1) Early history of labral lesions
   a) Doug Jackson—“Labrum may play a role similar to that of the meniscus in the knee” (Point of View, 1984). Lots of hope that debriding labral tears would be as common (and financially rewarding) as menisectomy of the knee.
   b) Andrew’s early study (1) successful debridement of unspecified types of labral tears-1985
   c) Almost immediate controversy as to pathology-Kohn 1987 (39)
      i) Labral fissuring in 76% of cadavers with no known shoulder symptoms
      ii) Pointed out that many were normal variants-suggested that labral lesions were not clinically relevant unless they could displace into the joint

2) Definitively described by Snyder, et. al. (66)
   a) Clarified importance of labral lesions as attachments for biceps and ligaments
   b) Began the recommendation of repair, not debridement
   c) Type 3 and 4 fairly easy to separate pathology from benign
   d) Type 1 and 2 more difficult
   e) Clarified the normal sublabral hole and Buford complex

3) Incidence rates of SLAP repair a growing concern
   a) “SLAP’s are the plica of the shoulder” apocrapally attributed to Frank Jobe
   b) Pascal Boileau SLAP’s are the “American Disease”
   c) Anders Eckland “I haven’t done a SLAP repair in six years”
   d) High incidence of surgical repair in US not supported by European experience

4) Lots of questions since
   a) Is it pathology or plica?
   b) Everyone has seen a plica
   c) Rarely pathology
   d) Often times an incidental finding
   e) There are certainly surgeons that see plicas in everyone
   f) Rates of plica removal are frequently used by insurance companies to flag bad surgeons

5) How do you separate pathology from plicas-needs to be:
   a) Clearly defined mechanism of injury
   b) Clearly definable on clinical exam
   c) Clearly definable on imaging studies
   d) Clearly definable surgically
   e) Clearly get better with surgical treatment

6) How do SLAP lesions hold up to these questions?
   a) Mechanism of injury
      i) Andrews (1) biceps overload
      ii) Snyder compression due to fall on abducted arm (66)
      iii) Jobe’s internal impingement (56), Walch et al. (74)
      iv) Maffett and Gartsman “pull on arm downwards” traction injury (41)
      v) “Peel back” mechanism of Morgan and Burkhart (8)
      vi) No real agreement
b) Clinical examination. A multiplicity of tests, usually with glowing results by the surgeon who initially described the test, usually failing to be validated by subsequent reviewers

i) Snyder biceps tension test and compression-rotation test (65)
   (1) Doesn’t work
      (a) Weber (79)
      (b) Kim and McFarland (34,35)
   ii) Relocation test of Jobe
       (1) Works some
          (a) Weber (79) 70% sensitivity
          (b) Guanche (23) 73% sensitivity
       (2) Doesn’t work
          (a) Mileski and Snyder (46)
   iii) Anterior slide test of Kibler (33)
       (1) Doesn’t work
          (a) McFarland (35)
   iv) Liu’s crank test (40)
       (1) Doesn’t work
          (a) Ottl et al. (53)
          (b) Guanche (23)
          (c) Stenson (70)
   v) O’Brien’s Active Compression test (52)
       (1) Works some
          (a) Guanche (23)
          (b) Morgan (48) anterior lesions only
       (2) Doesn’t work
          (a) Ottl et al. (53)
          (b) McFarland (35)
          (c) Stenson (70)
   vi) Mimori’s pain provocative test (47)
       (1) Only ½ of patients actually arthroscoped
   vii) Bicep’s load test of Kim (37)
   viii) Speed’s and Yergason’s (82) test (Holtby et al. (26))
        (1) variable usefulness
        (2) “Clinicians should understand that clinical examination tests do not perform consistently” (26)
   ix) Final assessment
       (1) Kim and McFarland-“our findings question the diagnostic value of the clinical assessment of SLAP lesions” (35)
       (2) Snyder “there is no physical finding specific for SLAP lesions of the shoulder” (46)

c) Imaging

i) Arthrography and CT arthrography of historic interest
ii) MRI generally found most accurate by radiologists, not surgeons
    (1) In our study only 4 of 99 patients with type II SLAP lesions were accurately diagnosed preoperatively by MRI (79)
iii) Contrast MRI of some improvement
    (1) Ottl et al. (53)
iv) Snyder “diagnostic arthroscopy remains the only definitive way to diagnose SLAP lesions of the shoulder” (46)
v) “Preoperative...MRI was non-specific in identifying SLAP lesions.” Green and Belanger (3)

d) Surgically

i) Normal variants emphasized early

ii) Belanger and Green “in many cases identified SLAP pathology may not be relevant to the clinical problem.” (3)

iii) Type III and IV SLAP very rare, usually clear

iv) Type I SLAP usually normal variant, especially over 40

v) No clear criteria on how to separate normal labral separation from true type II SLAP

vi) Two studies (Gobezie et al. (21) and Jia et al. (27) show that even fellowship trained observers cannot agree on what a SLAP lesion is.

e) Isolated SLAP lesions are extremely rare in most published studies

i) Most studies present to OR with other findings for treatment

ii) Stenson presented outcomes of isolated SLAP lesions (69) with long-term follow-up this year (68) at AANA.

iii) Recently Cohen et al (14) reviewed 41 patients with isolated SLAPS

iv) Every other study repairs SLAP in association with correction of at least one other source of pathology

v) Makes one wonder if treating SLAP was relevant to improvement

7) If you can’t diagnosis it clinically, can’t diagnosis it by imaging studies, can’t agree on the pathology, and can’t prove fixing the lesions helps, how real can it be?

a) SLAP lesions are rare, but real

i) Snyder et al. 3% (66)

ii) Later studies 5.9% (65)

iii) Weber 1.9% (79)

iv) Handelberg et al. 6% (25)

v) McFarland 6.6% (35)

vi) Gartsman (41) 11.8% but more instability

vii) If you’re doing more than 10% SLAPS, you’re doing plicas

b) Avoid operating on normal variants

i) Sublabral holes-first described by Cooper and Arnowsky. (JBJS 1992)

ii) Buford complex presented by Snyder (Arthroscopy 1994)

iii) Labral variants thoroughly reviewed by Ilahi, et al. (Arthroscopy 2002)

1) Wide variation in both ligaments and labrum

2) 18.5% sublabral hole

3) 6.5 % Buford complex

iv) Labral degeneration-rarely the problem in older patients

v) Why not operate?

1) Not a benign procedure-despite painting SLAP repair as a universally successful procedure, this is hardly the case

(a) Cohen et al.14/29 (48.2%) return to sport with tacks (14)

(b) Cohen et al. 31% return to play multiple surgeons for single professional baseball organization (16)

(c) Cohen et al. 84% return to play, but took 12 months (15)

(d) Gorantla et al. review article 20-94% return to play in different published series (22)

(e) Ide et al. 68% return to play (27)

(f) Stetson et al. 74% good or excellent results in a series of pure SLAP lesions (68)

(g) Van Kleunen et al.40% return to play with associated capsular release (73)

(h) Park and Glousman (59) 42% return with revision SLAP repair
(i) Park et al. much higher rate of failure with SLAP repair with PLA anchors (58)

(2) Complications include
(a) Stiffness reported by numerous authors.
(b) Synovitis, cysts, and arthritis reported with bio implants (13,58)
(c) Arthritis from prominent metal hardware
(d) Two studies Cohen et al. (14) and Mair and Hurt (42) noted significant problems with trans-rotator cuff portals for SLAP repairs, primarily rotator cuff tears. This risk will increase with older patients.

c) Most SLAP I and II lesions in patients greater than 40 years of age are normal variants
   i) Goes back as far as DePalma classic study (AAOS Inst Course Lectures 1949)
      (1) Fetal labrum universally fixed
      (2) By second decade detachment and further degenerative changes were noted
   ii) Pfahler et al. (JSES 2003) noted that age related changes were common, and that these changes “should be evaluated in the context of age related changes in normal shoulders.”

d) SLAP III and IV are easy to diagnose

e) SLAP II remain a problem
   i) Meniscoid labrum a problem both on imaging studies and surgically
   ii) We suggested criteria of exposed bone or granulation tissue as diagnostic of pathology (79), also supported by Snyder (46). He also suggested displacement of more than 3-4 mm with traction on the biceps.
   iii) “Sulcus score” of Mihata and Tibone et al. (45) measures both length of labral detachment and depth to get a sulcus score. Higher scores were created with mechanical stretching in external rotation and abduction in cadavers.
   iv) Beware the SLAP repair in patients with poor quality biceps, especially over the age of 40. Generally better treated with tenotomy than repair. Significant number of redo SLAP’s in our AANA and AOSSM presentation (76,77) had varying degrees of partial biceps ruptures. Presented again by Bicknell and Boileau (4) and yet again by Katz et al. (31). All patients with poor quality biceps and many patients older than 40 are better managed with tenodesis than SLAP repair. Franceschi et al. noted better results with RCR and tenotomy than with RCR and SLAP repair (19).
   v) Burns and Snyder et al. (10) excellent summary from the experts. Recommend tenodesis age>40, and any patient with “significant concomitant surgical pathology... we prefer to focus on the major surgical pathology and debride labral tearing down to a stable base”.

(10)

8) How are we doing? Weber et al. (80) review of ABOS Part II applicants experience with SLAP lesions.
   a) There were 4,975 SLAP repairs, representing 9.4% of all applicants shoulder cases. This is three times what the literature would support
   b) The rate of repair increased over the study period to 10.1% by 2008.
   c) Mean age of male patients was 36.4 years with a maximum of 85 years of age. Mean age of female patients was 40.9 with a maximum of 88 years of age.
   d) Pain was reported as absent in only 26.3% of patients at follow-up, and function as normal in only 13.1%. 40.1% of applicants self-reported their patients to have an excellent result. The self-reported complication rate was 4.4%.
   e) Procedure done far too often, and without respect for age of patients

9) Other recent articles:
   a) Cook et al. Diagnostic accuracy of five orthopedic clinical tests for diagnosis of superior labrum anterior posterior (SLAP) lesions JSES 2012.
      1) Five clinical tests evaluated
2) Clinical examination not useful
3) “No clusters (of tests) represented better diagnostic accuracy” than any stand alone test.
4) Shows again that clinical examination not helpful.
   i) Showed an average annual rate of increase of 21% from 2002 to 2009
   ii) 0.31 to 1.88 per 1000 person/years
   iii) No explanation offered
b) Onyekquelu et al. JSES 2012
   i) SLAP repair rate increase 464% from 2002 to 2010.
   ii) Age of patients also significantly increased. As with our study, multiple patients over 80 years of age
   iii) 4/100,000 to 22/100,000 incidence rate
   iv) Increase in part due to “financial motivations”
a) Schroder et al. Long-Term Results After SLAP Repair: A 5-Year Follow-up Study of 107 Patients With Comparison of Patients Aged Over and Under 40 Years. J Arth 2012
   i) 13% stiff
   ii) Only 2/5 European handball players returned

2) Summary
a) SLAP lesions are rare injuries. Unless you do a high percentage of throwing athletes, it will be a small part of your shoulder practice. Reassess your indications if you do more than 10% SLAP repairs.
b) Clinical and radiographic factors will not allow you to routinely predict these patients
c) SLAP over 40 and/or with significant concomitant pathology is best managed with tenodesis/tenotomy
d) Counsel your patients; success rates are only from 20-75% and return to sport not guaranteed.
e) Casual SLAP repair to be avoided.
f) MRI report of SLAP lesion not an indication for surgery.

References


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