Surgical Treatment of Hip & Groin Pain in the Athlete

Harvard Course
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Neither I, Brian D. Busconi, nor any family member(s), have relevant financial relationships to be discussed, directly or indirectly, referred to or illustrated with or without recognition within the presentation.

Disclosure

Location, Location, Location
1. Intra-Articular Pain / Central
   - OA
   - Labral pathology
   - Anterior Hip Structures
   - Synovial Chondromatosis
   - Intertental Snapping Hip
2. Peri-Trochanteric Compartment
   - Trochanteric Bursitis
   - External Snapping Hip
3. Symphyseal Structures
   - Ostitis Pubis
4. Abdominal Structures
   - Athletic Pubalgia
Location, Location, Location

- Diamond: Intra-Articular Pain
  - OA
  - Labral pathology
  - Anterior Hip Structures

- Rectangle: Peri-Trochanteric Compartment
  - Trochanteric Bursitis

- Midline: Symphyseal Structures
  - Osteitis Pubis

- Oval: Abdominal Structures
  - Athletic Pubalgia

Differential Diagnosis

- Stress Fractures
- AVulsion Injuries
- Apophysitis
- Osteitis Pubis
- Avascular Necrosis
- Tumors
- Degenerative Joint Disease
- Athletic Pubalgia
- FAI
Physical Exam

- Palpate over Peripubic Area, Symphysis Pubis, Adductor Area, greater trochanter
- Palpate for direct and indirect Hernia
- Neuro Exam Normal

Hip Range of Motion

Average ROM
- Flexion = 115°
- Extension = 30°
- Abduction = 50°
- Adduction = 45°
- Internal Rotation = 25°
- External Rotation = 60°
Exam

- Palpate insertion of rectus abdominus and adductor longus
- Insertional pain with crunch

Resisted Adduction
Ober's Test for Iliotibial Tract Tightness

FADDIR
Pelvic Stress Fractures

- Seen in Repetitive Motion such as Running
- Dependant on the Degree of Force Applied and the Strength of Bone Involved
  - Bone Resorption > Bone Formation
- Pain Subsides with Rest
- XR Normal Until Bone Remodeling Occurs
- Bone Scan and MRI are Sensitive
  - MRI more Specific and can Rule Out Neoplasms
Femoral Stress Fractures

- Compression sided
  Non-Weight Bearing Until Pain Free
  Progressive Weight Bearing
  Return to Training When Full WB and Pain Free
- Tension sided
  ORIF

Imaging Femoral Neck Stress Fracture
Compression Side

Imaging Femoral Neck Stress Fracture
Tension Side
Degenerative Joint Disease

- Connection of Athletics and Hip DJD
- Controversial
  - Some Believe 7x Risk of DJD with High Impact Activity
- Presentation:
  - “Start-up” Pain
  - Limited ROM
- XR:
  - Joint Space Narrowing
  - Osteophyte Formation
  - Subcondral Cysts
  - Sclerosis

Athletic Pubalgia

- “Gilmore’s Groin,” “Sportsman’s Hernia,” or Chronic Exertional Inguinal or Pubic Area Pain in Athletes
- EXERTIONAL ONLY – No Palpable Hernia
- Tear of Adductor Longus or Rectus Abdominus Attachment
- Occurrence: Males > Females

Sagittal (a) and axial (b) schematics of the pubic symphysis show the common aponeurosis of the rectus abdominis and adductor longus muscles, immediately anterior to the midline of the pubic body.

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Lateral schematic of the pubic soft-tissue anatomy shows the superficial ring of the inguinal ligament, located a few millimeters from the lateral margin of the rectus abdominis–adductor longus aponeurosis.

Clinical History
- Hyperextension Injury
  - Pivoting Around Anterior Pelvis or Pubic Symphysis
- Disabling Lower Abdominal Pain at Extremes of Exertion
- Resolves with Cessation of Activity
- Often found in Soccer or Hockey
  - Sports Involving Frequent Change of Direction
**Imaging**

MRI may show:
- Adductor Longus origin injury
- Rectus Tear
- Avulsion Fracture
- Symphyseal Edema
- Cleft sign - bone edema of the SPR
- May Be Normal

**Treatment Algorithm**

**Pre- or Mid-Season**

<table>
<thead>
<tr>
<th>Acute, Primary</th>
<th>Recurrent w/ Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>RICE</td>
<td>RICE</td>
</tr>
<tr>
<td>4 Weeks Rest/2 Weeks core</td>
<td>4 Weeks of Rest</td>
</tr>
<tr>
<td>Steroid injection/PT</td>
<td>No Better by 6 Weeks Inject Steroid or PRP</td>
</tr>
</tbody>
</table>

**Post-season**

- >6 Weeks Sx's
- + History & PE +/- MRI
- Pubalgia
  - Surgery
Treatment

- Surgical
  - Pelvic Floor Repair
  - Reattachment of Inferolateral Edge of the Rectus Abdominus
  - Imbrication of the Transversalis Fascia
  - Repair posterior wall of the inguinal canal
  - Reports of Endoscopic Success

- Adductor
  - Leave alone if no clinical involvement
  - Injext with steroid or PRP if clinical involvement but nl MRI
  - Release if severely involved on MRI
    - Divide Epimysial Fibers of Longus about 2-3cm from Pubis
    - Muscle belly left intact
    - Low Success if done independently

- 95% Success with Pelvic Repair
The Repair

Insert surgical picture of repair

[Image of surgical repair]

[Image of surgical repair]
**Type of FAI**

- Mixed CAM Pincer (77%)
- Isolated Cam (16%)
- Isolated Pincer (5%)


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**Femoroacetabular Impingement**

- Recently recognized cause of hip pain in all age groups
- Pathologic contact
  - femoral head neck junction and acetabular rim
Types of FAI

• Ganz described two distinct types:
  • Cam Impingement: (non-spherical femoral head) is jammed against acetabulum and may tear the labrum. Young male athlete.
  • Pincer Impingement: Overcoverage is usually the problem and the femoral head may be normal (Coxa profunda). Middle age active women.
• It was later found that a “MIXED” third type was rather common as well.

Femoroacetabular Impingement

• Femur based: Cam Impingement
• Acetabulum based: Pincer Impingement
• Combination: Cam and Pincer
• Typical hip joint pain with athletic limitations.
• Early acetabular chondral delamination
• Progression to full thickness chondral lesions and labral detachment,
• Femoral neck and head osseous degeneration
Cam FAI: Predisposing Conditions

- Pistol grip deformity (most common)
- Developmental abnormality
- Legg-Calve-Perthes
- Slipped capital femoral epiphysis
- Coxa magna
- Hip dysplasia
- Fractures

Pistol Grip Deformity

[Image: Radiographic image showing a hip with a pistol grip deformity.]

Legg-Calve-Perthes Disease

- Idiopathic avascular necrosis

[Image: Radiographic image showing changes typical of Legg-Calve-Perthes disease.]
Slipped Capital Femoral Epiphysis

- 10-15 year Adolescents
- Oblique Axial for slippage
- Male: Female 4:1
- Black, Overweight
- 20-25% Bilateral
- Axis

Coxa Magna

- Widening of the femoral head and neck.
- Seen in:
  - DDH
  - Legg Calv Perthes disease
  - Septic arthritis.
**Hip Dysplasia: DDH**
- Inadequate contact between acetabulum and femoral head
- Ligamentous laxity - major contributor
- Female infant - endogenous estrogen
- Left hip: 40-60%
- Bilateral: 20%
- F:M - 6:1
- 1 in 200

**Acetabular Protrusio**

**Fractures**
FAI: Demographics

- Classic: 20 yo athletic male with athletic limitations
- Additionally: 43 yo male and female athletes with early OA

FAI Clinical Presentation

Sport limitations:
- Participate in sports for as long as desired (91%)
- High demand sports, including aerobics, football, basketball, and tennis (88%)
- Running (77%)
- Jumping (64%)
- Quick starts and stops (56%)

FAI: Imaging

- Supine AP pelvis (Coccyx should be centered over the symphasis pubis and 1-3 cm above it)
  - Acetabular version
  - Acetabular depth
  - Superior femoral head-neck offset
  - Alpha Angle
  - Center Edge Angle
Plain XR: Standing AP Pelvis

Imaging of FAI
Plain XR: Standing AP Pelvis

Center Edge Angle

The Hip JW Thomas Byrd
FAI: Imaging

- Lateral Hip
  - Dunn View
  - Frog leg
  - Cross-table
- Alpha angle – measured on a cross-table lateral with 15 deg IR
  - Mean 46-49 degrees

No one view is reliable to show the cam as the location of the cam will vary.
**FAI: Imaging**

- MRI Athrogram
  - Alpha angle - mean 42 degrees
  - upper limit 55 degrees
- Morphologic changes:
  - Labral degeneration, tear
  - Chondral delamination
- Herniation pits do not imply a correlation with FAI Kim et al Skeletal Radiology 2010 May 22
Cystic Changes

- Fibrocystic Changes: High prevalence in patients with FAI
- Cam-type: 5%
- More common in patients with Pincer than Cam


Imaging of FAI

- CT Scan
- 3 Dimensional Reconstruction
- Shows Asphericity and Offset Imbalance
- Distal Femoral Cuts to Determine Version

Chondralabral Degeneration and Tear
LABRAL TEAR

• Normal

LABRAL TEAR

• Stage IA

LABRAL TEAR

• Stage IB
LABRAL TEAR

- Stage IIIb

Spectrum of Intra-articular damage

- Early: grade I chondral blistering
- Late: grade III or IV chondral damage with detachment from the labrum
Treatment
- Conservative
  - PT
  - Steroid injection
  - Activity modifications
- Surgical - restore the contour of the head neck junction
  - Open
  - Arthroscopic
  - Both

Open Management
- Surgical Dislocation and Arthrotomy with possible O steotomies
- Advantages
  - Easy access to all structures
  - Ability to intraoperatively test and accurately measure dynamic range of motion
- Disadvantages
  - Highly Invasive
  - Risk of AVN
Post-Op Management

- Protected Weight Bearing for 4-6 Weeks
- Return to High Impact Activities at 12 Weeks
- Patients at Risk for Femoral Neck Fractures
  - 2 Documented Reports of Fractures After FAI Debridement (Sampson, 2005)

Arthroscopic: 3 Major Portals
- Anterior
- Anterolateral
- Posterolateral

Arthroscopic Portals
Labral Tear

Labral Repair

Peripheral Compartment
- Hip capsule
  - Iliofemoral ligament
  - Pubofemoral ligament
  - Ischiofemoral ligament
  - Zona orbicularis
- Dienst 7 areas
  - 1. Anterior neck
  - 2. Medial neck
  - 3. Medial head
  - 4. Anterior head
  - 5. Lateral head
  - 6. Lateral neck
  - 7. Posterior area
Accesing the Periphery

- Typically the peripheral compartment is entered after addressing all central compartment pathology
- Variety of ways to enter
- Hip in or out of traction
- Flexed between 30-45°

Fluoro Check

My proposed technique: Expose femoral bump, plan area of resection, then resect
Resection Osteoplasty for CAM Type

Flex hip to check resection
**FAI Management**
- Failure to address bony impingement lesions of the hip are key factors in unsuccessful hip arthroscopy
  - Philippon et al., *AJSM* 2007.

**Rehabilitation After Arthroscopy**
- Generally Shorter Than Open Procedures
- Procedure Performed Determines Weight Bearing Allowance and Restrictions
- Passive, Active Assisted and then Active ROM are Advanced as Tolerated
  - Hip Isometric Strengthening Started Immediately
- Progressive Resistive Exercises when Tolerated
- Full Activities by 3 Months

**Results of FAI Treatment**
- Varied Depending on Procedure
  - Not Much Data
- Pain Relief Dependant on Pre-Existing Damage in Joint
- Younger Patients Do Better
- Complication Rate Depends on Complexity of Procedure, duration of traction
**Snapping Hip**

- Coxa Sultans aka “Snapping Hip”
- Three Types:
  - External
  - Internal
  - Intra-articular
- External is most common
  - ITB or Gluteus Maximus Sliding Over Trochanter
  - Inflammation of the Trochanteric Bursa
- Internal
  - Iliopsoas Snaps over iliopectineal Eminence or Femoral Head
- Intra-articular
  - Labral Tears, Loose Bodies, Osteochondral Injury
  - Often History of Trauma

**Open Treatment for Internal Snapping Hip**

- Fractional Iliopsoas Lengthening
  - Groin incision
  - 4 Partial Tenotomies of Posterolateral Tendon at 2cm Intervals
  - Begin 1cm Proximal to the Lesser Trochanter
  - Non-Weight Bearing Post-Op

**Arthroscopic Treatment of Internal Snapping Hip**

- Iliopsoas Release
  - No Traction
  - Hip Flexed 30 Degrees and External Rotation
  - 2 - 3 Portals
  - Use Fluoro to Navigate to Lesser Trochanter
  - Shaver to Resect Synovium
  - Retrograde Release with Radiofrequency Hook
Open Treatment for External Snapping Hip

- Z-plasty of IT Band
- Techniques of Elliptical Excision with Bursal Removal
- Mixed Results

Arthroscopic Treatment of External Snapping Hip

- Trochanteric Bursectomy
  - Localize with Spinal Needles
  - 2 Portals
    - Tip of Greater Trochanter
    - Below Trochanteric Flare
  - Clear Fatty Tissue

- IT Band Release
  - In Combination with Bursectomy
  - Cruciate Incision in IT Band
    - Proximal Distal First
    - Anterior-Posterior Next

Post-Op Rehabilitation

- Crutch for Ambulation as Needed (~ 5 Days)
- Early Physical Therapy for Hip ROM
- Hip Abductor and IR Strengthening
- Return to Play at 3-6 Months

- Complications:
  - Recurrence
  - Motor and Sensory Changes
  - Bursal Swelling
  - Hematoma
  - Infection
Ligamentum Teres Tear

Anatomy

Hip dislocated to show ligamentum teres

MRI