Biceps/Labrum injuries

Yanni Pappou, MD PhD
Shoulder to Hand, Palm Harbor
Overview

1. Anatomy
2. Biomechanics of biceps-Superior labrum complex (BSCL)
3. Presentation, exam, nonop treatment
   Surgical result hierarchy
4. RCT
5. Comparative Studies
6. SSRL/Retrospective reviews
7. Results in overhead athlete and Pro baseball players
8. Tenodesis for failed SLAP repair
9. Future directions
1. Anatomy

- LHB: 60% off supraglenoid tubercle, 40% of labrum proper
- Vascular: suprascapular, subscapular (circumflex scapular branch), PHCA. Reaches labrum through capsule
- Significant variability – sublabral recess, meniscoid variants
- Biceps take off: centrally versus posteriorly
- Rarely: bifid biceps or take off from capsule
- Anterior sublabral foramen: 3% to 12% of shoulders
- MGHL: absent 12%, cord-like adjacent to sublabral foramen 9%
- Buford: 1.5% complete absence of labrum in A-Sup + cord-like MGHL, attaches directly to the base of the biceps tendon.
2. Biomechanics of BSLC

- LHB counteracts SHB proximal migration
- Release of the long head of the biceps: ↑proximal humeral migration 15.5% with elbow flexion and supination

- Humeral head abrasion found in failed SLAP repairs (Kuhn)

- SLAP tear w/wo tenodesis: increased instability
- SLAP repair restores stability even with tenodesed Biceps (Strauss)
2. Biomechanics of BSLC in ABER

- in ABER: shoulder stabilized with biceps contraction especially anteriorly

- Anterior displacement ↓ with biceps tension even with Bankart

- Cadaveric SLAP: ↓ decreases torsional rigidity in ABER, ↑ IGHL strain, ie microinstability anteriorly

- in Lower/ Mid Range: ↑ SI and AP translation , SGHL and MGHL originate from superior labrum.
2. Real life function of biceps

- UNKNOWN

- BRETT FARVE HAD A TENOTOMY, HIS PAIN IMPROVED AND WON A CHAMPIONSHIP!!
3. Presentation and exam

- Deep pain
- May be various location
- Can radiate down arm, sometimes into clavicle and along SS fossa
- Exam: typically full ROM, positive provocative signs
3. Presentation and exam

Test name - Sensitivity/Specificity

- O’Brien’s Test 90% / 98%
- Speed Test 90% / 14%
- Palpation NR / NR
- Crank 80% / 20%
- Kim Test 90% / 97%
3. Non op Tx Results

- Edwards **49% success rate** in 371pts, “all comers”, 3.1 yrs,
- VAS 4.5 to 2.1, ASES 59 to 85, 71% athletes RTS, 66% of overhead athletes same or higher

- Shin, **85% success rate** in 52pts, 25months,
- VAS 5.1 to 1.1, ASES 54 to 90, 70% RTS pre-injury level

- Jang, **71% success rate** in 45 pts, 21m, VAS 4.6 to 1.7, ASES 54 to 86,
- Failure: history of trauma, positive compression-rotation test result, and participation in overhead activities

- Conversely patients with trauma do well with surgery Brockmeier, 2009
4. RCT’s

- https://clinicaltrials.gov/show/NCT00586742
- SLAP Lesions; a Comparison of Conservative and Operative Treatment. A Prospective, Randomized Study, Denmark, enrollment completed

- https://clinicaltrials.gov/ct2/show/NCT02296554
- Superior Labral Tear From Anterior to Posterior (SLAP) Repair Versus Biceps Tenodesis for SLAP Tears in the Shoulder (SLAP), University of Minnesota
5. Comparative Studies

- Boileau, 2009
  - 15pt (52yo) tenodesis, vs 10 pt (37yo) at 35mos
  - Tenodesis vs repair: CS 89 vs 83,
  - Repair: 6/10 dissatisfied with pain and inability to return to sports, only 2/10 RTS
  - Tenodesis: 14/15 satisfied or very satisfied, 87% RTS
  - Complications: 4 repairs underwent tenodesis and full RTS

- Denard 2014, >35yo, 15 Tenodesis (52yo) vs 22 repair (45yo), min 2yr
  - Similar improvement, ASES 90 vs 87, UCLA 33 vs 31
  - Satisfaction: 100% vs 77%
  - ROM: FROM achieved 3 months earlier in tenodesis
  - Complications: 2 SLAP repairs required a secondary capsular release.

- Ek, 2014, 15 tenodesis (47yo) vs 10 repair (31yo) 30+m follow up,
  - ASES 93 vs 94, Satisfaction 93 vs 90, RTS 73 vs 60,
  - 1 failure each, SLAP: 2 cases stiffness treated nonoperatively
5. Comparative Studies

- Non randomized, older patients receiving tenodesis
- Yet outcomes were in general better with tenodesis, less stiffness, easier recovery, better RTS
- Selection bias or virtue of the procedure? Only RCT can answer
6. Surgical outcomes compiled

- **Systematic review**, Wright 2010: G/E 40-94%, RPP 20-94%, Overhead lower RPP, Baseball RTP 22-64%
6. Surgical outcomes compiled

- **Age >40** 81 vs 90% good results, **Workman’s comp** 65% vs 95% (Denard)

- Systematic review Erickson, 2015: corroborates
7. Results in overhead athlete and Pro baseball players

**Overhead**, Neuman 2011, 30 pt, type II SLAP, 24 years, 3.5yr. Baseball/softball (21), Javelin or Tennis (9), ASES 88, KJOC 73.6,

- Subjective: 84% of preinjury function, mean RTP 11.7m
- Baseball/Softball Drop in KJOC
- Satisfaction 93.3%, Majority very satisfied.

**Pro Baseball**: 68 pros,
- 21 pitchers nonop: 40% RTS/22% RPP non op.
- 27 pitchers op: 38% RTP/7% RPP
- 10 position nonop: RTP 39%/RPP 26%
- 10 position op: 85%/RPP 54%

Fedoriw, 2014
8. Tenodesis for Failed SLAP repair

- Provencher 2014:
  - 42 pts, 39yo, 3.5ym RTD/RTS 81%, ASES 68->89, SANE 64->84, FF 135->155, abd 125->155
  - 1 case of transient musculocutaneous nerve neurapraxia.

- Gupta 2013, 9pt, 40yo, 26 months, ASES 55 to 78, SANE 43 to 70,
  - 6/9 labrum healed, 2/9 partially healed, 1 healed but degenerative on 2nd look
  - No failures, complications occurred, additional surgery

- Werner/Brockmeyer
9. Unanswered Questions/future directions

- Which patient should receive primary tenodesis?
- Primary tenodesis in >40, blue collar, workmen’s comp?
- Any role for primary tenodesis in thrower?
- Can we improve RTP/RPP in athletes?
- Concurrent SLAP repair and biceps tenodesis?

- Trends in surgery: declining SLAP repair rates increasing tenotomy/tenodesis (Patterson, Strauss)
MY PREFERENCE

- NONOP first in **ALL**
- SUCCESSFUL NON OP IS AS GOOD AS SUCCESSFUL SURGERY AND BETTER FOR MY CORONARIES
- YOUNG, <30 AND TRAUMA MY FAVORITES
- 1 year for full recovery
- BONE TO LABRUM HEALING
- ANCHOR ANTERIORLY AND POSTERIORLY
THANK YOU