Bicep Pathology in the Athlete: Cut it or fix it?

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Learning Objectives

1. Identify the pathology of both SLAP tear and bicep disease
2. Learn how to make/confirm diagnosis of SLAP tear/bicep disease
3. Compare/Contrast treatment options
   - Repair
   - Bicep tenotomy
   - Bicep tenodesis
SLAP tear

“Superior labrum anterior to posterior”
- Andrews 1985: 73 baseball players with bicep pathology
- Snyder 1990: classified SLAP tears in 27 surgical patients
SLAP – Type I-IV
Now, Types I-X...
Nonspecific shoulder pain with overhead/cross-body motion

- Often dull, posterior, “tooth-ache”
- May have concomitant instability
- Traction injury – very common (climbers)
Diagnostic accuracy of five orthopedic clinical tests for diagnosis of superior labrum anterior posterior (SLAP) lesions

Chad Cook, PT, PhD, MBA, Stacy Beaty, MD, Michael J. Kissenberth, MD, Paul Siffri, MD, Stephan G. Pill, MD, Richard J. Hawkins, MD


“No tests demonstrated diagnostic utility when diagnosing any SLAP lesion”
SLAP - Imaging

- Xrays – nml
- MR Arthrogram
SLAP - Treatment

- Debride...
- Repair...
- Bicep Tenodesis...
- Who gets what??
SLAP - debridement

- Degenerative shoulder
- Type I, III
- ? RTC repair without bicep symptoms
- Poor results if truly “unstable” (40% success)
Controversial!

~90% success rate in some populations (though highly variable)

Considerations

- Age
- Sport
- Bicep pain
SLAP - Repair

- **Provencher, 2011**
  - 215pts; SLAP II repair
  - 38% failure rate
  - Age over 36 greatest predictor of failure
  - Rescued successfully with tenodesis

- **Boileau 2009**
  - 25pts (avg age 37), randomized to SLAP repair vs tenodesis
  - 87% RTP vs 20% with tenodesis vs repair
Take Home Points

- Not everyone with a SLAP tear needs to be repaired (Weber → 9x increase in SLAP repair on Part 2 ABOS)
- Fix if isolated, history, imaging, arthroscopy match
- Fix if combined with instability lesion (esp posterior!)
SLAP repair – Technique?

- Probably matters...
  - Though minimal biomechanical difference (thus far...)
SLAP Outcomes

- 71-97% success overall (Schroder, Arthroscopy 2012)

- Controversial
  - Age -> ? >36... > 40??
  - Bicep disease **
Biceps (Proximal) Pathology
Biceps Anatomy

Intra-Articular Portion

- Intra-articular and extra-synovial
- Clearly visualized arthroscopically

Extra-Articular Portion

- *Cannot be seen arthroscopically, but typically involved in pathology*
Biceps Anatomy

Biceps Sling
- Soft tissue restrains required to maintain biceps stability in the groove
Commonly associated with other shoulder problems (SLAP, Supraspinatus and Subscapularis tears)

Tenosynovitis of the LHB tendon may occur with concomitant bursitis, rotator cuff pathology, SLAP, AC joint disorders, adhesive capsulitis, impingement or sometimes a combination of these conditions.

However, may present as an isolated source of shoulder pain.
Over past decade the role of isolated biceps tendonitis (tenosynovitis) is increasingly recognized as a sole source of shoulder pain
Diagnosis

- **Dx:**
  - History of anterior shoulder pain
  - Tenderness to palpation over the intertubercular groove
  - Positive provocative biceps tendon tension tests
  - Confirmatory + response to ultrasound guided biceps sheath injection
Biceps Exam

- Tenderness in Bicipital Groove
- Speed’s Test
  - 90% Sensitive
  - 14% Specific
- Yergason’s
- Diagnostic Injection – U/S
Diagnosis

Imaging
- MRI
  Subluxation/dislocation... (remember the subscap!)
  Increased signal around biceps tendon
  SLAP lesion
- Ultrasound
The Problem is Pain

- "Pain Generator"
- Painful biceps tear
- Painful massive tear
- Painful SLAP
- Painful biceps instability
- Painful revision surgery
Biceps Treatment

- Tenotomy
- Proximal Tenodesis
- Subpectoral Tenodesis
Tenotomy vs. Tenodesis

- Systematic review concluded only major difference was presence of cosmetic deformity in tenodesis group

<table>
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<th>All Studies</th>
<th>Concurrent Rotator Cuff Disease</th>
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<tr>
<td></td>
<td>Tenotomy</td>
<td>Tenodesis</td>
</tr>
<tr>
<td>No. of patients</td>
<td>699</td>
<td>433</td>
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<tr>
<td>Excellent/good outcome</td>
<td>77%</td>
<td>74%</td>
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<td>Popeye sign</td>
<td>43%</td>
<td>8%</td>
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<tr>
<td></td>
<td>Tenotomy</td>
<td>Tenodesis</td>
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<tr>
<td>No. of patients</td>
<td>430</td>
<td>156</td>
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<tr>
<td>Excellent/good outcome</td>
<td>74%</td>
<td>85%</td>
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<tr>
<td>Popeye sign</td>
<td>49%</td>
<td>5%</td>
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Slenker, Arthroscopy 2012
Tenotomy vs. Tenodesis

- Younger age group less than 55 years in active population (avg age 49.9 years)
- 42 (22 tenotomy, 20 tenodesis) patients
- Avg f/u 3.3 years
- Popeye in 35.0% (7/20) of tenotomy vs 18.2% (4/22) of tenodesis patients.

Aircast Award Winner, Friedman and McCarty, 2012 AOSSM Annual Meeting
Tenotomy vs. Tenodesis

- Strength was not significantly different between groups for isokinetic strength and endurance measures.
- Subjective functional outcome measured by the DASH, ASES and VAS scores were similar between groups.
- Frequency of cramping higher in the tenotomy group (4/20 vs. 1/22)

Aircast Award Winner, Friedman and McCarty, 2012 AOSSM Annual Meeting
Supination/Flexion strength

- Generally mixed results in literature
- Important in *certain* populations
  - Young males
  - Laborers (screw driver/wrench)
  - ?? Climbers / Extreme Athletes...??
Assume Tenodesis is the Answer!

- Relieve anterior shoulder pain
- Maintain tendon-length relationship
- Avoid Cosmetic deformity
- Avoid subjective or objective weakness
  - supination
  - flexion
- Avoid fatigue/cramping
“Popeye” Deformity
Why do Biceps Tenodesis more distal (mini-open subpectoral)?

- Decreased incidence of postoperative groove pain with distal tenodesis location
  Lutton et al, CORR, 2011
Why do Biceps Tenodesis in Sub-Pectoralis area?

- Completely removes the tendon from the sheath and synovium (which may contribute to persistent pain)
- Poor tendon quality proximally may make tenodesis challenging
- Anatomy is easily defined and identified
- Efficient technique with “short” learning curve
  - Small cosmetic incision
Complications

Nho SJ, Reiff SN, Verma NN, Slabaugh MA, Mazzocca AD, Romeo AA. Complications Associated with Subpectoral Biceps Tenodesis. Low Rates of incidence following Surgery JSES, 2010

- Over 3 yrs, 7 of 353 Biceps Tenodesis had complications with
  - incidence of 2.0%
  - 2 pts (0.57%) with persistent bicipital pain
  - 2 pts (0.57%) with failure of fixation with Popeye deformity
  - 1 pt (0.28%) with deep wound infection
  - 1 pt (0.28%) with temporary musculocutaneous neuropathy
  - 1 pt (0.28%) with RSD
Unpublished data

- 200+ pts (JTB)
- Tenodesis prior to bicep release
- Bird beak vs “free needle” technique
  - 13% vs 2% failure / deformity
Pre-op ultra-sound guided injection in bicipital groove (with positive response) will help confirm biceps sheath pain and indication for biceps tenodesis.
Postoperative Rehabilitation

Goals
- Protect Biceps Tenodesis site
- Full Shoulder motion

Early
- Concentrate on healing

Late
- Strengthening beginning with light 2 ½ lb weight at 6 weeks

Return to sports
- Normally 4 months minimum
Take Home

- Consider tenotomy in low-demand, older, or larger patients who would be accepting of potential cosmetic deformities
- Do NOT recommend tenotomy for:
  - High Level Athletes
  - Workers comp patients
  - Concerns by anyone of cosmetic deformity
- If doing tenodesis for biceps pathology, then recommend subpectoral biceps tenodesis
“The greater the ignorance the greater the dogmatism”

Sir William Osler
Thank You!

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