Revision Hip Arthroscopy
Surgical Revision of Residual Impingement

Brian D. Giordano
URMC Sports Medicine and Hip Preservation
CSHA San Francisco, CA
September 17, 2016

Disclosures
- Brian Giordano MD
  - Arthrex: Consultant, Research Support, Royalties
  - Carticept: Research Support
  - Louis B. Goldstein Grant: Internal research support

Growing Popularity of Hip Arthroscopy
- Rapid growth in volume of primary arthroscopies
  - A frequent component of fellowship training
  - 365% increase in volume of primary arthroscopies (Montgomery, et al., Arthroscopy 2013)
  - 600-fold increase in number of hip arthroscopists (Montgomery, et al., Arthroscopy 2013)
  - No growth in surgeons performing open HPS (Montgomery, et al., Arthroscopy 2013)
- Clinical outcomes generally excellent following arthroscopic/open tx
  - High rate of return to play (RTP)
  - Low complication and reoperation rate
  - Short and limited long term follow-up demonstrates durability

Hip Arthroscopy Failure
- Recurrent/persistent pain increasingly common
- Systematic review of >6000 patients
  - 6.3% reoperation rate (Harris, et al., Arthroscopy 2013)
  - Conversion to THA 2.9% (46%)
  - Revision arthroscopy 1.8% (30%)
  - PAO/Other open (11/13%)
- Majority female (60-70%)
  - Clohisy JC, et al., CORR 2013
- Younger in age
  - Riccardi BF, et al., AJSM 2014

Indications for Revision
- Many reasons for failure and indications for reoperation
  - Residual FAI (81%)
    - Labral/chondral (53/36%)
    - Capsulolabral adhesions (24%)
    - LT pathology (15%)
    - Capsular laxity/instability (14%)
    - Psoas pathology (13%)
  - Residual acetabular dysplasia (8.2%)
    - Second most common cause of failed arthroscopy in some studies
    - 19% adult DDH
    - Depends on cohort studied (adult vs. pediatric hip disease)
Residual FAI As A Mode of Failure

• Residual FAI initially reported as leading indication for revision
  - 95% Philippon MJ, et al. JOSI 2007
  - 31-93% rate documented in other series Bogunovic L, et al. CORR 2013
  - Majority of residual deformities mixed (~50%) Ross JR, et al. CORR 2015
• Unaddressed EAI emerging as a cause of failure Riccardi BF, et al. JOSI 2014

Strategies for Treatment

• Revision strategy depends on surgeon skill set and preference
• Dependent on population treated (Adult vs. Pediatric hip disease)
  - Arthroscopy
    • Successful for addressing residual FAI in ~80% Riccardi BF, et al. JOSI 2014
  - Open approaches
    • Surgical dislocation
      • Used in 32% of revisions in large prospective series Bogunovic L, et al. CORR 2013
      • More powerful tool for complex FAI or mixed FAI/EAI
    • Osteotomy
      • 8.2% Riccardi BF, et al. JOSI 2014

Optimized Imaging

• Adequate imaging requisite to precise correction
• 3D imaging ± planning software
  - Can define size and topography of bony lesions Kang KH, et al. CORR 2013
  - Notable improvement in FAI correction parameters using 3D CT planning software Ross JR, et al. CORR 2015
  - Mixed or complex impingement patterns
  - Intra/extra-articular

Management of Residual FAI

• Revision procedures performed: Cvetanovich GL, et al. Arthroscopy 2015
  - Femoral osteoplasty (25%)
  - Acetabuloplasty (18%)
  - Cartilage procedures (12%)
  - Labral debridement/repair (9/8%)
  - Lysis of adhesions (8%)
  - LT debridement/recon (5%)
  - Capsular closure/capsulorrhaphy (5%)
Management of Residual FAI

Revision Outcomes

- Improvements in all PROs
- All PROs but mHHS inferior for revision HA vs primary
- By 3 years, satisfaction rates and mHHS decrease
  - Aprato A, et al. KSSTA 2013
- For residual FAI
  - Larson CM, et al. AJSM 2014
- 62.7% vs. 81.7% Good/Excellent results

Predictors of Outcome

- Positive predictors of successful revision:
  - Residual FAI
    - Conflicting reports show no association
    - Larson CM, et al. AJSM 2014
  - Previous open surgery
  - Greater head-neck offset and AIIS decompression
    - Larson CM, et al. AJSM 2014
  - Labral repair/reconstruction
    - Larson CM, et al. AJSM 2014
  - Failed labral repair and hips requiring capsular plication
    - Philippon MJ, AJSM 2016
- Negative predictive factors related to outcome:
  - High grade chondral injury/osteoarthritis

Refocused Attention on Osseous Conflict

- Early focus on intra-articular FAI patterns and abnormal proximal femoral and acetabular morphology
- Common cause of failed arthroscopic procedure
- Evolving trend towards recognition of diverse FAI/EAI subtypes
  - Trochanteric-pelvic
  - Ischiofemoral
  - AIIS/Subspine
- Abnormal conflict often in extremes of motion
**Trochanteric-Pelvic**
- Conflict between GT and ilium
  - GT overgrowth/Proximal location
  - FN shortening
  - Soft tissue interposition
- Pain and reduced motion with ABD
- Troch advancement +/- FN lengthening
  - Eliminate conflict
  - Improve mechanical advantage
  - Optimize force coupling

**Ischiofemoral Impingement**
- Static or dynamic
- +/- Prior surgery
- Ischial sided deformity/pathology
  - Prior ischial avulsion (HO/Overgrowth)
  - Proximal HS pathology
- Femoral sided deformity/pathology
  - LT or posterior GT-ischial conflict
  - Malalignment of prox femur
  - Valgus, Coxa breva, Antetorsion
  - Femoral head medialization
  - Acetabular protrusio/profunda

**AIIS/Subspine Impingement**
- Evolving concept with varying patterns of IA/EA impingement
- Native hip or post-surgical
- Typically groin pain with deep flexion
- AIIS contacts distal femoral neck and/or associated soft tissues
- False "Cross-over"
- Variable association with IP snapping/contracture and ST impingement

**Summary**
- Recognize the diversity of impingement patterns
- Comprehensive treatment requisite to successful outcomes
  - Arthroscopic, open, or hybrid surgical approach may be required
  - Complete bony decompression with optimized head-neck offset
  - Labral preservation/reconstruction
  - Judicious capsular management
  - Treatment of all associated pain generators
- Counsel reasonable expectations, acknowledge limitations
- Dialog about other modes of failure and potential for future study

**Thank You**