SLAP Tears
How and When…

Nikhil N. Verma, MD
Professor, Department of Orthopedics
Director, Sports Medicine
Rush University Medical Center
Team Physician, Chicago White Sox and Bulls

SLAP Repair Outcome using suture anchor technique

<table>
<thead>
<tr>
<th>Year</th>
<th>Author</th>
<th>LOE</th>
<th># Shoulders</th>
<th>% Improvement</th>
<th>Age</th>
<th>Results</th>
<th>RTP at same level</th>
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<tbody>
<tr>
<td>1998</td>
<td>Morgan</td>
<td>4</td>
<td>402</td>
<td>90% satisfactory</td>
<td>26</td>
<td>90% G/E</td>
<td>87% of the pitchers</td>
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<tr>
<td>2005</td>
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<td>4</td>
<td>34</td>
<td>90% satisfactory</td>
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<td>90% G/E</td>
<td>72% of 18 CH athletes</td>
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<tr>
<td>2005</td>
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<td>4</td>
<td>40</td>
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<td>24</td>
<td>90% G/E</td>
<td>75% of 19bb players</td>
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<td>4</td>
<td>27</td>
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<td>32</td>
<td>90% G/E</td>
<td>77% of 26 participating</td>
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<tr>
<td>2009</td>
<td>Brockmeier</td>
<td>4</td>
<td>47</td>
<td>90% G/E</td>
<td>36</td>
<td>90% G/E</td>
<td>74% of OH athletes</td>
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<tr>
<td>2009</td>
<td>Neri</td>
<td>3</td>
<td>50</td>
<td>&gt;80% G/E</td>
<td>25-40</td>
<td>89% satisfied</td>
<td>53% of 11 bb players, 4/10 tennis/squash players</td>
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<td>2010</td>
<td>Friel</td>
<td>4</td>
<td>48</td>
<td>90% G/E</td>
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2/3 Of Overhead Athletes Return to Sport following SLAP Repair

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SLAP Repair

Outcome of Arthroscopic Repair of Type II SLAP Lesions in Worker’s Compensation Patients
Nikhil N. Verma, MD - Ralph Garabedian, MD - Anthony A. Romeo, MD

21 Patients with Type II SLAP Repair and work related injury

Significant improvement in VAS, SST, SF-36

5/21 (24%) Required Revision Surgery

33% RTW at same Level
47% RTS at Reduced Level
16% Did not return to work
Anatomy
Vasculature & Neuroanatomy

Mistake
Bad biology and hurts without mechanical instability

Anatomy
Labral Sulcus

Type I
30%

Type II
30%

Type III
20%

Type IV
20%


Normal anatomy

No separation

Phaler JSES 2003
What is a SLAP?

Origin of long head biceps

Also means 40% to 60% comes from superior labrum

- 100 shoulders
- 40% to 60% origin from supraglenoid tubercle
- Rest from Labrum

Vangsness, JBJS Br 1994

All posterior Most posterior = ant & posterior Most anterior

Vangsness, JBJS Br 1994
Pain Generator

Normal Variation

- Normal Meniscoid variant of superior labrum
- Sub-Labral Foramen

Sub-Labral Foramen
Beware

BARF

If you want to fix a SLAP order an MRI!!

Richard Hayward, BMJ, 2003

Keys to Recognizing Normal Anatomy

- Fibrocartilage blends with articular cartilage
- Meniscoid Variant at Superior Labrum is common-not to be mistaken for a labral tear
- To distinguish a tear from a variant, look for tissue damage, fibrillation under the labrum, separation from articular cartilage
- Biceps Anchor variations. In most patients the biceps blends with the posterior labrum (Huber 1997, Vangsness 1994)

Incidence of SLAP Lesions

- Snyder 27 of 700 scopes (4%)
- Stetson 140 of 2375 scopes (5.9%)
- Maffet 84 of 712 scopes (11.7%)
- Handelberg 32 of 530 scopes (6%)
Etiology

- Eccentric Overload (Andrews)
- Peel Back (Morgan/Burkhart)
- Weed Pull (Gartsman)
- Kinetic Chain (Kibler)

SLAP types (I-X)

- Snyder
- Type I
- Type II
- Type III
- Type IV

Wait...there's more!

Type II + Labral Pathology

- Type V
- Type VI
- Type VII
- Type VIII
- Type IX
- Type X

- Bankart
- Unstable labral flap
- Extension beneath MGHL
- PBIGHL
- Nord and Ryu
Physical Examination
How reliable is it?

An Evaluation of the Provocative Tests for Superior Labral Anterior Posterior Lesions
Michael Andrew Pennington, MD, Ronald E. DeGeuser, MD, Karen S. Utn, PT, SCS.
and Marcus P. Harper, MD.

"There is no single maneuver that can accurately diagnose a SLAP lesion"

Internal Rotation
External Rotation

Sens: 47% - 100%
Spec: 31% - 98.5%

Clinical Features of the Different Types of SLAP Lesions
An Analysis of One Hundred and Thirty-nine Cases

Tae Kyun Kim, MD, PhD, William S. Queale, MD, MS, MHS, Andrew J. Cosgarea, MD and Edward G. McFarland, MD

- 544 Shoulder Arthroscopies
- 139 SLAP lesions
  - 88% Associated with other lesions
    - 74% Type I
    - 21% Type II
    - 0.7% Type III
    - 4.0% Type IV
  - Type II < 40 years old: Bankart lesions
  - Type II < 40 years old: Impingement, RC, OA
  - No clinical examination specific

So when should we fix ‘em?

Pain
“I just want the pain gone”

Performance
“I can tolerate the pain except when I do my sport, my performance is impaired”
Are We Fixing Too Many?

- Normal SLAP Incidence: 3-5%
- ABOS Part II Over 6 years
  - 9.4% of all shoulder cases (3x incidence)
  - Age 36 (range x -81!)
- We are not doing as well as we think
  - 4.4 % complication rate
  - 74% with persistent pain
  - 40% with "excellent" result

The “Three Questions”

- Who really needs a SLAP fixed?
- What is the role of the biceps?
- How do we manage failure?
Treatment

• Type I, III Debride

• Type II Repair

• Type IV Excise/Tenotomy/Tenodesis

• Types V-X Repair

• GIRD Posterior Capsular Release?

• SG Cyst Decompress or leave

Technical considerations:

• Beach Chair or Lateral Decubitus

• Accessory trans-cuff portal(s)
  • Portal off lateral edge acromion
  • Usually percutaneous

• 1 to 3 anchors
  • Biomech studies conflicting
  • SL or DL

• Trend towards posterior to LHB anchor
  Mattress? Knotless?

Patient Position

• Lateral Position/Lateral
  • Provides hands free lateral traction
  • Facilitates access to inferior and posterior quadrant
  • Positions the surgeon at the head of the table with access to both anterior/posterior shoulder
Labral Debridement

Anchor Insertion

Portal Placement
- Posterior View
- Anterior Working
- Anchor Insertion: Port of Wilmington
Knotless Technique

Outcomes of SLAP repair are Heterogeneous

- No level 1 or 2 studies available
- Good to excellent results: 40 – 95% (wide range)
  - Patient selection is important
- Overhead athletes are hardest to return to activities
  - RTS rates vary from 22 – 64%

Evidence:

Arthroscopy 2010

Baseball Players: RTP = 22% to 64%

Results of Type II SLAP repair: much less predictable in throwing and overhead athletes
Evidence:
CORR 2012
Return to Play After Type II Superior Labral Anterior-Posterior Lesion Repairs in Athletes: A Systematic Review.
Sayde, Cohen, Ciccotti, Dodson

Methods:
Type 2 SLAP Lesions
2 year follow-up
506 Patients, 14 studies
198 Overhead Athletes
81 Baseball Players
Repair:
Anchor: 327
Tacks:    169
Staples:  10

Results:
83% “good-to-excellent”
73% Returned to previous level of play

Outcomes of Type II Superior Labral Anterior Posterior Repairs in Elite Overhead Athletes
Effect of Concomitant Partial-Thickness Rotator Cuff Tears
Brian F. Neer, M.D., Kyle S. Gehrke, M.D., Kevin C. Overlee, M.D.,
Bruce Mahler, P.T., and Lewis J. Younkin, M.D.
Investigation performed at Keene-Judge Orthopaedic Clinic, Los Angeles, California

- Level of Evidence: IV
- 23 Elite Pitchers, mean 38 month F/U
- 57% Returned to their pre-injury level of competition
- Return correlated with partial RCT
- KJOC Score – 9 excellent, 3 good, 4 fair, 7 poor

Military Population
A Prospective Analysis of 179 Type II Superior Labrum Anterior and Posterior Repairs: Outcomes and Factors Associated With Success and Failure
Matthew T. Provencer, Frank Caccavo, Christopher Dowling, Scott McBride and Daniel Sidles
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**Poor Prognostic Factors**

(ASES < 50)

- **Social Factors**
  - Age > 40
  - Alcohol use
  - Tobacco use
  - Heavy lifting at Work

- **Preoperative Tests**
  - Pain in bicipital groove
  - + O’Brien’s Test
  - + Speeds Test
  - + Yergason’s Test

*Risk of revision surgery had a significant association with age less than 20 years and throwing activity.*

**Alternative Treatment Approach**

- Instead of fixing the SLAP tear – treat with a biceps tenodesis
Applicable to the Younger Athlete?

- Biceps Tenodesis Group
  - Average Age: 52 (28-64)
  - 8/15 Overhead Sport
  - 60% Single Event trauma

How Does this Apply to our Athletic Patients?

Upper Extremity Motion In The Overhand Pitch: Repair or Tenodesis?

Postoperative Restoration of Upper Extremity Motion and Neuromuscular Control During the Overhand Pitch: Evaluation of Tenodesis and Repair for Superior Labral Anterior-Posterior Tears


Rush University Medical Center
Chicago, IL

Long head of biceps EMG: No Difference

Altered Thoracic Rotation with SLAP Repair

- 18 SLAP Repair & Tenodesis
- 45 SLAP Repair
- 23 Tenodesis

RTS and Work: No difference
Tenodesis alone lower revision
Combined with more pain!
Complications

- SLAP Repair (30%)
  - Stiffness
  - Chondrolysis/Chondral Injury
- Persistent Pain
- Nerve Injury

Complication Rate \( \rightarrow 0.2\% \) (7/353)

Complications:
- Persistent pain (2)
- Failure of fixation (2)
- Infection (1)
- Musculocutaneous neuropathy (1)
- RSD (1)

Incidence and Return to Play after Biceps Tenodesis in Major League Baseball Players

Peter N. Chalmers, Brandon J. Erickson, Nikhil N. Verma, John D’Angelo, Anthony A. Romeo

Results: Return to Play

- Return to play: 35\% @ 0.8+/−0.5 years
  - Additional labral repair (p=0.620)
    - Isolated tenodesis: 44\%
    - Tenodesis and labral repair: 25\%
  - Position (p=0.028)
    - Position players: 80\%
    - Pitchers: 17\%
  - Prior shoulder surgery (p=0.131)
    - Yes: 13\%
    - No: 56\%
My Treatment Plan…

- Suspected SLAP Tear
- Non-Operative Management
  - Elite / Overhead Athlete
  - Primary Repair
  - Biceps Surgeon
  - Consider Tenodesis
  - Age Over 35:
  - Consider Tenodesis
  - Revision:
  - Tenodesis

Practice Patterns: ABOS

- % of SLAPs repaired decreased from 69% to 45%
- Biceps tenodesis increased from 1.9% to 19%
- SLAP repair with cuff repair decreased from 60% to 15%

Midwest Orthopedics at Rush

Thank You