

# FEMORAL ACETABULAR IMPINGEMENT

## **Background**

1. Definition - Osseous deformities on acetabular rim, femoral head-neck junction or both
  - At extremes of hip motion, can cause injury to acetabular labrum and cartilage
  - Results in pain and loss of motion.<sup>1</sup>
2. General Information – Two Types
  - Cam type – Anterior femoral neck loses concave anatomy
  - Osseous bump impinges on labrum with hip flexion.
    - More common in young males.
  - Pincer type - Arises when anterior acetabular rim is prominent relative to posterior rim, or there is excessive coverage of acetabulum
    - Impinges on femoral neck during movement.
    - More common in middle aged women.
  - Mixed type can occur

## **Pathophysiology**

1. Pathology of Disease - aberrant contact between acetabular rim and femoral head-neck complex during terminal motion
  - Causes lesions on acetabular rim or labrum leading to degenerative changes.<sup>2</sup>
2. Prevalence
  - Radiographic findings: In cohort of over 2,000 young adults
    - CAM impingement occurred in 35% of males, and 10% of females
    - Pincer type occurred in 34% of males and 17% of females.<sup>3</sup>
  - Clinical prevalence of hip impingement estimated at 10-15%.<sup>3</sup>
3. Risk Factors
  - Non spherical femoral head
  - Coxa Vara/Profunda
  - Mal-united femoral neck fracture
  - Legg-Calve-Perthes disease
  - Slipped capital femoral epiphysis
  - Prior femoral osteomy
  - Os acetabuli
  - Post-trauma
  - Protrusio acetabuli.
4. Morbidity / Mortality–can be a cause of chronic hip pain.
  - Reportedly associated with an increased risk of developing osteoarthritis at an earlier age<sup>2</sup>.
  - Also an association with increased incidence of labral tears.

## **Diagnostics**

1. History
  - Commonly insidious onset
  - Young active adults
  - Pain initially intermittent, worsened by activities with terminal motion

- Pain deep in anterior hip/groin
  - Catching, locking, clicking
  - Pain worse after prolonged sitting or stair climbing (SOR:B).<sup>4</sup>
2. Physical Examination
- Positive C-Sign
    - Patient identifies the location of pain by gripping hip between abducted thumb and index finger just above and slightly anterior to greater trochanter
  - Limitation of internal rotation and adduction
    - Pain with FADIR test (forcing the hip into Flexion ADduction and Internal Rotation - (SOR:B)<sup>4</sup>
  - Limitation of flexion, abduction and external rotation (FABER) (SOR:B)<sup>4</sup>
  - Posterior Inferior Impingement test
    - Pain with passive external rotation of a hyperextended hip<sup>4</sup>
5. Laboratory evaluation—none directly for condition
- In appropriate clinical setting rheumatologic testing may be necessary to exclude other diagnoses.
6. Diagnostic imaging
- Radiographs
    - Standing AP of pelvis to look for cross-over sign and to evaluate for arthritic changes.
    - Dunn view: Axial view of hip with hip in 45 degrees of flexion and abducted 20 degrees will evaluate for:
      - Osseous protuberance on anterior aspect of femoral neck
      - Reduced offset of femoral head-neck junction
      - Pronounced acetabular rim
      - Can be used to measure the alpha angle (SOR:A)<sup>5,6,7</sup>
    - Cross-over sign
      - Anterior acetabular wall crosses over posterior wall and projects laterally rather than medially as it does in normal acetabulum<sup>1</sup>
    - Alpha Angle
      - Angle between line drawn from center of femoral head through central axis of femoral neck and a second line drawn from center of head exceeds radius of subchondral femoral head
      - Normal is less than 55 degrees
  - MR arthrogram
    - MRI identifies depth and coverage of acetabulum, anterior femoral neck thickening or abnormal osseous protrusion.
    - Arthrogram enhances identification of labral tears.(SOR:B)<sup>5,6,7</sup>
7. Diagnostic Criteria
- Presence of clinical signs of impingement (SOR:B)
  - Evidence of Pincher Impingement/Alpha Angle greater than 55 degrees (SOR B)
  - Evidence of Cam Impingement/Crossover sign (SOR:B)

## Differential Diagnosis

### 1. Key Differential Diagnoses

- Athletic Pubalgia/sports hernia
- Developmental dysplasia of the hip
- Groin strain
- Osteonecrosis of the femoral head
- Iliopsoas impingement/Snapping hip
- Trochanteric bursitis
- Septic arthritis
- Intra-articular loose body
- Extensive Differential Diagnoses
- Tumor of pelvis or spine
- Intra-abdominal/pelvic pathology - appendix, ovarian cyst, endometriosis
- Direct/Indirect Hernia

## Therapeutics

### 1. Conservative Management<sup>8,9,10</sup>

- Initially patients undergo either rest, or relative rest depending on severity of symptoms.
- For mild symptoms
  - Avoid motions and activities that exacerbate symptoms.
  - Seat position modification in biking
  - When running, avoid treadmill and narrow straight trails; instead use zigzag or open courses.<sup>11</sup>
- NSAIDs for pain and/or other inflammatory causes.
- Physical Therapy/Stretching
  - Improve external rotation and abduction
  - If tolerated well, add internal rotation stretches and flexion
- Corticosteroid Intra-Articular Injections
  - Can be used alone or in combination with MR arthrogram to provide diagnostic information
  - Pain improvement can indicate intra-articular pathology
- Surgical Management
  - Open approach includes visualization of femoral head, labrum and acetabulum by dislocating hip
    - Followed by removal of CAM and/or Pincher defects and possible repair or debridement of labral tears<sup>12,13</sup>
  - Arthroscopic approaches include examination of central compartment (inside joint capsule) with debridement and peripheral compartment with debridement/resection of osteophytes.<sup>8</sup>

## Follow-Up

### 1. Return to Office

- Patients will likely need 4-6 weeks of modified activity and physical therapy interventions before follow-up.
- Worsening of pain symptoms, mechanical or locking symptoms should follow-up sooner as surgical necessity is more likely.

2. Refer to Specialist
  - Diagnostic studies that indicate labral and/or articular cartilage pathology
  - Failure to improve symptoms after conservative management in those with CAM or pincer morphology without identified labral tear

### Prognosis

1. Not well documented.
2. Current literature only discusses short-term and mid-term follow-up
  - Long-term follow-up studies limited at this time.

### Prevention

1. None

### Patient Education

1. Handout from American Academy Family Physicians - Hip Impingement
2. Handout from American Academy of Orthopedic Surgeons - Femoroacetabular Impingement

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