Femoroacetabular Impingement Syndrome (FAI)

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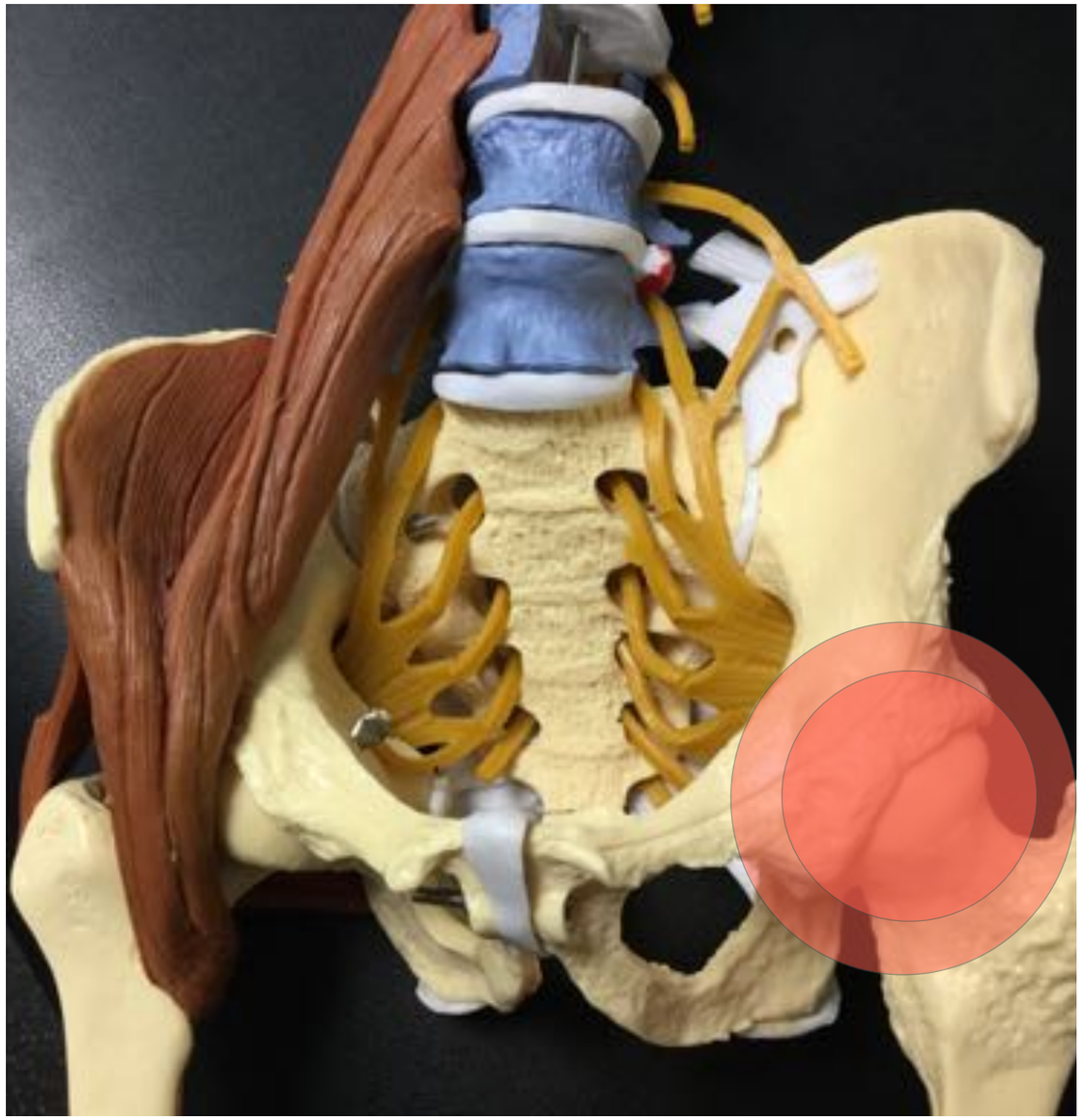
CHAPTER 1

FAI Overview

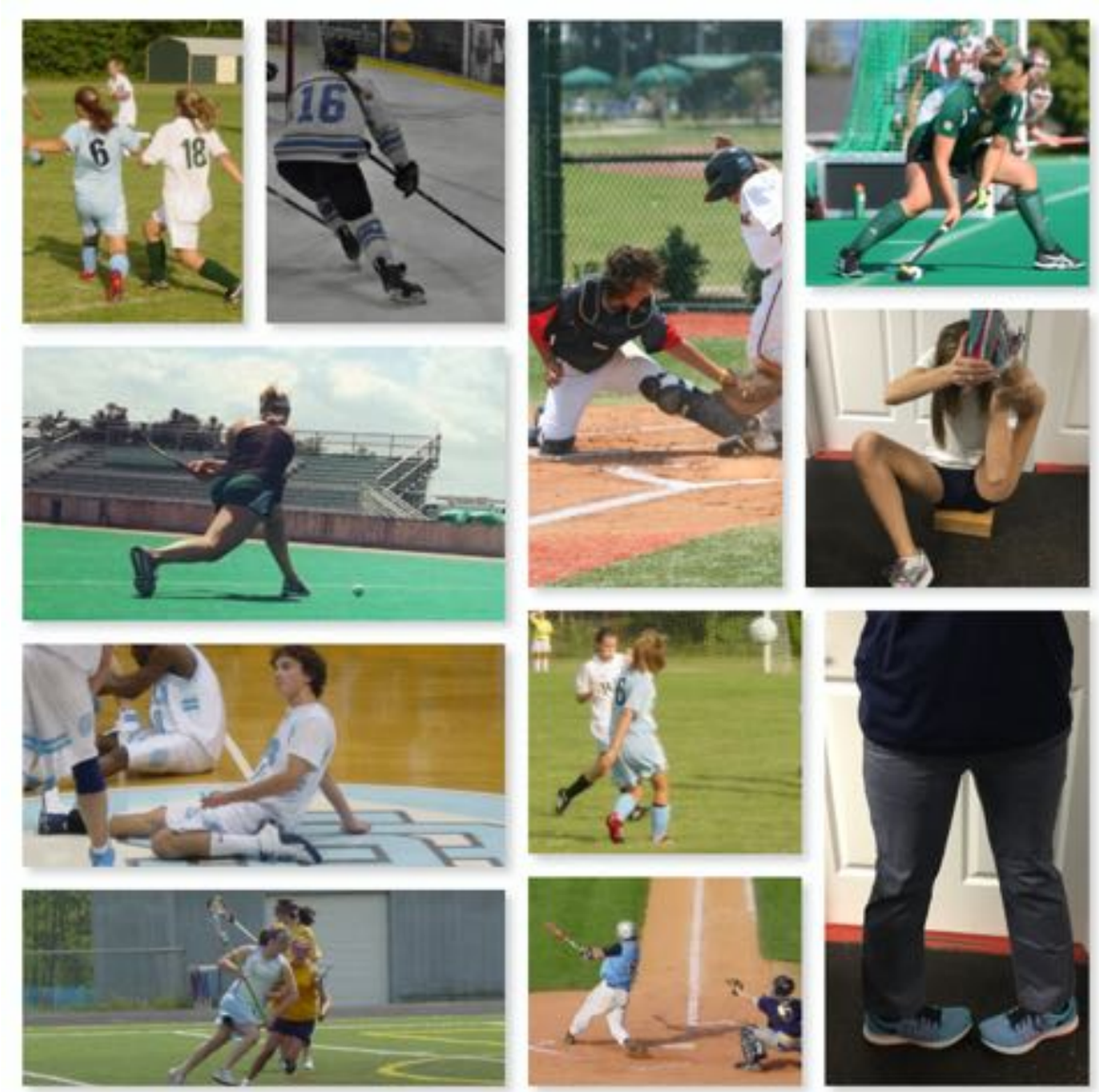
What is FAI?

- 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)[4]
- Concern of FAI leading to:
  - Lesions in the labrum, chondrolabral junction, and/or articular cartilage
  - Full thickness cartilage delamination
  - Early degenerative joint disease at the hip/ osteoarthritis



Causative Factors

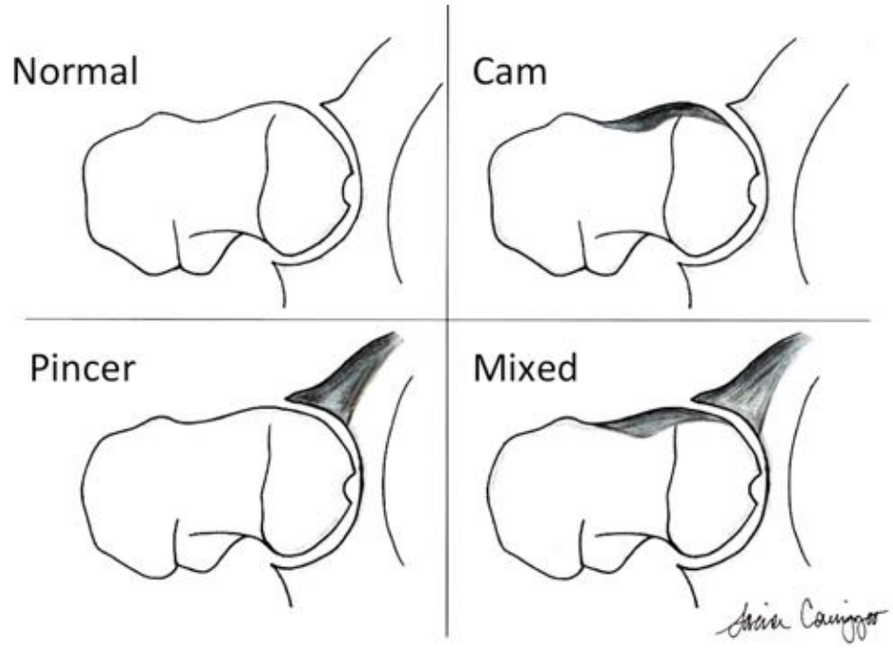
- Trauma
- Acetabular labral impingement
- Capsular laxity
- Dysplasia
- Degeneration
- Aggressive athletic activities
    - Hockey, soccer, football, baseball, kickboxing, lacrosse
- Genetic factors
- Structural abnormalities in femur or acetabulum

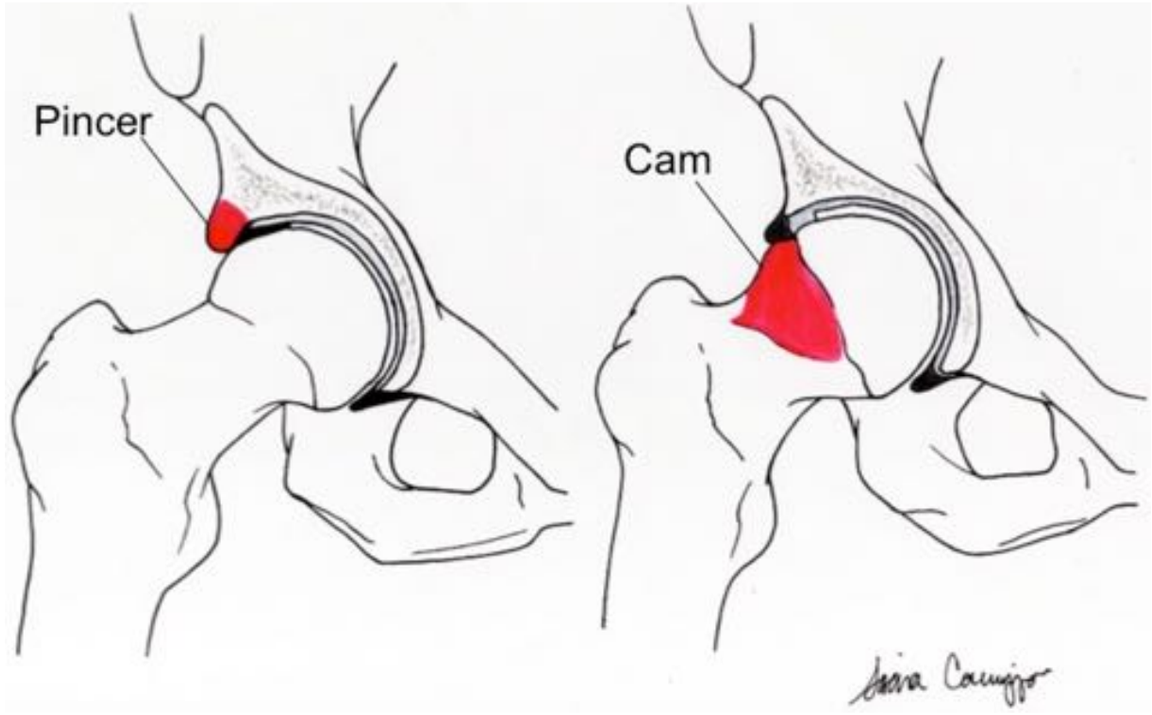


Structural Abnormalities

Classifications/Types

1. Cam Impingement
   - Excessive bone growth on femoral head
   - Aspherical femoral head
   - 3:1 male to female prevalence[3]
   - Problematic in young adulthood
2. Pincer Impingement
   - Excessive bone growth on the acetabulum --> over coverage of femoral head
   - Male/female prevalence equal[3]
   - Symptoms arise in middle age
3. Combined/Mixed Impingement



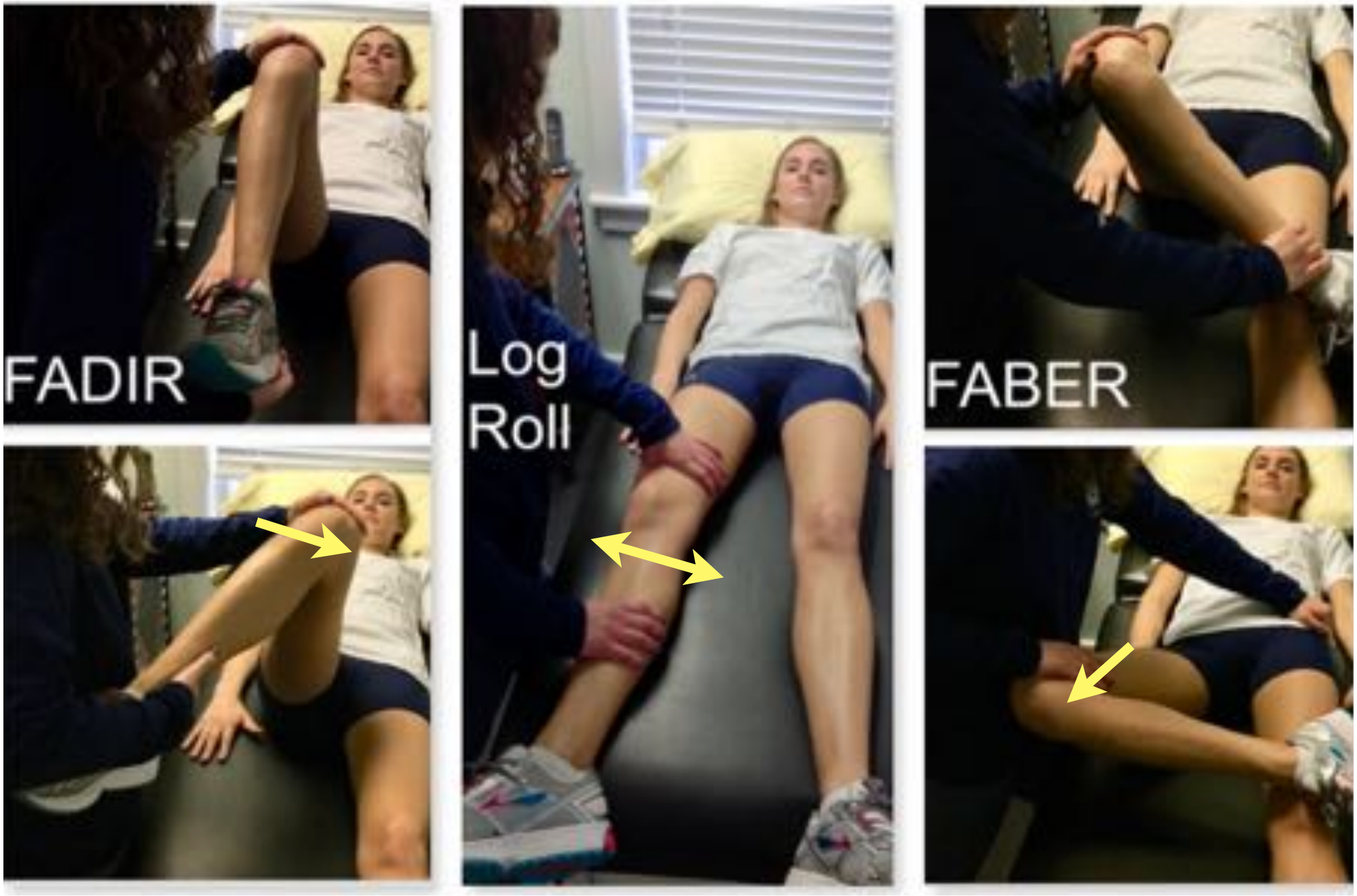


CHAPTER 2

Clinical 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
- Positive (+) mechanical symptoms
    - Catching, locking, clicking, giving way

Special Tests



Objective Findings

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

CHAPTER 3

Treatment Options

Conservative/Non-Operative

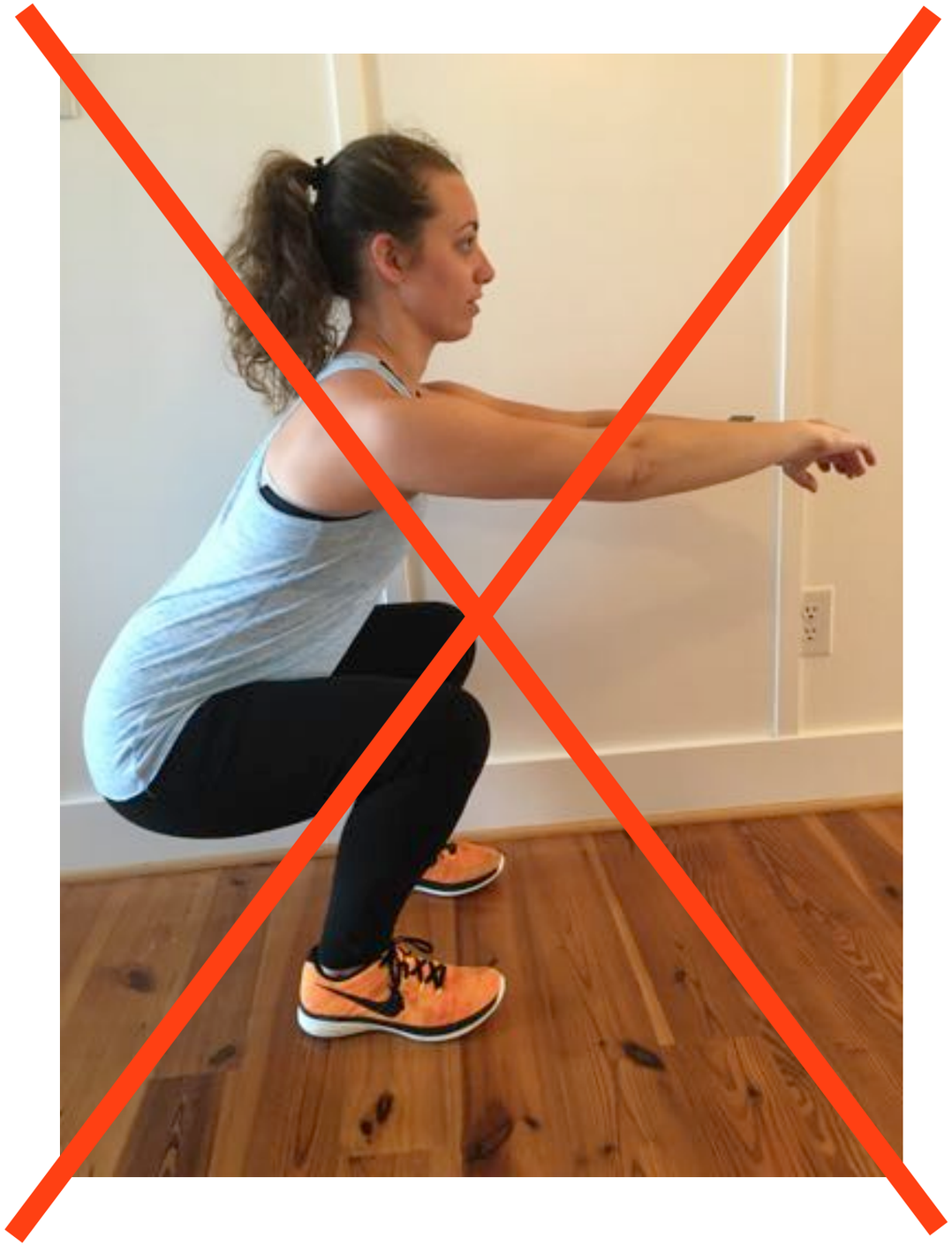
- Demonstrates effectiveness for symptomatic patients for 8-12 years[4]

Surgical/Operative

- Addresses mechanical factors and intra-articular pathology
- Goals:
    1. Relieve pain
    2. Improve function
    3. Return patient to sport/activity
    4. Prevent further joint degeneration

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

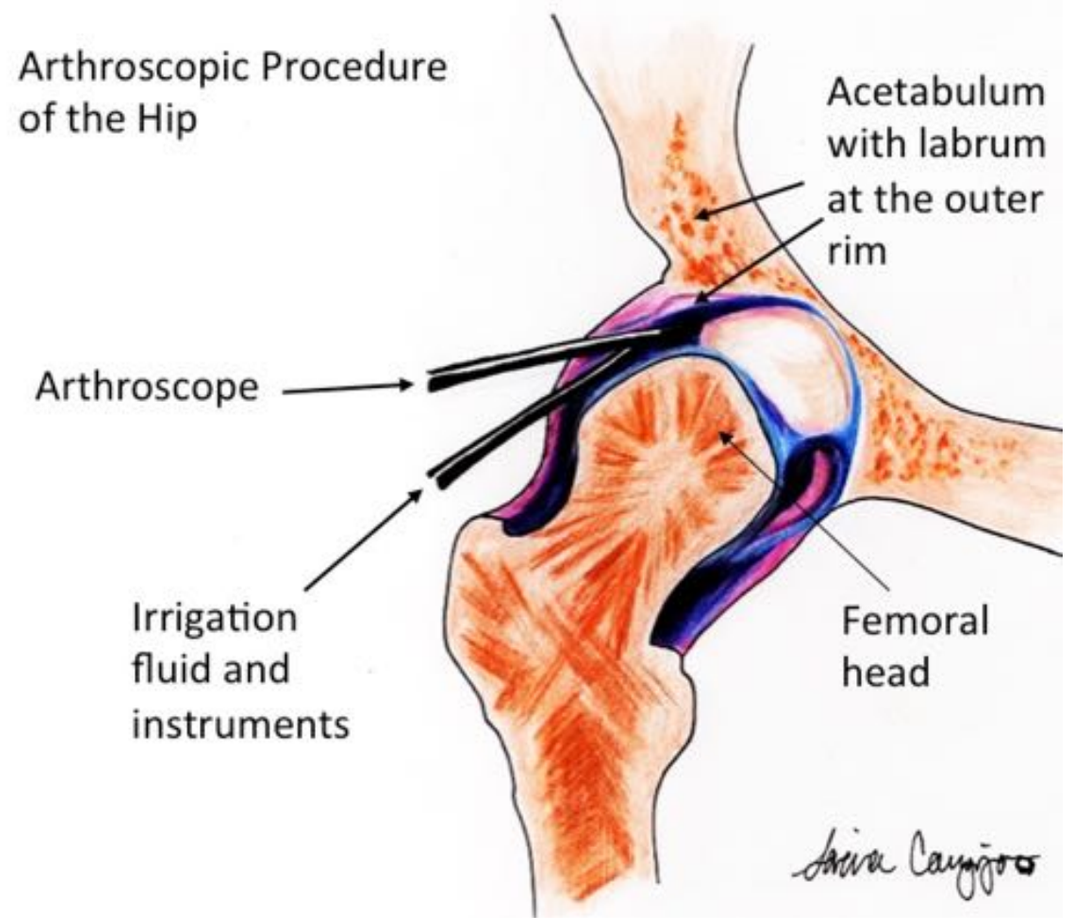
Conservative Interventions



- 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
- More invasive step: intra-articular anesthetic hip injection (for pain relief and/or diagnostic indications)

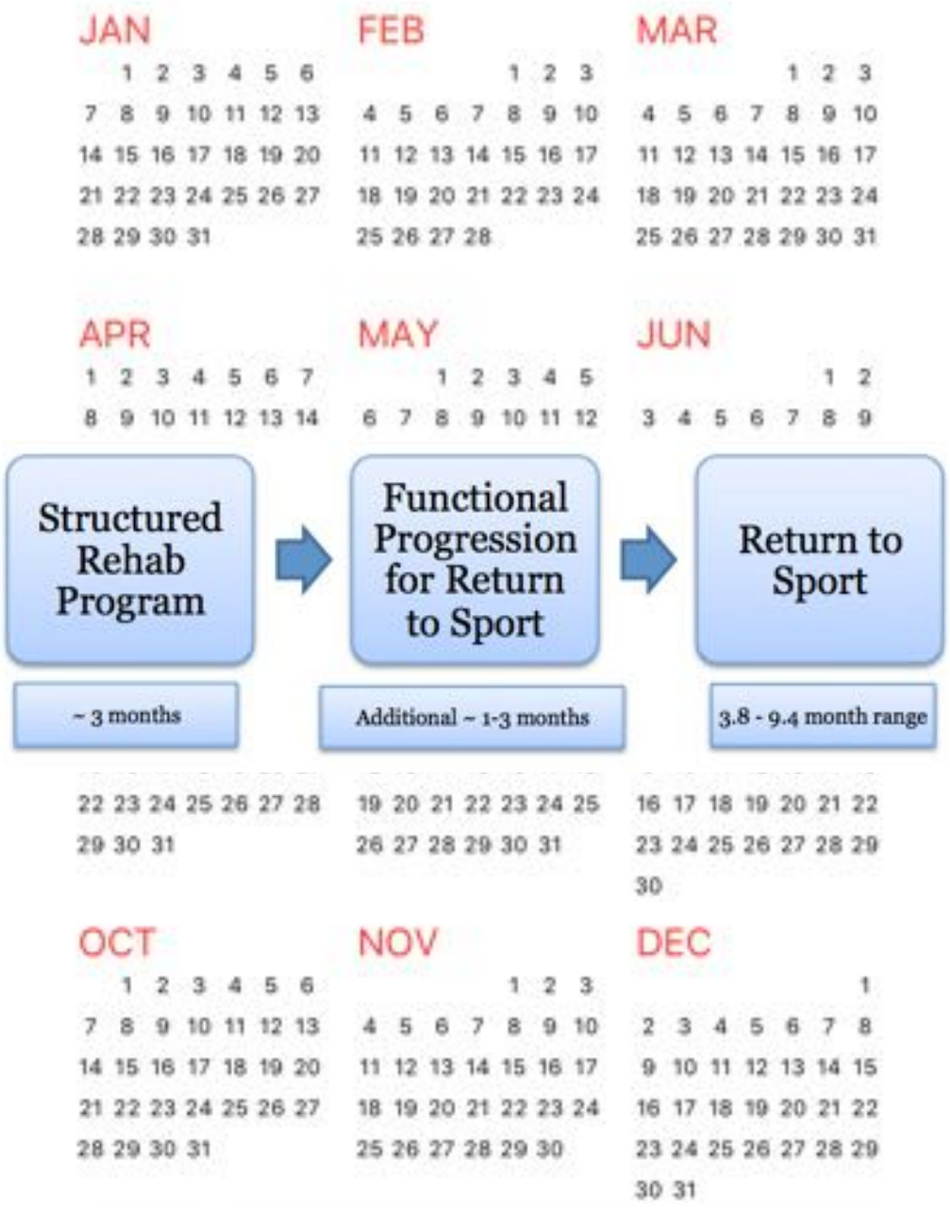
Operative Techniques

- ***Arthroscopic Surgery***
    - Higher rate of return to sport/ activity
    - Preferred approach (50.4%)[9]
- Open Surgical Dislocation
    - Original technique
    - 2nd preferred approach (34.4%)[9]
- Mini-Open Method with Concomitant Arthroscopic Surgery
- Labral debridement vs. repair
- Periacetabular Osteotomy
    - Uncommon technique for FAI



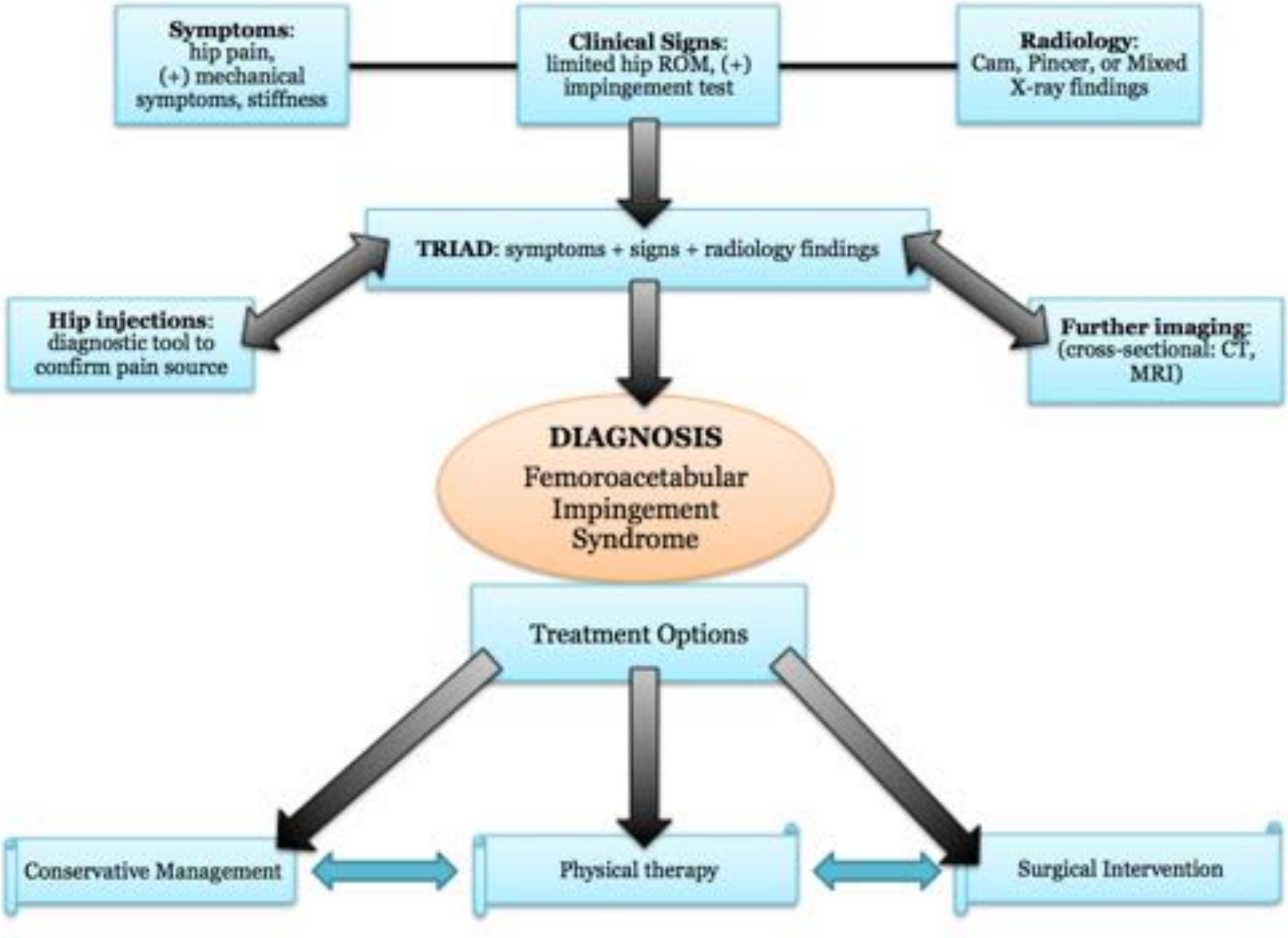
Postoperative Rehabilitation

- Dependent upon hip condition and performed 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)[3]
    - Microfracturing --> optimize healing response of fibrocartilage with extended protected WB
- Structured rehabilitation program: ~ 3 months[3]
- Functional progression for return to sport: an additional ~ 1-3 months[3]
- Return to sport timeframe: ~ 3.8 – 9.4 month range[3]
- Individualized rehab program based on findings from evaluation and adapted after re-evaluation



SECTION 4

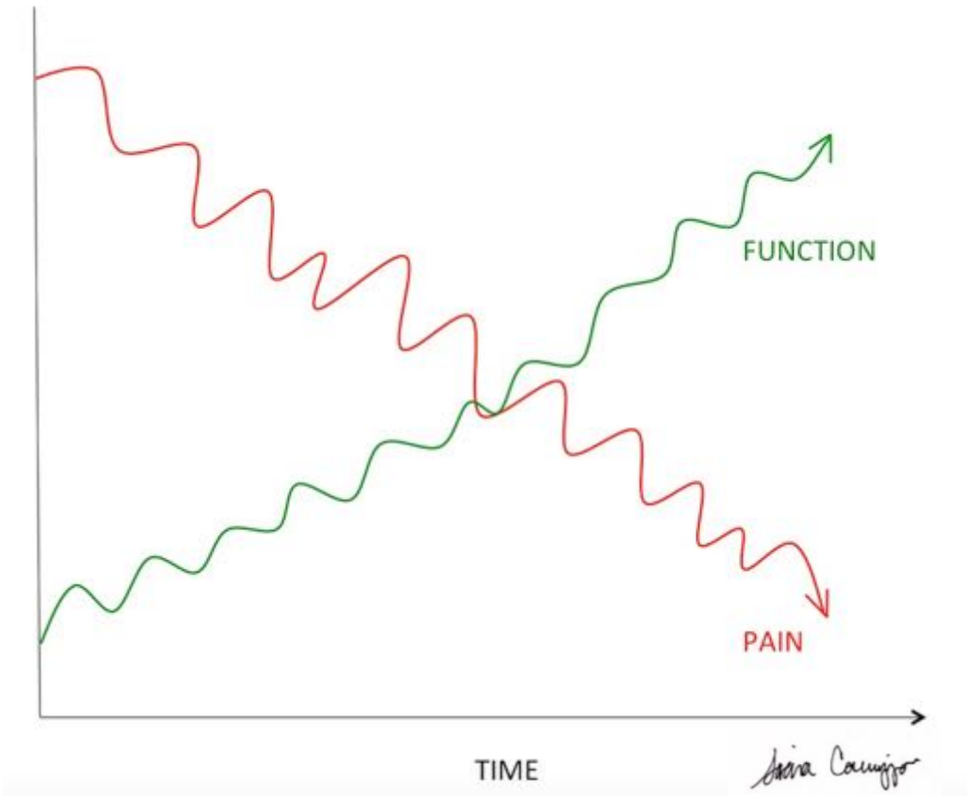
Flowchart: Diagnosis & Treatment of FAI



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)

Phased Protocol[10]



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

- Phase I: 0-6wks post-op
  - Protection; limited WB; restore early ROM through passive ROM (PROM) and active assistive ROM (AAROM); avoid excessive hip extension, flexion, external rotation; 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, active ROM); continue strengthening core and hip musculature; focus on core, gluteals, and lateral column; continue with hip flexor 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; cannot have any subjective or objective deficits
- Phase IV: minimum 12wks post-op
  - Progress rehab program to return to activity-specific exercises (safe and unrestricted); avoid any regression (pain, stiffness, weakness)

CHAPTER 4

Differential Diagnosis

- 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: The Differentiating Factors

- **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
- **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 a coincidental finding? 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
- **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
- **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, or a history of cancer
  - Imaging: X-ray, MRI, CT
  - Biopsy

CHAPTER 5

Available Resources

Links embedded:

- Hip Arthroscopy electronic book: Free on App Store
- American Academy of Orthopaedic Surgeons website
- Hospital for Special Surgery website
- Rothman Institute website
- Royal Berkshire NHS website
- Nirschl Orthopaedic Center website
- Children's Hospital of Philadelphia
- Injury Prevention Resources

Chapter 6

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