

Increased Awareness of the Variability of Glenoid Labral Tear Patterns

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INTRODUCTION

The glenohumeral joint is a minimally constrained joint with a tremendous range of motion. Stability is gained primarily through a group of ligaments within the glenohumeral joint capsule which connect the proximal humerus to the glenoid through the labrum [1]. Damage to this system of ligaments in the glenohumeral joint can lead to instability either through stretching of the ligaments or tearing of their insertions to the glenoid by detachment of the labrum. Instability of the glenohumeral joint varies both in degree and direction depending on the location and severity of the lesion causing it. Instability often presents with distinct patterns of functional and positional limitations and may include a sensation of impending dislocation, loss of strength and control or pain. For many years, anterior stability was thought to encompass 90% of the identified cases with only 10% of patients identified as presenting with some form of posterior instability [2].

As arthroscopy has become the standard in treatment of shoulder problems including glenohumeral joint instability, the ability of surgeons to accurately identify labral pathology has improved. With this new tool, surgeons have observed a wider variety in the labral tear patterns associated with instability. It is now obvious that posterior stability constitutes much more than 10% of cases. Superior labral tears were first identified in 1985 by Dr. Andrews [3]. The original classification of SLAP tears (Superior Labral Anterior to Posterior) by Snyder of 4 types has been expanded over the years to include over 12 patterns of tears whose only commonality is the fact that the superior labrum constitutes a portion of the tear. This occurred as surgeons began identifying a much greater spectrum of labral pathology than was previously appreciated.

In the sporting population, posterior stability has been identified in football lineman due to repetitive jarring in the flexed adductor positions of the arm. This pathology has only recently been identified in throwing athletes and batters in baseball. Although multiple series have previously documented the effectiveness of arthroscopic posterior labral repair in football lineman, the results in the throwing athlete have only recently been reported [4].

Our observations over the last 10 years have been similar to those of other surgeons and include an identification of a wider variety of labral tears than previously described including a higher percentage of not only posterior pathology but more extensive tears of the labrum [5].

Spurred on by the discrepancy we noted between published literature and our own experience, we decided to retrospectively review our arthroscopic instability cases which were performed between 2012 and 2019. These were all the cases performed by 2 fellowship trained shoulder surgeons and included a total of 280 patients [6]. This did not include patients treated non-operatively and therefore cannot claim to be representative of all symptomatic tear patterns, but it is a good representation of the types of tears that do not respond to a course of conservative management. Tears were classified into 10 categories based on the intraoperative description of tear location and size in degrees of the labral ring involved. We aggregated these 10 categories into 3 groupings: Tears exclusively anterior to the midline of the glenoid, exclusively posterior, and those crossing the midline from anterior to posterior on the glenoid. We chose these groupings to compare our results with the literature which stated that only 10% of labral tears involve the posterior labrum. We also evaluated the chief complaint, mechanism of injury, hand dominance, and preoperative MRI interpretation by both the surgeon and the radiologist [7].

RESULTS

Approximately 81 % of patients were male in 19% were female and just over 60% of injuries occurred in the dominant shoulder. 60% of tears were traumatic with dislocation being the largest traumatic mechanism in over 30%. The single largest mechanism of injury however was repetitive stress in approximately 34% of patients. Primary complaint by patients varied based on the labral tear location. Patients with anterior labral tears complained of instability in over 62% of cases and of isolated pain in only approximately 22% of cases. This differs significantly from patients with posterior labral tears who complained primarily of pain in 68% of cases and instability and only 21% [8].

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We identified 10 distinct tear patterns: 3 types of 90-degree tears, 4 types of 180-degree tears, 2 types of 270-degree tears, and 360-degree labral tears. (Table 1) Of the 280 tears identified, 134 tears (47.9%) were classified as exclusively posterior and did not cross the midline. 72 tears (25.7%) were exclusively anterior. 74 tears (26.4%) were combined anterior posterior tears crossing the midline of the glenoid. Labral tears involving some portion of the posterior labrum therefore constituted 74% of the patients we evaluated. This was much higher than the reported 10% of cases in the literature. Isolated Bankart lesions which are most commonly associated with anterior shoulder dislocations made up only 17% (48 cases) of labral tears identified. However, 115 labral tears involved the anterior inferior labrum indicating that in most cases Bankart lesions are not isolated to the anteroinferior labrum [9].

Table 1: Labral tear patterns identified intraoperatively.

Tear Pattern	Frequency	Percent
SLAP	23	8.21
90° Anteroinferior	48	17.14
90° Posteroinferior	45	16.07
90° Poster superior	45	16.07
180° anterior	24	8.53
180° inferior	22	7.86
180° posterior	44	15.71
270° Anteroinferior	3	1.07
270° Anterosuperior	8	2.86
360°	18	6.43

Note: SLAP = superior labrum anterior and posterior.

The accuracy of MRI and MR arthrograms in these patients was relatively poor. Accurate assessment of the tear pattern occurred in 49% of tears for the surgeon as compared to 39% for the radiologist and approximately 50% of tears were under called by both the radiologist and surgeon. The actual tear at the time of surgery was larger than what was identified on preoperative scans in most cases.

The major findings of this study indicate that the prevalence of posterior labral tears and posterior instability is much higher than previously reported. Reasons for under appreciation of this pathology are many. Patients present very often after repetitive stress without a single identifiable traumatic event and most often complain of pain and not of a sensation of instability. Both MRI and MRA have only a fair accuracy in the diagnosis of these lesions. Previously, open surgery did not allow adequate visualization of the posterior labrum. Even now if the surgeon is not cautious and the scope is placed centrally in the glenoid from a posterior portal, pathology of the posterior labrum is not well appreciated.

As this was a retrospective study, our physical examination maneuvers evolved during the course of this patient series. Therefore, the accuracy of our physical examination in making this diagnosis cannot be determined. Kibler has demonstrated that the dynamic posterior shear test is the most accurate for this problem. In this test, the arm is placed in the abducted/externally rotated position with the tester behind the seated patient. The arm is forced into an extended position and lowered from 120 degrees to 80 degrees. A sharp pain in the posterior joint line indicates a possible posterior labral tear. We now typically perform this test along with the High Whipple test in which the patient's arm is placed diagonally cross body at a 45-degree angle pointing to the ceiling with the thumb in a downward position and the patient is asked to resist a downward directed force. With posterior stability this often duplicates symptoms felt by the patient.

Another important finding in this study was the fact that isolated Bankart tears that involved the anteroinferior 90 degrees of the labrum most commonly were associated with a more extensive labral tear either inferiorly or superiorly. The failure rate of isolated Bankart repair is relatively high reaching up to 35% in reported series. There are many reasons for these failures including bony deficiencies, but one reason may be the under appreciation of these more extensive labral tears. Inadequate treatment by repair of the isolated labral Bankart lesion without addressing the more extensive part of the labral tear may be one cause for failure in this patient group. This is speculation and cannot be proven based on the data from our study.

The current classification system for labral tears is woefully inadequate. The early classification of superior labral tears made sense as these were isolated to varying patterns of tears of the superior labrum. As surgeons realized that the spectrum of tears is much wider than originally realized, the superior labral classification was expanded to include a huge variety of tears that include the superior labrum. A shortcoming of a classification such this is that it does not guide the surgeon in terms of management. Patients with these tear patterns present differently, and appropriate treatments vary widely. The emphasis of surgical treatment in these cases must be to obtain a balanced repair that adequately addresses the identified pathology. This begins with understanding the pattern of instability through the patient's complaints and examination and then visualizing the entire extent of the tear at the time of surgery. As the saying goes, posterior instability has been seeing us a lot longer than we have been seeing it. A realization by surgeons of the frequency of these tear patterns will encourage greater scrutiny at the time of patient examination and at arthroscopy and hopefully lead to more effective treatment of these patients.

DISCUSSION

The treatment of posterior labral tears has been extensively studied in the recent literature. These lesions were originally identified, primarily in football lineman sustaining axial load injuries with the arm in the forward flexed position. Bradley demonstrated excellent results with arthroscopic operative

repair. It has only been recently that these lesions have been identified in throwing athletes and that batter's subluxation has been identified as a cause of pain in the lead shoulder in batters and golfers. Some limited success has been obtained with conservative treatment in this patient group. Recent studies on the operative management of these lesions have also demonstrated excellent results. A prior study of ours looking at 32 baseball players undergoing posterior labral repair demonstrated 94% return to play with 61% return to previous level of play. The return to previous level of play was higher in position players than pitchers (86% vs 41%). Even within this group of patients with posterior labral tears, a significant variation of tear patterns was identified including posterior superior 90-degree tears, posterior inferior 90-degree tears and 180-degree posterior tears. Although the study was not powered enough to differentiate between the results of surgery between these 3 types of tears, a trend towards worse results were noted in patients with posterior superior 90-degree tears. Results in this group mirrored those seen in patients with Type II SLAP tears reported previously in the literature.

CONCLUSION

In summary, posterior labral pathology and posterior instability is much more common than was originally appreciated. An appreciation of the fact that these patients often complain more of pain than instability can alert the clinician of this potential diagnosis. Thorough clinical and arthroscopic examinations are necessary to identify these patients. A physical therapy program focusing on scapular stabilization, posterior strengthening and proprioceptive and plyometric training can successfully manage some of these cases. Operative treatment of posterior labral repairs has been successful in both football and overhead throwing sports.

REFERENCES

1. Acakpo A, Fayomi B, Djrolo F, Kolanowski J, Agueh V, Makoutode M. Prevalence and study of the determining factors of obesity in Cotonou. *Louv Med*. 2000; 119:276-281.
2. Kaila B, Raman M. Obesity: A review of pathogenesis and management strategies. *Can J Gastroenterol*. 2008; 22(1):61-68.
3. Musso S. Physical activity and bariatric surgery: Synthesis of studies. *Diabetes & Obes*. 2013; 8(72):2-4.
4. Ghroubi S, Elleuch H, Chikh T, Kaffel N, Abid M, Elleuch MH. Physical training combined with dietary measures in the treatment of adult obesity: A comparison of two protocols. *Ann Readapt Med Phys*. 2009; 52(5):394-413.
5. Smida Y, Ghroubi S, Yahia A, Elleuch MH. Contribution of isokinetic muscle strengthening in obese adults. *Ann Readapt Med Phys*. 2011; 54(1):26.
6. Ghroubi S, Kossemntini W, Mahersi S, Elleuch W, Elleuch MH. Contribution of isokinetic muscle strengthening in the rehabilitation of obese subjects. *Ann Phys Rehabil Med*. 2016; 59(2):87-93.
7. Djrolo F, Gbary A, Akoha ER, Djigbenoude O, Segnon J, Houinato D. Prevalence of obesity and overweight in adult population in Cotonou. *Ann Endocrinol*. 2012;73(4):424.
8. Gaillard S, Barthassat V, Pataky Z, Golay A. A new therapeutic education program for obese patients. *Rev Med Switzerland*. 2011; 7:695-699.
9. Dansou P, Kotin LM, Laleye A, Lawani M, Darboux R. Effects of physical exercises on the adipose cellularity of obese premenopausal women. French-language study and research notebooks. *Health*. 2004; 14(3):183-186.
10. Baillot A, Vibarel-Rebot N, Lecoq AM, Chadenas D. The six-minute walk test in obese women: reproducibility, relative intensity and relationship to quality of life. *Sci Sports*. 2008; 24(1):1-8.