Introduction

• Tears of the acetabular labrum are a common source of hip pain and mechanical symptoms

• Increased understanding of the role of the labrum, improved imaging techniques, and new instrumentation and surgical techniques have allowed for better diagnosis and treatment of labral tears
Diagnosis

• History
• Physical exam
• Plain films
• MRA
History & Physical

- May report catching, clicking, or locking
- Current examination techniques are sensitive to intra-articular pathologies, but not specific to detect labral tears
- Rely on imaging and diagnosis of associated pathologies to direct treatment
Strength Deficits

Athletes with a labral tear had adductor weakness of the affected side

*Philippon et al. AANA 2004*

![Graph showing hip adduction strength before (Pre_OP) and after (Post_OP) surgery. Pre_OP values are 93.5% for involved/matched and 106.1% for uninvolved/matched, with Post_OP values being 94.6% and 99.0% respectively. The difference is statistically significant (p < 0.05).]
Clinical exam

- The hip needs to be examined in the supine, lateral and prone position
Impingement Tests

**Anterior Impingement:**
Passive flexion to 90° followed by forced adduction and IR

**Posterior Impingement:**
Extension + ER

Leunig et al. *Op Tech Orthop* 2005
Passive Prone ROM

ER

Normal = ~ 45°

IR

Normal = ~ 35°
FABER Test

Negative

Positive

Physical Exam Findings

- Anterior impingement test
  - Positive in 95% of patients with FAI

- FABER distance
  - Side to side decrease in hip motion from the lateral genicular line to the exam table in 90% of patients

- Logroll exam
  - Abnormal logroll exam in 44% of patients

Philippon et al. ESSKA 2006 Innsbruck, Austria
ROM Measurements

• Significant decrease in ROM when injured hip is compared to non-injured hip:
  – Flexion (112 degrees), 9 degrees less (p<0.001)
  – Abduction (40 degrees), 5 degrees less (p<0.001)
  – Adduction (19 degrees), 3 degrees less (p<0.001)
  – Prone IR (31 degrees), 5 degrees less (p<0.001)
  – Prone ER (38 degrees), 4 degrees less (p<0.001)
Specific Tests

• Thomas Test
  – Evaluate flexion contracture
• Trendelenberg Test
  – Evaluate strength of gluteus medius
• Ober Test
  – Evaluate contraction of the iliotibial band
• Leg Length Discrepancy evaluation (pelvic obliquity)
• Faber
  – Lateral genicular distance
• Log Roll Test
  – Hip laxity
Plain Films

Supine AP pelvis

- Acetabular version
- Acetabular depth
- Superior femoral head-neck offset
- Consider center-edge angle and WBS inclination angle for pre-operative planning of rim trimming
Acetabular Retroversion

Professional football player c/o R hip pain

Pre- Rim Trimming

Post- Rim Trimming
Coxa Profunda

- Medial acetabular wall overlaps ilioischial line
- Posterior acetabular wall overlaps the center of the femoral head
Superior H/N Offset
Plain Films

• Cross-table lateral
  – Anterior femoral head-neck offset

Professional hockey player c/o R hip pain

Pre-Osteoplasty  Post- Osteoplasty
MRI and MRA

- **MRI**
  - 94% of labral tears correctly identified
    
    *Mintz et al. Arthroscopy 2005*

- **MRI vs. MRA**
  - Higher sensitivity and accuracy for MRA (90% and 91%) compared to non-arthrogram (30% and 36%)
    
    *Czerny et al. Radiology 1996*
↑ alpha angle in FAI patients (74°) when compared to controls (42°)

Notzli et al. JBJS Br 2002
Alpha Angle

Larger alpha angles associated with:

- **Decreased ROM:**
  - Hip flexion
  - Internal rotation
  - External rotation

- **Operative findings:**
  - Large acetabular chondral defects (>1.5 cm)
  - Full-thickness acetabular chondral lesions

*Johnston, Philippon et al. accepted to ISAKOS 2007*
MRI
Demonstrating a labral tear with underlying CAM Impingement
When should labral repair be considered?

- **Important considerations:**
  - **Location of tear**
    - Articular vs. Capsular
    - Significantly more vascularity to capsular side of the labrum vs. articular side
When to repair?

Important considerations:

- Tear morphology
  - Repair: detached and midsubstance peripheral
  - Debride: flap, frayed, degenerative
When to repair?

• Important considerations:
  – Tear size: multiple anchors
  – Activity level and willingness to comply with rehab protocol
Rationale for Labral Repair

• The acetabular labrum has been shown to
  – Provide additional femoral head coverage
  – Provide an intra-articular fluid seal
  – Enhance hip stability

Rationale for Labral Repair

• Loss of Labral function leads to
  – Up to 40% quicker cartilage compression
  – Up to 92% higher contact stress
  – Loss of suction seal
  – Early degenerative joint disease

Ferguson et al. J Biomech, 2000
Rationale for Labral Repair

Open surgical dislocation procedure performed for FAI; compared labral resection vs. refixation

N=52, 2 year f/u, Merle d’Aubigne score

<table>
<thead>
<tr>
<th></th>
<th>Resection</th>
<th>Refixation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>28%</td>
<td>80%</td>
</tr>
<tr>
<td>Good</td>
<td>48%</td>
<td>14%</td>
</tr>
<tr>
<td>Moderate</td>
<td>20%</td>
<td>6%</td>
</tr>
<tr>
<td>Poor</td>
<td>4%</td>
<td>---</td>
</tr>
</tbody>
</table>

Espinosa et al. JBJS (2006)

*Radiographic evidence of OA was more prevalent in resection group at both 1 and 2 years*
Rationale for Labral Repair

• Ovine model demonstrated that labral repairs show evidence of healing at both 8 and 12 weeks

  Philippon et al. AAOS 2006

• Personal experience
  – Detached and midsubstance tears respond favorably to repair
Our Approach

The Modified Supine Approach for Hip Arthroscopy
Identification of Pathology
Rim trimming

Labral separation is completed with a beaver blade
Rim Trimming

- 5.5mm round burr
- Interchange of portals
- Typically resect to the end of rim chondrosis (~3-5mm)
- Important to consider the pre-op center-edge angle to avoid over-resection
Labral Reattachment

Bioabsorbable suture anchors are used to fix the labrum back to the acetabular rim
Labral Reattachment

- The appropriate angle is determined using a sleeve as a guide
- The anchor is placed ~15% to the vertical, while observing the adjacent acetabular cartilage to ensure that it is not damaged

Labral Reattachment

The decision to retrieve the suture either through or around the labrum depends on the *quality* and *quantity* of the available labral tissue.
Cam Impingement

- Morphology of lesion
  - Convex surface
  - Chondral color changes (purple/gray)
  - Chondral texture changes (fibrillation)
Cam Impingement
Identify location and extent of lesion by dynamic examination
Osteoplasty Technique
Osteoplasty Technique

5.5mm motorized burr restores anatomic concavity of head neck junction
Osteoplasty Technique

Care must be taken to avoid resecting too much bone and resecting to the epiphyseal vessels.
Dynamic Exam
confirms FAI decompression and labral repair
Personal Experience

September 2002 to November 2006

- > 1000 labral repairs performed
- Technique has evolved
- No complications specifically related to the labral repair technique
- Now most commonly performed in conjunction with treatment of femoroacetabular impingement
Early Outcomes of Labral Repair

- 52 patients underwent arthroscopic labral repair
- HOS (sport), NAH, and MHH were used as outcome measures
- Average f/u was 9 months
- All Outcome scores showed significant improvement (p<0.05) compared to pre-operative values
- Average patient satisfaction was 8.8

Philippon et al. accepted to AANA, 2007
Clinical Outcomes

- Philippon et al. (JOSPT 2006, Volume 36)
  - N=9
  - Average 3-year f/u
  - 78% with labral repair reported excellent clinical outcomes and 100% would have surgery again
2nd Look Labral Repairs

- N=19
- 100% healed to the acetabular rim and were stable to probing
- Fibrous tissue integrated with the articular cartilage
- Two patients with incompletely addressed FAI had only 90% and 80% healing, with a residual gap

Johnston, Philippon et al. accepted to AAOS, 2007
2nd Look Labral Repair
Summary

• Preserving joint anatomy is a proven concept in orthopaedic surgery

• Recent evidence (healing in an ovine model, improved clinical outcomes, and decreased OA) support labral repair over resection

• Advances in instruments and techniques facilitate arthroscopic repair
Thank you!