Hip Arthroscopy in Adolescents
Applications & Indications

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Disclosures
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Outline
• Femoroacetabular Impingement (FAI)
• Sequelae of Pediatric Hip Disorders
  • SCFE
  • Dysplasia
• Traumatic Injuries
  • AIS Apophyseal Avulsions
  • Snapping Iliopsoas Tendon
  • Chondral Loose Bodies
Femoroacetabular Impingement (FAI): Morphology vs. Pathology

The cross-over sign = Pincer

CAM Lesion – Alpha Angle > 55 degrees

FAI- Associated Bony Morphology

**CAM Lesion**
- Decreased femoral head-neck offset (α > 55°)
  Neumann M et al, 2008
- Extension of the growth plate
  Schutzer CORR 2002
- Adolescent sport activity
  Schutzer CORR 2002
- SCFE
- Post-traumatic changes
- Extremes of femoral version
  Austin A et al, 2008

**Pincer Lesion**
- Acetabular retroversion
- Coxa profunda
- Acetabular protrusio
- Abnormal stress across anterior labrum → bony proliferation
- Low lying AIIS
  Hestroni et al. 2012
Length of Time Playing Elite-Level Tennis Increases Risk for FAI in Young Athletes

- Boykin et al. ESSKA 2012 Meeting
- 148 Elite Spanish Tennis Players (58 girls, 90 boys)
- Avg age 15.1 years old
- Tennis at 6 yrs of age, 20 tourney/year, 47 wks/year
- Assessed for + FADIR, decreased IR
- 62% Considered “at-risk” for FAI
- “At-risk” hips had played 9.5 years
- “Normal” hips had played 8.6 years

The CAM-type deformity of the proximal femurs arises in childhood in response to vigorous sporting activity.

- 72 hips in 37 male basketball players.
- 76 hips in 38 age-matched non-active patients.
- Avg age 17.6 years.
- IR of the hip avg. 30.1° in non-active group compared with only 18.9° in the athletes.
- Alpha angle larger in the athletes (average, 60.5°), compared with the control group (47.4°).
- Overall, the athletes had a 10-fold increased likelihood of having an alpha angle greater than 55°.

History & Physical Examination

- Groin pain (sharp and aching), +/- mechanical symptoms
- Activity related
- Exacerbated by hip flexion, rotation (squatting, kicking, dancing, etc)
- Sitting (car, movie, class)
- Hip ROM (IR),
- Impingement Test (FADIR)
Diagnostic Algorithm

<table>
<thead>
<tr>
<th>Hip Pain</th>
<th>Preservation of joint space</th>
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<tbody>
<tr>
<td>Labral Injury (90%)</td>
<td>Trauma</td>
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<tr>
<td>Chondral Injury</td>
<td>Hypermobility</td>
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<tr>
<td>Capsular Injury</td>
<td>Impingement</td>
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<tr>
<td>Extraarticular Injury</td>
<td>Dysplasia</td>
</tr>
<tr>
<td>Systemic Injury</td>
<td>Degenerative</td>
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</tbody>
</table>

Labral Injury
- Trauma
- Hypermobility
- Impingement
- Dysplasia
- Degenerative

Chondral Injury
- Lateral impact
- Chondromalacia
- Chondrolysis

Capsular Injury
- Capsular laxity
- Adhesive capsulitis
- Synovitis

Extraarticular Injury
- Snapping hip
- Tendonitis/bursitis
- Sports hernia
- Apophyseal avulsion fracture/apophysitis
- Lumbar referral

Systemic Injury
- RA
- Polyarticular arthritis
- Regional pain

When Functional Needs > Physiologic Capacity

- Where does the rest of motion come from:
  - Lumbar Spine
  - SI joint/public symphysis
  - Posterior subluxation

Femoroacetabular Impingement in the Athlete: Compensatory Injury Patterns

James E. Voos, MD, Craig S. Mauro, MD, and Bryan T. Kely, MD

Femoroacetabular impingement is an increasingly recognized cause of hip and groin pain in the athlete. Loss of hip motion from femoroacetabular impingement may result in compensatory injury patterns involving the lumbar spine, sacroiliac joint, pelvis, and other hip subluxations. Failure to recognize and address intra-articular hip pathology in addition to treating compensatory injury patterns is a subset of athlete.
Imaging

- AP Pelvis
- Dunn lateral

**Pubic Symphysis – Sacrococcygeal Distance**

Men: (Mean: 32 mm)  
Women: (Mean: 47 mm)

Dunn projection (90°)

Imaging

- MR Arthrogram
  - Poor Negative Predictive Value
  - Cannot be used to rule out labral tears

- Hip injection under fluro
  - Lidocaine/Marcaine +/- steroid
Before Arthroscopy...

Open surgical dislocation

Espinosa N. et al. JBJS 2007;89:34-53

Hip Arthroscopy

- Outpatient Surgery
- 3-4 portals
- Spinal Anesthesia
- Long, flexible instruments

Femoroacetabular Impingement Surgical Techniques

Craig S. Mauro, MD,¹ James E. Voos, MD,¹ and Bryan T. Kelly, MD ¹

Arthroscopic Management of Labral Tears in the Hip

Michael K. Shindle, James E. Voos, Shane J. Nho, Beatrice E. Hayworth and Bryan T. Kelly

FAI Case Examples

19 y.o. collegiate rower. Pain with rowing, squatting. Pain walking up hill at school.
+ Mechanical catching.
+ Loss of IR.
+ FADIR test.
15 y.o. female volleyball player. Pain with squatting position and running.
+ Mechanical catching.
+ Loss or IR.
+ FADIR
Outcomes 2-5 years following hip arthroscopy for FAI in the patient aged 11-16 years.

- Philippon et al. Arthroscopy. 2012 Sep;28(9).
- 60 patients, Ages 11-16, Avg. 15 years old.
- 31% boys and 69% were girls.
- Femoral physis open in 10%, partially closed in 19%, and closed in 71%.
- Cam impingement 10% of cases, pincer 15%, and mixed type in 75%.
- 3 year follow-up, Mod HHS avg. increase 57 – 91.
- 13% of patients did require a second procedure for capsulolabral adhesions.
Sequelae of Pediatric Hip Disorders

- SCFE
- Dysplasia

Arthroscopy for SCFE

- Osteochondroplasty of the head-neck junction for Slip angles 15-30 degrees.
  - Kuzyk et al. JAAOS 2011
  - Leunig et al. CORR 2010

- Screw removal for "hardware impingement."

- Address intra-articular pathology.

In Situ Pinning With Arthroscopic Osteoplasty for Mild SCFE

- Leunig et al. CORR. 2010 Dec;468(12):3160-7.
- 3 males aged 11 – 15 years old.
- Slip angles 15-30 degrees.
- Ambulatory, 2-12 weeks of groin pain, decreased IR and flexion, + impingement test.
- Performed in situ pinning followed by hip arthroscopy (labral debridement, osteochondroplasty).
- Short term f/u with good pain relief and motion.
SCFE Case Example

- Courtesy:
  - Ryan Goodwin, M.D.
  - Children's Hospital Cleveland Clinic

12 y.o. female 1 year s/p in situ pinning for SCFE. Daily groin pain. + Impingement.
Post Osteotomy Hip Impingement

- Bernese PAO in males: is there and increased risk of FAI after PAO?
  - Ziebarth et al. CORR. 2011
  - 46 males hips average of 12 months s/p PAO for hip dysplasia.
  - 47.8% with positive impingement maneuver postoperatively.
  - Raised question of over correction vs. low tolerance for femoral head deformity despite good correction.

- Effect of Pelvic Osteotomy in the Skeletally Immature on Acetabular Coverage.
  - Beaule et al. HSS J 2012
  - 28 pts w/ osteotomy for DDH, LCP.
  - + Impingement in 8 pts
  - + Crossover and ischial spine sign in 10 pts
  - Mean CE angle 24 degrees.
  - Concluded over coverage (retroversion) common post osteotomy.

15yo. female softball player w/ anterior hip and groin pain.
History of pelvic osteotomy as a child for hip dysplasia.
+ FADIR
Relative loss of IR
Traumatic Injuries

- Anterior Inferior Iliac Spine Apophyseal Avulsion Fracture
- Coxa Saltans; Snapping iliopsoas tendon
- Chondral Loose Bodies

Caution in patients with femoral anteversion > 25 degrees.
Iliopsoas has an intimate association with capsulolabral complex

Hip Injuries in the Adolescent Athlete

The hip is a complex ball-and-socket joint, which can produce a wide array of injuries and disorders. Injuries affecting children and adolescents are common in a number of specific situations, especially in certain sports and activities. The hip’s unique anatomy makes it susceptible to various injuries, including fractures, dislocations, and labral tears. Understanding the causes, symptoms, and treatment options is crucial for effective management.

Case Report

A 15-year-old male football player presented with a sudden “pop” in his hip while performing a tackle. He reported sharp groin pain and difficulty walking. Physical examination revealed tenderness over the hip and limitation of motion. Radiographs were ordered to rule out any structural injuries.

Mechanical symptoms and "grinding" + FADIR Pain with hip flexion and squating maneuvers.
Post Op – Rehab Keys

- PWB with Crutches 2 weeks
- Increase to WBAT by 3 weeks
  - Establish normal gait
- Hip Flexion Brace 0-80 deg w/ brace.
  - 0-110 w/ PT out of brace first 3 weeks
- Key is to avoid hip flexor tendinitis!
- Heel slides
- Glut medius / Core firing & strength
- Early PT at 4-5 days post op
- Bike for motion

Rehab Keys

- ER to 30 degrees for first 3-4 weeks then increase
- Extension just past neutral for 3-4 weeks then increase
- Deep Tissue Release/Massage after sutures out at 2 weeks.
- Drive 2-4 weeks, School 1-2 weeks
- Approx. 3-4 weeks to sit comfortably at desk for full day
- Prep for “6 Week Blues”
- 16 weeks begin return to sport.

Thank You