

# The Throwing Shoulder

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# Disclosures

- **None**

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REVIEW

## Glenohumeral internal rotation deficit in throwing athletes: current perspectives

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tears. The mainstay of treatment for patients with GIRD is posterior capsular stretching and strengthening to improve scapular mechanics. In patients who fail nonoperative therapy, shoulder arthroscopy can be performed. Arthroscopic surgery in the high-level throwing athlete should be to restore them to their functional baseline with the minimum amount of intervention possible.

# Objectives

1. Review problems encountered by overhead throwing athletes
2. Discuss surgical treatment of overhead throwers

# What is the problem?

- Repetitive motion leads to overuse injury
  - tissues that are relatively avascular
- Increased motion increases velocity
  - ER 160 deg
  - Acceleration 6000 deg/second
  - IR torque 60 N/m
- Places Extreme stress on stabilizers of shoulder
  - Ultimate load to failure
- Throwers paradox

# Internal Impingement

- Repeated contact between the undersurface of the rotator cuff and the posterior superior glenoid
  - Occurs in ABER
- Impingement occurs at the junction of the posterior SS and anterior IS



# Internal Impingement

- Posterior capsular tightness => increased force at posterior-superior labrum
- Repetitive impact leads to labral tearing and fraying of articular side of infraspinatus
- Increase stretch of the anterior capsule allows for anterior-inferior pseudolaxity

# Evaluation of the throwing shoulder

- History
- Physical Exam
  - Shoulder
  - Hips and trunk
- Imaging



# Evaluation of the throwing shoulder

- INTRA-ARTICULAR

- Labral tears
- Rotator cuff tears
- Bicep tendinosis/partial tearing
- Posterior capsular thickening
- Anterior capsular injury

- EXTRA-ARTICULAR

- Muscle strains  
(latissimus/subscapularis)
- Nerve injuries
- Vascular problems

# History

- Where
  - Anterior – SLAP; biceps
  - Posterior – labrum, cuff
  - Axilla – latissimus/  
subscapularis strain
  - Superior – AC joint (rare)
  - Periscapular- muscle strain,  
cervical, rib stress fracture
- When
  - Late cocking – SLAP tear,  
anterior capsular
  - Follow through – posterior  
capsule, cuff

# Physical Exam: Shoulder

- ROM
  - GIRD
  - TROM
- Strength
- Instability
  - Apprehension/Relocation, Load and Shift
- Special tests
  - Hawkins, Neer, Obrien's, Speed's, Labral Shear, Belly Press, Lift Off, Jerk

# Physical Exam: Kinetic Chain

- Core and Trunk
  - Hip ROM
  - Single Leg Squat
  
- Scapula
  - Dyskinesis/Winging
  - SICK scapula

# Physical Exam: Other

- Nerve Pathology
  - Suprascapular
    - Infrascapular weakness/atrophy => EMG/PNCV, MRI
      - Cummins AJSM, 2004, Present in 4% of professional pitchers
  - TOS
    - Non-dermatomal
  - Musculocutaneous
    - Proximal medial arm pain, elbow flexion weakness
- Vascular
  - VTE
  - Arterial Thrombus

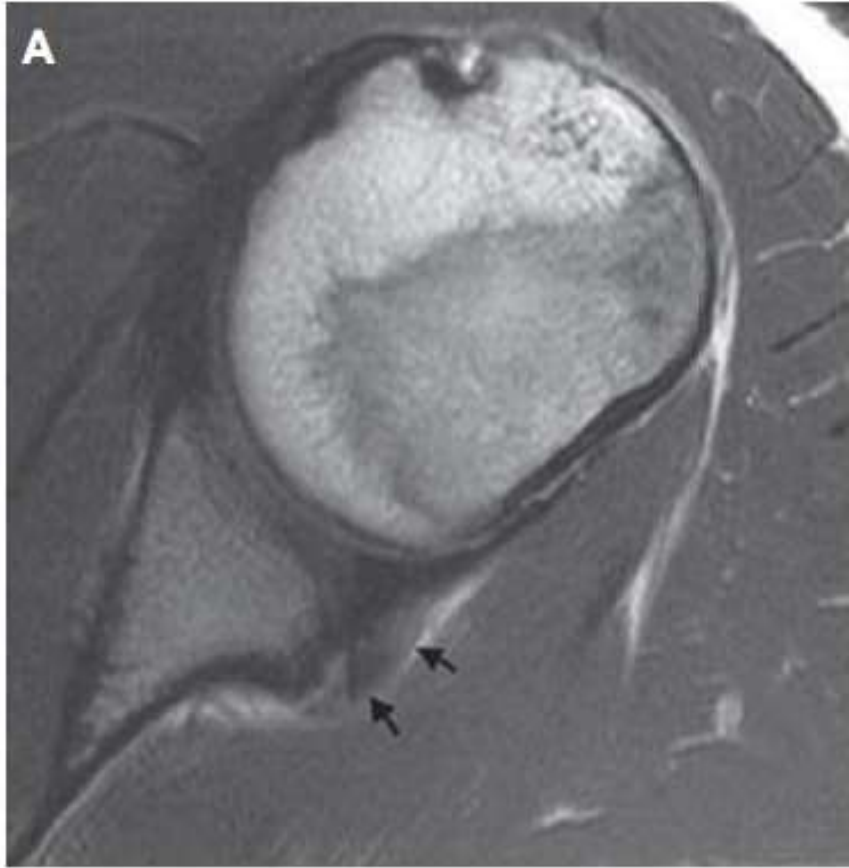
# Imaging

- To MRI or to not MRI?
- Many abnormal findings on shoulder MRI of asymptomatic throwers
  - Connor AJSM, 2003; 20 asymptomatic overhead athletes
    - 40% with RCT, 7.5% with labral abnormality
  - Miniaci AJSM, 2002; 28 professional pitchers
    - 86% RC abnormality, 45% labral tear

# Imaging

- Counsel the athlete before ordering the MRI
  - Unlikely to be “normal”
  - May be difficult to interpret findings
  - Does the athlete really want to know (or have the scout know!)
- Typically will get MRI before steroid injection
  - Make sure not masking something significant
  - Potential for worsening of partial RCT/degenerative biceps tearing

# MRI Findings



- Axial image showing thickening of the posterior capsule



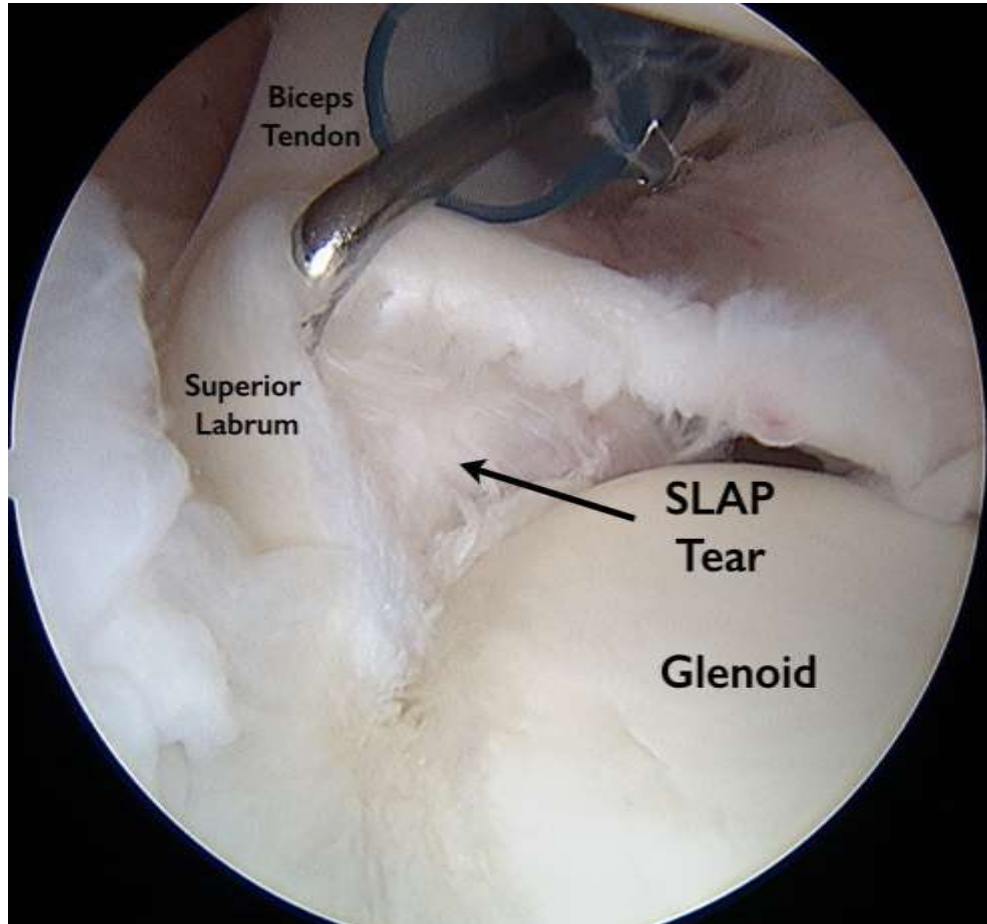
- MR Arthrogram of the shoulder in ABER showing fraying of undersurface rotator cuff



# When to Operate?

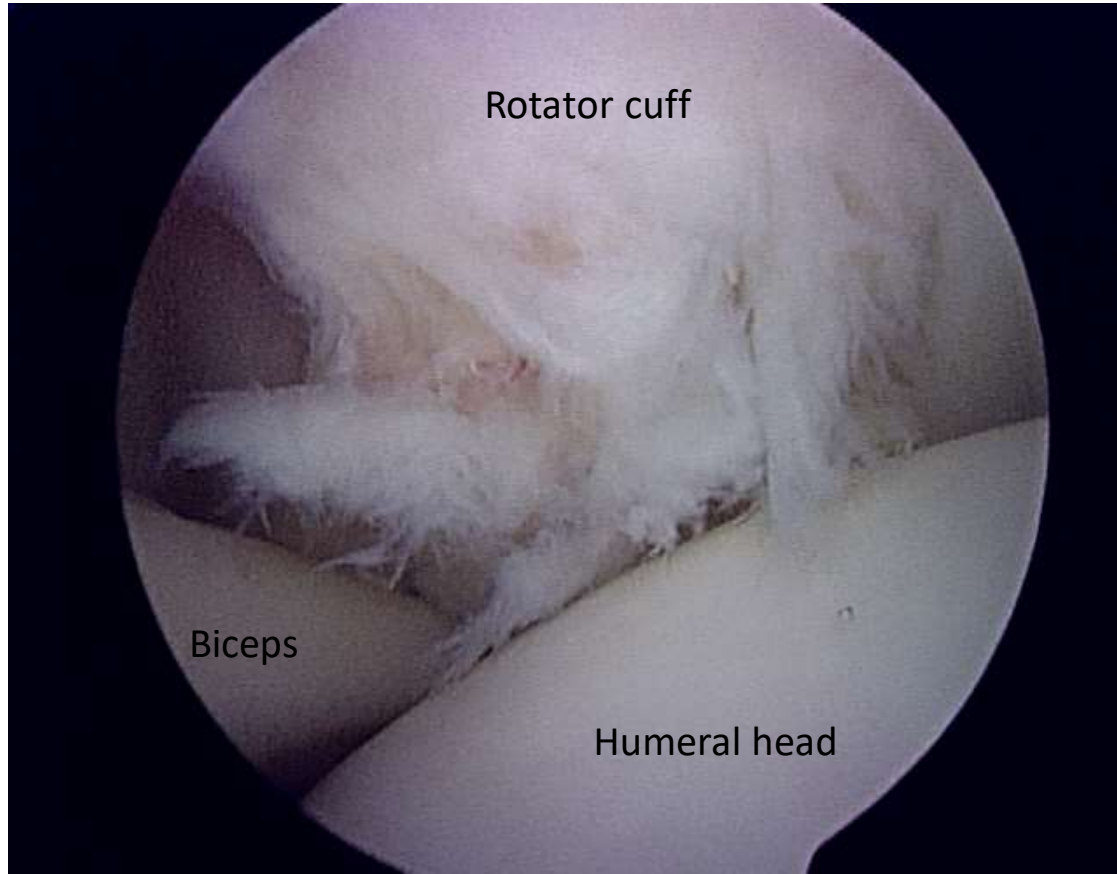
- Rarely with acute shoulder pain
  - Clear mechanical indication (unstable labral flap, loose body)
- Failure of good rehabilitation program
  - >3 months conservative treatment
  - Adequate period of rest
  - Good throwing program

# Treatment – SLAP/Labrum



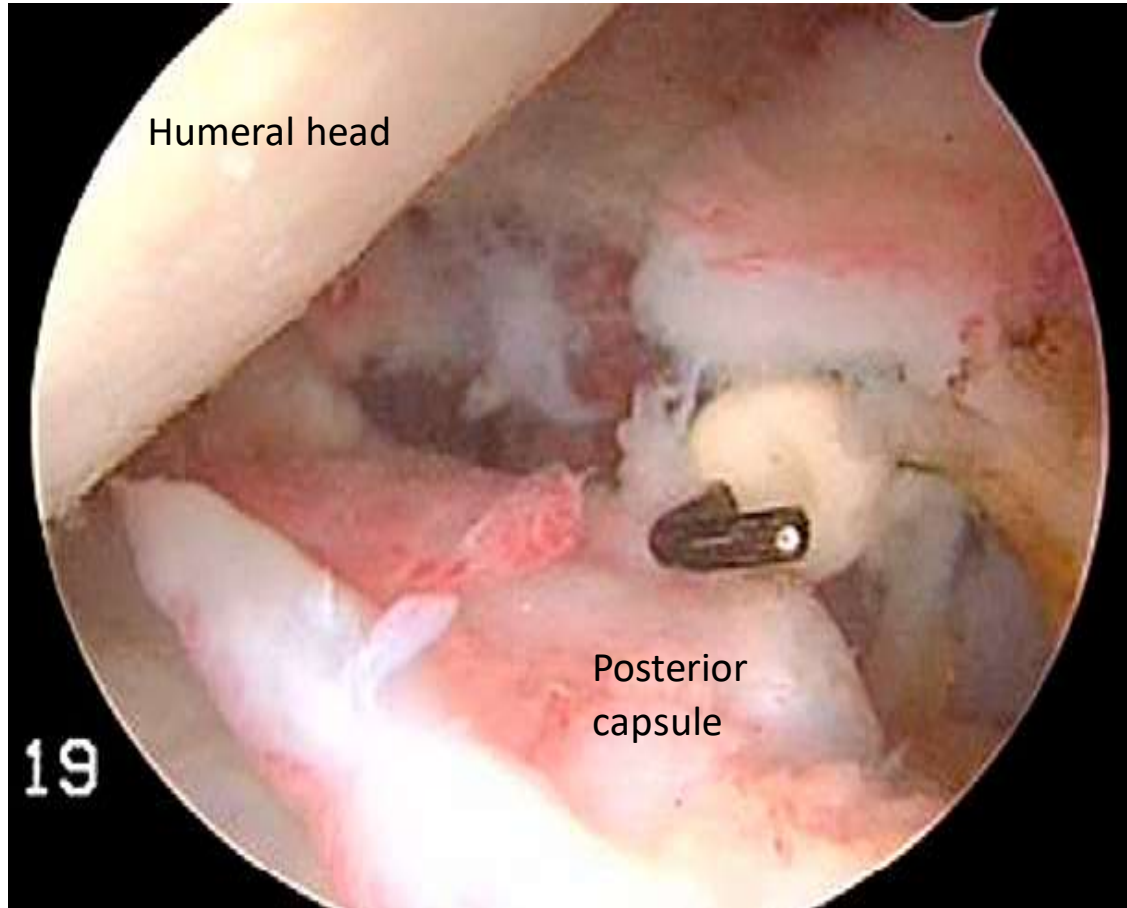
- Fix SLAP tears in pitchers
- Consider Tenodesis in non-pitching throwers
  - Open sub-pec
- Fix Anterior/posterior labral tears in all throwers with instability

# Treatment - Cuff



- Debride Partial tears in symptomatic throwers
- Partial repair if > 75%
  - Suture shuttle technique
- Double row knotless technique for Full thickness repair
  - Set expectations

# Treatment - Capsule



- Posterior capsular release for refractory stiffness
- Release for 6:00 – 11:00 using hook probe
  - Until cuff muscle belly is exposed

# Return to Sports

## Return to Sport Following Shoulder Surgery in the Elite Pitcher: A Systematic Review

Joshua D. Harris, MD,\*† Jonathan M. Frank, MD,† Mark A. Jordan, MD,†  
Charles A. Bush-Joseph, MD,† Anthony A. Romeo, MD,† Anil K. Gupta, MD, MBA,†  
Geoffrey D. Abrams, MD,† Frank M. McCormick, MD,† and Bernard R. Bach, Jr., MD†

- 6 studies, 287 players
- Multiple pathologies addressed (cuff, labrum, capsule)
- 68% return to sports at 12 months after surgery
- Did not return to pre-injury performance levels but did perform better than pre-operatively

# Return to Sport

## **Return to Play After Type II Superior Labral Anterior-Posterior Lesion Repairs in Athletes**

### **A Systematic Review**

**William M. Sayde MD, Steven B. Cohen MD,  
Michael G. Ciccotti MD, Christopher C. Dodson MD**

- 506 patients with Type 2 SLAP
- 83% good to excellent results
- 63% return to pre-injury level of play
- Return to play was higher in anchor repair vs tak/staple

# Return to Sport

## Return to Play After Shoulder Surgery in Throwers

Robert Thorsness, MD\*, Jeremy A. Alland, MD,  
Colin B. McCulloch, BA, Anthony Romeo, MD

- Rotator Cuff
- 76% RTS for debridement of partial thickness cuff tears (55% RTPP)
- 50% RTS for partial repairs (33% RTPP)
- 41% RTS for full thickness repairs

# Conclusions

- Return to sport varies on based upon pathology
- SLAP repair and Cuff Debridement have more favorable outcomes
- Rotator cuff repair has poor outcomes
- Exhaust extensive non-surgical options in throwers
- Set expectations for return to sport and prior performance



# Other Take Home Points: Observations from Tom Noonan

- Not all pitchers get better because of your surgery
  - Surgery → a lot of rehab
- Some pitchers learn how to pitch
  - Beware the “max effort” guy
- Throwing injuries occur from chronic repetitive activity; we “fix” them and then they go right back to doing the same thing
- Shoulder surgery at a young age in a thrower is a bad thing