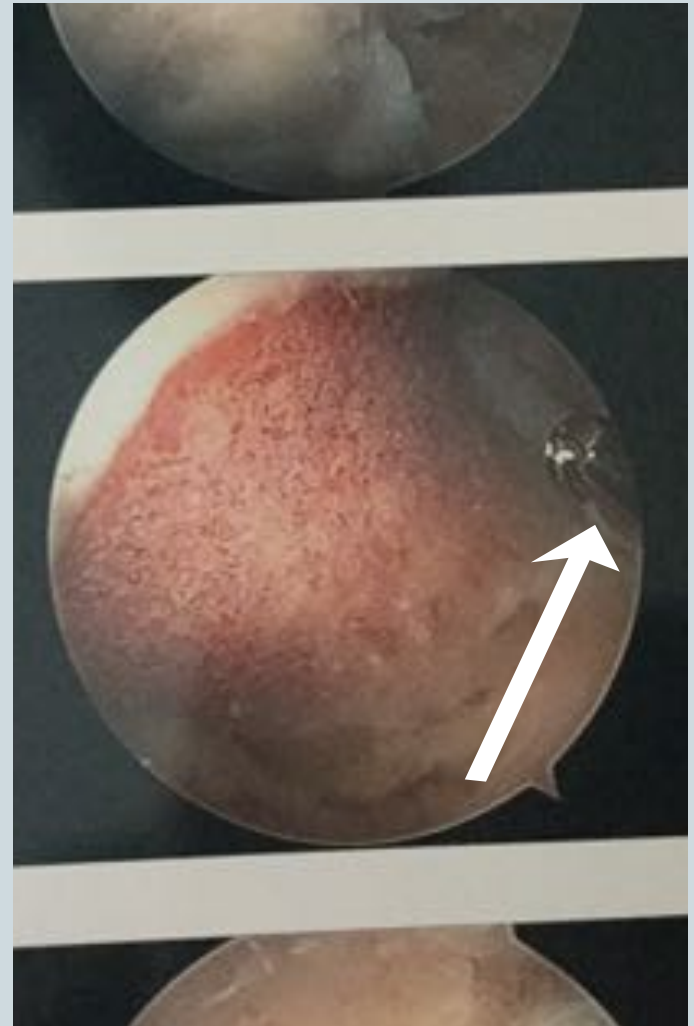
- Operative Techniques
 - *Arthroscopic Surgery*
 - ✦ Higher rate of return to sport/activity
 - ✦ Preferred approach (50.4%)
 - Open Surgical Dislocation
 - ✦ Original technique
 - ✦ 2nd preferred approach (34.4%)
 - Mini-Open Method with Concomitant Arthroscopic Surgery
 - Labral debridement vs. repair
 - Periacetabular Osteotomy
 - ✦ Uncommon technique for FAI



Treatment Options: Surgical^{3,6,9}



- Shaver (arthroscopic tool) being used to remove excess bone from the femur



Treatment: Postoperative Rehabilitation³

- Dependent upon hip condition and surgical procedure
 - For example:
 - ✦ Femoroplasty → modest precaution; avoid spontaneous fracture of femoral neck
 - ✦ Repair to the labrum → post-op precautions; 4 weeks of limited weightbearing (WB)
 - ✦ Microfracturing → optimize healing response of fibrocartilage with extended protected WB
- Structured rehabilitation program: ~ 3 months
- Functional progression for return to sport: an additional ~ 1-3 months
- Return to sport timeframe: 3.8 – 9.4 month range



Treatment: Postoperative Rehabilitation^{10,11}

- Individualized rehab program based on findings from evaluation and adapted after re-evaluation
- Outcome Measures:
 - Hip Outcome Score (HOS)
 - International Hip Outcome Tool (iHOT)
 - Non-Arthritic Hip Score (NAHS)
 - Modified Harris Hip Score (mHHS)
 - Western Ontario and McMaster Universities Arthritis Index (WOMAC)
 - Copenhagen Hip and Groin Outcome Score (HAGOS)

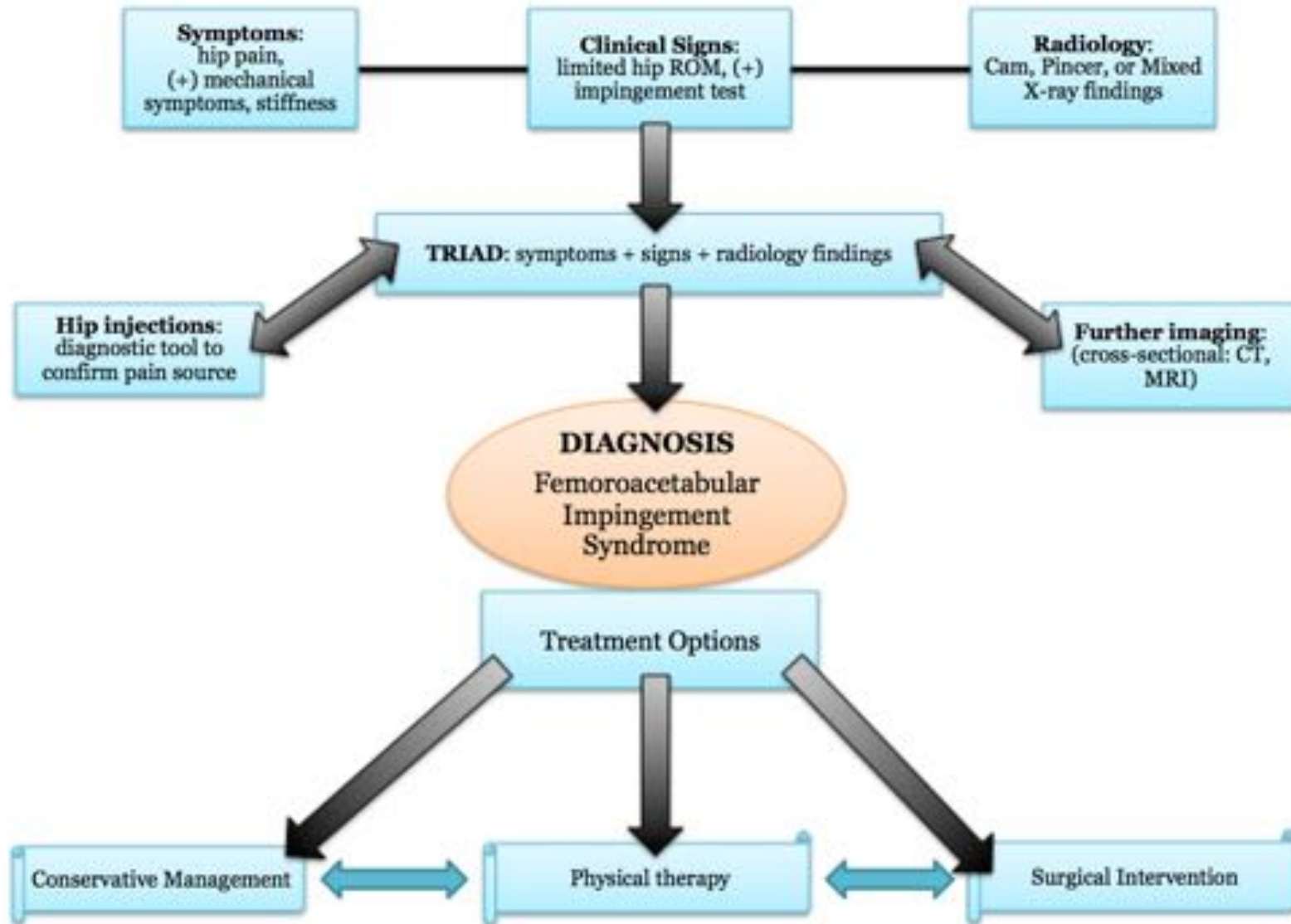


Treatment: Postoperative Rehabilitation^{10,12}



- **Phased Protocol**
 - **Phase I: 0-6wks post-op**
 - ✦ Protection; limited WB; restore early ROM through PROM and AAROM (avoid excessive hip ext, flex, ER); limited core and hip isometric strengthening; hip flexor sparing
 - **Phase II: 4-12wks post-op**
 - ✦ Advance to pain free WB, gait, and ROM (PROM, AAROM, AROM); continue strengthening core and hip musculature, focus on core, gluteals, and lateral column; continue hip sparing; goal of normal gait
 - **Phase III: 8-20wks post-op**
 - ✦ Emphasis on endurance; continue strengthening; progress to sport-specific training
 - ✦ To advance to Phase IV: must have pain free full ROM and strength; no subjective or objective deficits
 - **Phase IV: minimum 12wks post-op**
 - ✦ Progress rehab program to return to activity-specific exercises (safe and unrestricted); avoid regression (pain, stiffness, weakness)
- **Considerations**
 - Use circumduction to improve hip ROM; avoid adhesions (intra-articular and extra-articular); hip flexor sparing to eliminate long-term issues
 - Avoid/reduce risk for development of hip flexor tendonitis

Flowchart: Diagnosis & Treatment of FAI¹³



Differential Diagnosis^{3,14,15,16,17}



- Labral tear
- Athletic pubalgia (“sports hernia”)
- Femoral neck stress fracture
- Hip flexor tendon strain
- Snapping hip syndrome
- Secondary features obscuring primary disorder
- Gynecological disorders
- Avascular necrosis
- Cancer



Differential Diagnosis: Differentiating Factors^{3,14,15,16,17}



- **Labral tear**
 - Insidious or due to trauma (as a result of quick twisting, pivoting, forced hip rotation, falling, or repetitive stress/impingement)
 - Most common location in North Americans = anterior-superior labrum (location of WB)
 - Diagnosis: hip impingement testing, MRI, or can undergo arthroscopic procedure
- **Athletic pubalgia (“sports hernia”)**
 - Insidious onset of pain at lower abdominal wall, groin, and adductors
 - Activity-related pain; resolves with rest, recurs with resuming sport activity
 - To elicit pain: patient performs resisted sit-up (with legs extended and feet flexed), palpation at insertion of rectus abdominis
 - Differentiating factor = loss of ROM in FAI

Differential Diagnosis: Differentiating Factors^{3,14,15,16,17}



- **Femoral neck stress fracture**
 - Gradual onset of activity-related pain in groin and thigh; improves with rest, worsens with running
 - Diagnosis: X-ray may be negative early on; bone scans, CT or MRI can confirm
- **Hip flexor tendon strain**
 - Typically discerned in the clinical setting (ROM, manual muscle testing, tenderness to palpation); use of ultrasound (US) or MRI may be applicable
- **Snapping hip syndrome**
 - Iliopsoas: is snapping of the tendon painful or just coincidental? May be evaluated using US or iliopsoas bursography
 - Iliotibial Band: occurs during hip rotation, tensor fasciae latae crosses the greater trochanter; hip may appear to sublux, can resemble instability

Differential Diagnosis: Differentiating Factors^{3,14,15,16,17}



- **Secondary features obscuring primary disorder during examination**
 - Trochanteric bursitis
 - Over firing of gluteal muscles
- **Gynecological disorders**
 - Pain that is not dependent on position or activity
 - Tenderness to palpation, palpable mass
 - Pelvic examination required
 - Imaging: US, CT

Differential Diagnosis: Differentiating Factors^{3,14,15,16,17}



- **Avascular necrosis**
 - Insidious onset of pain that increases with WB
 - Could be a result of trauma or corticosteroid use
 - Imaging: X-ray (may be negative early on), MRI, CT
- **Cancer**
 - “Red Flag” signs and symptoms: non-reproducible pain (not dependent on position or activity), nocturnal pain, fever, weight loss, history of cancer
 - Imaging: X-ray, MRI, CT
 - Biopsy

Available Patient Resources^{11,16,17,18,19,20}



- Hip Arthroscopy iPad application
 - Free on App Store
<https://itunes.apple.com/us/book/hip-basics-hip-arthroscopy/id909133452?mt=11>
- American Academy of Orthopaedic Surgeons website
 - <http://orthoinfo.aaos.org/topic.cfm?topic=a00571>
- Hospital for Special Surgery website
 - https://www.hss.edu/conditions_femoroacetabular-impingement-a-patient-guide-to-hip-mobility-and-hip-arthroscopy.asp
- Rothman Institute website
 - <https://www.rothmaninstitute.com/files/What%20Is%20Femoral%20Acetabular%20Impingement%20Patient%20Guide%20into%20Joint%20Preservation.pdf>
- Royal Berkshire NHS website
 - http://www.royalberkshire.nhs.uk/patient-information-leaflets/Surgery_Femoroacetabular%20impingement%20FAI%20Orthopaedics%20October%202014.htm
- Nirschl Orthopaedic Center website
 - <http://www.nirschl.com/hip-arthroscopy-FAI.asp>
- Children's Hospital of Philadelphia
 - <http://www.chop.edu/conditions-diseases/femoroacetabular-impingement>
- Injury Prevention Resources
 - http://www.stopsportsinjuries.org/STOP/Prevent/STOP/Prevent_Injuries/Our_Resources.aspx

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