Title: The Complicated Hip – A New Debate

Combined Sections Meeting 2016 Anaheim, California, February 17 -20, 2016

Speakers
- Shaw Bronner PhD, PT, OCS - ADAM Center, New York, NY
- Dirk Kokmeyer, PT, DPT, SCS, COMT - Maine Medical Partners, Portland, ME
- Philip Malloy, MSPT, SCS - Marquette University, Milwaukee, WI
- Melissa Strzelinski, MPT, PT - Howard Head Sports Medicine at Vail Valley Medical Center, Vail, CO
- Marc J. Philippon MD - Sports Medicine/Hip Disorders, The Steadman Clinic, Vail, CO

Disclosures (Marc Philippon disclosures pending)

Learning Objectives

1. To understand the differences in anatomy, biomechanics, and clinical presentation of the hip joint complex in the open vs. closed chain athlete.
2. To appreciate the overlap in signs and symptoms between pathology originating from the hip, pelvis, or lumbar spine.
3. To understand the clinical examination findings for hip joint pathology and the diagnostic testing used to appropriately develop a treatment intervention for the complicated hip athlete.
4. To understand the indications for surgical intervention in the athlete with over- and under-coverage.
5. To understand the surgical interventions used to address hip pathology that is of an intra and extra articular origin.
6. To understand the surgical procedures necessary for the complicated hip, when initial surgical intervention does not succeed.
7. To be able to identify the athlete candidate for non-operative rehabilitation when surgery is not indicated.
8. To understand local and global functional movement control and when to apply each to the complicated hip athlete.
9. To apply appropriate manual and neuromuscular interventions when treating the complicated hip athlete.
10. To be able to design exercise programs with open and closed lower extremity and trunk progressions that enhance sports specific function in the OKC and CKC athlete.
11. To gain a basic knowledge of return to sport progressions and modifications necessary for complicated hip athletes recovering from hip injury or surgery.
Opposing Motions: Open versus Closed Chain Considerations
Melissa Strzelinski, PT – Vail, CO

- Structural and biomechanical considerations
  - “Natural selection” in high performance athletics
    - Role of dysplasia, hypermobility, ligamentous laxity
  - ROM demands
  - Training demands
    - Repetitive motion and endurance vs power and impact
- Gender bias – does it exist?
  - Morphologic differences
  - Greater prevalence of combined deformity in males with more extensive morphologic abnormality
  - Greater mobility, higher pain/disability and overall prevalence, milder morphologic abnormality in females
- Clinical manifestations from opposite sides of the spectrum:
  - Open chain: Figure skater/performing contortionist
    - Characteristic movement patterns, extreme combined hip motion
    - Initial presentation: bilateral symptoms R > L
      - Right = stiffness and groin pain
      - Left = lateral hip pain
      - Able to complete ADLs, training but increased pain after activity
    - Staged procedures due to bilateral involvement
    - 14 weeks between procedures
      - Right = labral debridement, reconstruction (4 anchors), osteoplasty (combined FAI), rim trim, AIIS decompression, acetabular chondroplasty and thermal treatment, capsular (iliofemoral and ischiofemoral ligament) plication, ligamentum teres debridement and thermal treatment, bursectomy, synovectomy, PRP and Supartz injections
        - Experienced hip flexor tendinopathy due to accelerated return to training and excessive strain in straight leg raise/end range hip flexion
      - Left = arthroscopy, posterior labral repair (9-12:30), labral reconstruction (1-3) with ITB autograft and ITB release, osteoplasty, rim trim, AIIS decompression, ligamentum teres debridement, capsular thermal treatment with synovectomy and plication, PRP and Supartz injections
    - Overall outcomes, return to performance progression
  - Closed chain: Aspiring MLB baseball catcher, power hitter
    - Mechanism of injury, symptoms, and pre-operative imaging suggested bony defect to femoral head
    - Presented for evaluation 75% WB, unable to complete Sport Test pre-operatively due to pain with WB
    - Imaging suggested potential need for OATs, microfracture
    - Primary arthroscopy findings
      - Procedure: Labral repair (3 anchors), osteoplasty, rim trim, iliofemoral plication, ligamentum teres debridement, synovectomy, PRP
    - Rehabilitation progression/ return to sport timeline
      - Introduction of sport-specific movement patterns
• Calculated progression of end range combined hip motions in closed chain due to difference in rate of healing of bone vs labral tissue

• Conclusions: Clinical pearls for activity specific, individualized care

References

A motor control approach to the convergence of instability with intra and extra-articular problems

Shaw Bronner, PT – Brooklyn, NY

1) Introduction: A patient presents with unilateral anterior hip pain and a positive labral tear, but confounding factors included hip dysplasia and snapping hip with psoas tendinitis. This is the type of patient who displays a convergence of issues that warrant careful consideration and a course of conservative management. What is the source of the problem?

2) Undercoverage osseous vs. soft tissue vs. neuromuscular control considerations. How do we determine what system to treat?
   a. Is mechanical pathology the source? If there are problems in form closure, how can we address problems in stability through force closure?
   b. Local vs. global muscular system
   c. Myofascial slings for alternative force transmission
   d. Motor control considerations
      i. Patterns of muscle imbalance
      ii. Muscle firing patterns
3) Optimizing functional movement patterns: treatment strategies using multiple perspectives
   a. Regional interdependence: proximal vs. distal control considerations
   b. Relationship between hip and lumbopelvic coordination
   c. Functional movement retraining considerations

References

When All Else Fails - Complicated Cases

Marc J. Philippon, MD, Vail, CO

I. Revision hip arthroscopy
   a. Inadequate decompression of FAI
   b. Over-resection of FAI
   c. Adhesions
   d. Failed Labral Treatment
   e. Micro-instability
   f. Capsular deficiency

II. Case 1. Prior labral debridement with limited labral tissue remaining.
   a. When the labrum is deficient, the amount of strain the remaining labrum also puts the hip at risk for instability
   b. Loss of labral tissue can dramatically reduce the functional seal and others have shown a resultant increase in cartilage load, concentration, and potentially shear forces, predisposing the articulation to early degenerative changes
   c. Loss of labral tissue has also been show to result in higher fluid efflux
   d. Treatment – Labral Reconstruction
      i. Indications for reconstruction
         1. Complex tears and radial tears, degenerative tissue
         2. Size of labrum
         3. Unstable labrum
         4. Failure to create seal with femoral head
   e. Technique
      i. Two portals (anterolateral and mid-lateral)
      ii. Estimate extent of labral insufficiency with arthroscopic probe
      iii. Careful attention is made to adequately addressing pincer impingement lesions resulting from acetabular retroversion or coxa profunda.
      iv. Rectangular ITB graft harvested through incision distal to greater trochanter
      v. Graft is tubularized
      vi. Graft sutured to intact labral remnant in region of deficiency and suture anchors used on acetabular rim to ensure stable fixation
   f. Outcomes
      i. Labral reconstruction shows excellent early to midterm outcomes and return to sport in high level athletes. AJSM 2013
         1. 86% returned to professional sports
      ii. Acetabular Labral Reconstruction with Iliotibial Band Autograft: Outcome and Survivorship Analysis. AJSM 2013
         1. Patients > 2 mm joint space - 93% survivorship at 2 years
         2. Patients ≤ 2 mm joint space - 69% survivorship at 2 years

III. Case 2. Capsular reconstruction in elite baseball pitcher
   a. Prior hip arthroscopy with continued pain and instability in hip
   b. MRI revealed defect in his anterolateral capsule
   c. Capsular reconstruction indications
      i. Deficient capsule
      ii. Adhesions: When removal of the adhesions requires removing capsule. Resulting in capsule deficiency
      iii. Patients reports pain and limited range of motion if adhesions
   d. Why reconstruct
i. Structural stability: Iatrogenic instability from excessive capsulotomy
ii. Biomechanical data strongly favors maintaining or restoring capsule to intact state to normalize kinematics and reduce risk of idiopathic instability.
iii. Restore hip morphology
iv. Helps restore sealing mechanism
v. Provide added protection for the dysplastic hip or the hip with a torn ligamentum teres
e. Clinical data reinforces capsular repair to maintain post-operative joint construct stability
f. Reduce post-operative micro-instability.
g. Limitations
   i. Complex surgery
   ii. Limited data on outcomes
h. Patient reported normal ROM and increased stability and strength in his hip. Returned to pitching.

IV. Case 3. Adhesions following hip arthroscopy
a. Intra-articular hip adhesions have recently been recognized as a significant source of failure and post-operative pain following both open and arthroscopic surgery for FAI.
b. Intra-articular adhesions have been noted to occur primarily in two locations
   i. Between the capsule and site of labral repair
   ii. Between the anterior femoral neck and capsule at the location of the capsulotomy.
c. Rehabilitation exercises can prevent or decrease risk of adhesions
   i. Circumduction exercises performed passively 3 times daily resulted in a reduction in the revision arthroscopy rate

V. Case 4. Over resection of FAI
a. Over resection of Cam lesion
   i. Femoral neck compromise – fracture
   ii. Loss of suction seal
b. 21 year old female with decreased ability to perform physical activity
   i. 2 prior surgeries for FAI and labral tear
      1. Arthroscopic labral debridement 3 years prior
      2. Cam osteoplasty via open approach 2 years prior
   ii. At arthroscopy
      1. Significant bone loss on superoanterior aspect of the femoral head-neck junction with suction seal loss
      2. 2cm x1cm autograft bone block was secured and contoured at area of over resection.
      3. Labral seal was re-established
   iii. Follow up
      1. Radiographs research proper offset with good fixation of the grafts
      2. At 4 years, patient is symptom free

VI. Conclusion
a. With the increased prevalence of hip arthroscopy, more complex cases are being seen.
b. Revision hip arthroscopy can be challenging
c. Revisions can be avoided by
   1. Proper patient selection
   2. Addressing all the pathology
   3. Proper post-op rehabilitation
References

Intra-articular hip injury in a female runner with generalized joint laxity
Phil Malloy, PT - Milwaukee, WI

- Pre-operative data and Post-operative Data
  - Physical measures
    - ROM
    - Muscle torque
    - Muscle flexibility
  - Outcome scale data
    - iHot
    - NAHS
    - HOS-ADL subscale
  - Pertinent Pre-operative biomechanical movement analysis findings
    - Kinematic and kinetics
      - Walking
      - Double, and single leg squat tasks

- Pre vs. Post-operative Finding interpretation
  - Movement pattern differences
    - What do they mean for rehab progression?

- Current research: Movement pattern differences in persons with symptomatic FAI and healthy controls
  - Preliminary biomechanical findings on movement pattern alterations in people with FAI compared to healthy controls
  - Movement pattern alteration and hip injury mechanism
  - Future directions of study

- Clinical relevance

References:


**The Complicated Hip: What have we learned in a decade?**

Dirk Kokmeyer, PT, DPT, SCS, COMT – Portland, ME

1) Introduction:
   a) The Vail experience
      i) Surgery to PT
      ii) Treatment strategies
      iii) Telemedicine/virtual HEP platform.

2) Early Phase: Setting up for success:
   a) The consequences of arthrogenic inhibition.¹
   b) Circumduction: why is passive ROM important?²,³
   c) Restoring normal firing patterns.⁴,⁶
   d) Aquatic therapy.

3) Restoring Gait: setting up for return to sport
   a) Normal gait vs. gait in the FAI hip.⁷-¹⁰
   b) Lumbopelvic posture and gait implications.¹¹-¹³
   c) Strategies to avoid recalcitrant anterior hip pain in gait.¹⁴-¹⁷

4) Return to sport:
   a) Hand held dynamometry testing.¹⁸-²⁰
   b) Sport testing.²¹-²³

5) Conclusions and Summary

**References**


## Disclosures - Marc J. Philippon, M.D.

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