Proximal Bicep Pathology: Leave it, Cut it, Fix it?

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Disclosures

No Disclosures
Pathogenesis

- LHBT is a primary pain generator in anterior shoulder.
  - Sensory and sympathetic innervation
  - Substance P and calcitonin gene-related peptides present
- Vascular anatomy role
  - Hypovascular areas
  - Increased mechanical strain
Physical Exam and Imaging

• Exam
  • Anterior shoulder pain
  • TTP over the bicipital groove
  • Snap or Pop on ROM
  • Popeye deformity
  • Provocative Exam
    • Speed
    • Ferguson
    • Bicep Instability
    • O’brien

• Imaging
  • Xrays
  • Arthrography
  • Ultrasound
  • MRI
  • Arthroscopy
Proximal Bicep Pathology

- Isolated Tendinitis
- Rare (5%)
- Instability + Lesion of pulley system and RCT
- Instability + SLAP lesion
Proximal Bicep Pathology

• **Isolated Tendinitis**
  
  • Rare (5%)
  
  • Instability + Lesion of pulley system and RCT
  
  • Instability + SLAP lesion
Isolated Bicep Tendinitis

• Treatment
  • Nonoperative
    • Rest
    • NSAIDs
  • Injections (subacromial/glenohumeral/bicipital sheath)
  • PT
Isolated Bicep Tendinitis

• Operative
  • Decompression
    • Release of Transverse Humeral Ligament via scope vs open approach
  • Tenotomy
    • Advantages: technically easier, simpler rehab, no need for immobilization
    • Disadvantages: Risk of Popeye deformity (70%), bicep cramping, and increased fatiguability (40%).
    • Patient satisfaction: >90%
    • Several studies state that >60 y/o did not appreciate fatigue
Isolated Bicep Tendinitis

- Operative
  - Tenodesis
    - Open/Scope
      - Advantages: Better cosmesis, restoration of strength
      - Disadvantages: More technically challenging, cost of implant, longer rehab, immobilization, possible failure of fixation
Bicep Tenodesis

- Goal: Preserve and Restore Length of LHBT
- Locations/Techniques vary
  - Arthroscopic, Mini-open, Soft Tissue, Suprapectoral, Subpectoral, etc
  - Keyhole, scope w screw/anchor, unicortical/bicortical.
Isolated Bicep Tendinitis

- **Tenodesis**
  - Younger patients
  - Athletes
  - Laborers
  - Cosmetic concern

- **Tenotomy**
  - Older individuals
  - Non-laborers
  - Cosmesis not an issue
  - Unwilling to be compliant with rehab/post op instructions
Proximal Bicep Pathology

• Isolated Tendinitis

• Rare (5%)

• Tendon Instability + Lesion of pulley system and RCT

• Tendinitis/Instability + SLAP lesion
Proximal Biceps Complex

- Anterior Supraspinatus
- LHB “Pulley”
- CHL
- SGHL
- Superior Subscapularis
Habermeyer and Walch Classification

<table>
<thead>
<tr>
<th>Table 1 Habermeyer and Walch Classification of Biceps Lesions.</th>
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</thead>
<tbody>
<tr>
<td>I. Origin Lesions</td>
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<tr>
<td>SLAP Lesions</td>
</tr>
<tr>
<td>A. Biceps Tendinitis</td>
</tr>
<tr>
<td>B. Isolated Ruptures</td>
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<tr>
<td>C. Subluxation</td>
</tr>
<tr>
<td>Type I: Superior</td>
</tr>
<tr>
<td>Type II: At the groove</td>
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<tr>
<td>Type III: Malunion-Nonunion Lesser Tuberosity</td>
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<tr>
<td>II Interval Lesions</td>
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<tr>
<td>Type IA: Extra-articular with partial subscapularis tear</td>
</tr>
<tr>
<td>Type IB: Extra-articular with an intact subscapularis</td>
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<tr>
<td>Type II: Intra-articular</td>
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<tr>
<td>III Associated with Rotator Cuff Tears (RCT)</td>
</tr>
<tr>
<td>A. Tendinitis</td>
</tr>
<tr>
<td>B. Dislocation</td>
</tr>
<tr>
<td>C. Subluxation with RCT</td>
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<tr>
<td>D. LHBT rupture with RCT</td>
</tr>
</tbody>
</table>

![Diagram of classification types I to IV with labels LHB, SSP, SGHL, SCP, and tears indicating location of lesions.]
The “Hidden” Lesion

- Murthi et al (JSES 2000)
  - 200 shoulders: SAD + RCR
  - Incidence related to extent of the cuff disease
  - 18% free of biceps disease
  - 50% of biceps disease not seen during arthroscopy
Biceps Instability

- Associated with:
  - Subscapularis tears (most common)
  - Tears of coracohumeral and/or SGHL complex
  - Medial subluxation/dislocation is most common
Biceps Instability

• Treatment:
  • Nonoperative: NSAIDs, PT, Injection, Rest.
  • Operative:
    • Repair/Reconstruction of Pulley complex and/or Rotator Cuff (<50% Biceps involvement)
    • Tenodesis
    • Tenotomy
Results of Tenotomy w RCT

• Walch et al (JSES 2005)
  • 307 bicep tenotomy with full thickness RCT
    • 57 mo f/u
    • Average age of 64 y/o
    • 87% of patients were satisfied/very satisfied
      • No fair/poor result due to cosmesis
    • Showed tenotomy can produce a favorable outcome
Results of Tenotomy

- Gill et al (JSES 2001)
  - Explored 30 pts with isolated scope tenotomy
  - High rate of pain free recovery (97%), RTW (97%, 2 wk avg), RTS (90% at previous level)
  - Mean ASES score of 81.8
  - Complication rate of 13.3%

- Kelly et al (AJSM 2005)
  - 40 pts treated with scope tenotomy
  - High patient satisfaction scores
  - ASES avg 77.6
  - Popeye deformity 70%
  - Fatigue discomfort (38%)
Results of Tenotomy

- Kempf et al (Arthroscopy 1999)
- 210 patients with scope managed RCT
- 18% Tenotomy
- Compared to nontenotomized group:
  - Significant improvements in level of physical activity, active mobility, and pain variables
Proximal Bicep Pathology

- Isolated Tendinitis
- Rare (5%)
- Instability + Lesion of pulley system and RCT
- Tendinitis/Instability + SLAP lesion
Snyder Classification

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>Fraying with intact biceps</td>
</tr>
<tr>
<td>Type 2</td>
<td>Superior labral tear and biceps instability</td>
</tr>
<tr>
<td>Type 3</td>
<td>Bucket-handle tear of superior labrum and intact biceps</td>
</tr>
<tr>
<td>Type 4</td>
<td>Bucket-handle tear of superior labrum and biceps instability</td>
</tr>
<tr>
<td>Type 5</td>
<td>Bankart lesion and superior labral tear</td>
</tr>
<tr>
<td>Type 6</td>
<td>Unstable flap tear and biceps instability</td>
</tr>
<tr>
<td>Type 7</td>
<td>Superior labral tear and biceps instability/middle glenohumeral ligament tear</td>
</tr>
<tr>
<td>Type 8</td>
<td>Superior labral tear with postoinferior extension</td>
</tr>
<tr>
<td>Type 9</td>
<td>Pan-labral tear (extensive anterior and posterior extension)</td>
</tr>
<tr>
<td>Type 10</td>
<td>Superior labral tear with rotator interval extension</td>
</tr>
</tbody>
</table>
SLAP tear

- Type 2 SLAP
  - Most common
  - Usually occur in setting of RCT or OA
- Treatment:
  - Nonoperative: Rest, NSAIDs, PT (Reduce GIRD and scapular dyskinesia)
  - Operative: Repair, Tenodesis, Tenotomy.
SLAP Repair

- Thought as the standard of care of unstable labral tear involving the LHBT
  - Boileau et al (AJSM 2009)
  - Kim et al (JBJS 2003)
  - Maffet et al (AJSM 1995)
  - Snyder et al (JSES 1995)
  - Rhee et al (Arthroscopy 2005)
  - Pagnani et al (Arthroscopy 1995)

- Trend towards poor results in patient with SLAP repair and concurrent SAD when they were 18-40 y/o

- Recommended not repairing SLAP in over 40 y/o
Franceschi et al (AJSM 2008)

- Level 1 RCT
  - Compared 31 patients with RCR with SLAP repair vs 32 patients with RCR with tenotomy
  - All patients over 50 y/o with minimum 2.9 year f/u
  - Found no advantages when comparing ROM values and UCLA scores
  - Authors concluded tenotomy with RCR provided a better clinical outcome
Forsythe et al (JBJS 2010)

• Analyzed outcomes of SLAP + RCR (avg age 56.9) vs RCR (avg age 59.6) over 40 months

• Higher postoperative Constant score in concomitant repair group

• No significant difference in ROM

• Concluded that concomitant repair can be comparable to isolated RCR in middle aged adults.
Trends

• A 2016 survey of MLB physicians found 93% would repair a symptomatic SLAP

• Patterson et al (AJSM 2014)
  • From 2002 - 2011:
    • Bicep tenodesis has risen from 2 —> 20%
    • SLAP repair decreased 69.3% —> 44.8%

• WHY???
Inconsistent Results with SLAP Repair

- Sayde et al (CORR 2012)
  - 83% Good to excellent results
  - Return to play 73%, but 63% of overhead athletes to previous level of play.
- Other studies report 22-85% return to preinjury level of sports activity.
- Frank et al (Adv Ortho 2013)
  - < 20 y/o pts and overhead throwers were more likely to require revision surgery
  - >40 y/o pts more likely to have lower post op ASES scores
Straus et al (JSES 2014)

• Evaluated experimental type II SLAP lesions
  • Produced increased translation anteriorly, posteriorly and ABER.
  • Bicep Tenodesis
    • No change in translation compared to SLAP lesion presence.
• Recommended tenodesis as a viable alternative to SLAP repair in symptomatic SLAP tear
  • Advised caution in overhead throwers due to increased translation.
Professional Baseball Players

• Fedoriw et al (AJSM 2014)
  • Level IV Case series
  • Retrospective review of 68 patients with MRI documented SLAP
    • Pitchers:
      • Nonoperative program (n=21) - RTP 40%, RPP 22%
      • Operative (n=27) - RTP 48%, RPP 7%
    • Position players:
      • Nonoperative (n=10) - RTP 39%, RPP 26%
      • Operative (n=13) - RTP 85%, RPP 54%
  • Concluded non-surgical treatment has a reasonable success rate
  • Return after surgery for pitchers was low.
Hurley et al (JSES 2018)

- Level III meta-analysis
  - 5 studies with 234 patients
- Biceps tenodesis (mean age 45.4 y/o) vs labral repair (mean age 38.8 y/o) in SLAP tears
  - BT Patient satisfaction 95.6% vs 76.2%
  - BT return to sport rate 81.3% vs 64.3%
  - No difference in complication rates or functional outcomes
Tenodesis renders better results than tenotomy in repairs of isolated supraspinatus tears with pathologic biceps

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Biceps tenodesis versus labral repair for superior labrum anterior-to-posterior tears: a systematic review and meta-analysis

Eoghan T. Hurley, MB, BCh, Daren Lim Fat, MCh, FEBOT, Cliona M. Duigenan, BSc, J. Chance Miller, BA, Hannan Mullett, MCh, FRCSI (Tr, Orth), Cathal J. Moran, MD, FRCSI (Tr, Orth)
# Summary

- Trends: All depends on age and activity level, patient factors

<table>
<thead>
<tr>
<th>Nonoperative vs Repair</th>
<th>Bicep Tenodesis</th>
<th>Bicep Tenotomy</th>
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<tbody>
<tr>
<td>&lt;25 y/o</td>
<td>20 - 40 y/o</td>
<td>&gt; 40 y/o</td>
</tr>
<tr>
<td>Elite overhead athlete</td>
<td>Non elite overhead athlete</td>
<td>Sedentary</td>
</tr>
<tr>
<td></td>
<td>Laborer</td>
<td>Not concerned about cosmesis</td>
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<tr>
<td></td>
<td>Cosmesis Concern</td>
<td></td>
</tr>
</tbody>
</table>
Sources


Franceschi F, Longo UG, Ruzzini L, Papalia R, Rizzello G, Denaro V: To detach the long head of the biceps tendon after tenodesis or not: Outcome analysis at the 4-year follow-up of two different techniques. Int Orthop 2007; 31(4):537-545.


Sources


Thank you!

Questions?