The superior labrum and biceps anchor improve joint stability by acting as a secondary stabilizer to the shoulder. Injury to this complex often involves tears of the superior aspect of the glenoid labrum in overhead throwing athletes.

Overhead athletes may be at increased risk of anterosuperior labral tearing due to the excessive forces imparted by the biceps tendon, particularly during the followthrough phase of throwing. These superior labral tears were later classified into 4 distinct subtypes that comprise today’s commonly utilized classification scheme (Figure 1). Common to each subtype is the anterior to posterior involvement of the superior labrum, giving rise to the universally accepted term, superior labral anterior-posterior (SLAP) tears.

Recently, SLAP tears have been recognized as a significant cause of shoulder pain and disability. These lesions often affect the athlete participating in overhead sports (eg, baseball, tennis, volleyball). More recently, the active-duty military population has been identified as another at-risk population for SLAP tears given the greater incidence of these injuries compared with civilians. The high physical demands of active military
personnel require daily push-ups, pull-ups, lifting of heavy deployment items, and combat readiness drills that leave this population prone to shoulder injuries.

A comparison of the incidence of SLAP lesions between the military and civilian populations demonstrated a significantly greater rate of these injuries among military patients: 38.6% versus 11.1%, respectively. This increased injury risk, coupled with the need for a reliable and predictable outcome in a very high-demand patient population, has led to an increasing number of patients being treated surgically. This review focuses on the management and outcomes of these lesions in the active military population compared with the civilian population.

Members of the Armed Forces represent a unique patient population that necessitates a thorough understanding of the injury to optimize their safe return to active duty.
MANAGEMENT

Prior to management, proper diagnosis and evaluation of the SLAP tear via magnetic resonance arthrography is absolutely necessary (Figure 2). Although recent reports have noted increasing incidence of surgically treated SLAP tears, it is still common for nonoperative treatment to be considered prior to any surgical intervention. The goals of nonoperative treatment are improvement in shoulder range of motion through posterior capsular flexibility and strengthening of the rotator cuff and scapular stabilizing musculature.

Reports on the success of nonoperative treatment typically involve overhead throwing athletes or recreational athletes exposed to repetitive overhead activities. No previous reports look at the outcomes of nonoperative treatment in active military personnel. Although chronic injuries caused by tight posterior capsules may occur, the workload undertaken by active military personnel results in risk of an acute traction injury leading to a SLAP tear. In this instance, it is crucial to understand the pathoanatomy of the lesion and interpret the success of posterior capsular stretching with caution due to potential lack of applicability in active military personnel.

OUTCOMES

Recent outcomes studies of surgical repair of SLAP tears have shown significant improvements in validated outcomes scores among nonmilitary patients. Ide et al reported 90% good to excellent results in overhead athletes, and Samani et al demonstrated good results in 25 athletes. Friel et al reported 89% patient satisfaction after arthroscopic SLAP repair. Factors that have been associated with poor outcomes in the civilian population have also been identified, and include age, workers’ compensation cases, concomitant rotator cuff repair, and status of throwing athlete. Pain and stiffness are the 2 most common complaints after failure of an arthroscopic SLAP repair.

The unique high-physical demand lifestyle of a military population puts these individuals at increased risk of sustaining SLAP tears. Unfortunately, there are limited and conflicting studies that look at outcomes of surgical treatment in this population. Enad et al specifically looked at 27 SLAP repairs in a military population and found that 96% of patients were back to full duty at final follow-up and 87% of patients with isolated SLAP tears had good to excellent results.

In contrast to these findings, Provencher et al looked at a larger series of 179 active military personnel who underwent surgical repair of type II SLAP tears. Although it was demonstrated that arthroscopic SLAP repairs provide statistically significant improvements in treatment outcomes, they reported a surprisingly high failure rate of 37% and a revision rate of 28%. Younger patients (<36 years) were found to have higher outcome scores and greater levels of function throughout the follow-up period. A total of 77% of failures in this cohort were younger than 36 years, thus leading to their conclusion that active military personnel younger than 36 years were more likely to benefit from arthroscopic SLAP repair than those older than 36 years.

These findings are consistent with those of Boileau et al, who suggested that biceps tenodesis in the older throwing athlete yielded superior results compared with repair of type II SLAP lesions when they reported an 87% return to play after tenodesis compared with 20% return to play after repair. Although an active military population differs from overhead athletes, the dependence on a reliable, painless arc of shoulder motion accompanied by prolonged, extreme mechanical forces across the glenohumeral joint is equally crucial in each. This similarity allows for comparisons regarding surgical outcomes in these 2 high-demand patient populations. Although more high-powered studies are necessary, the combined analyses of Boileau et al and Provencher et al suggest that active military personnel younger than 36 years would most benefit from an arthroscopic repair, while those older than 36 years benefit most from tenodesis. These recommendations are supported by Ek et al, who reported comparable results between civilian patients undergoing SLAP repair (age <35 years) and those undergoing biceps tenodesis (age >35 years).

SUMMARY

The high-demand lifestyle of the active military population places these patients at increased risk of superior labral tears. As SLAP tears are known to cause significant pain and dysfunction, it is imperative to know how to best advise these patients regarding their management options and likelihood of returning to active duty. Given that the biceps anchor may act as a secondary stabilizer of the shoulder, surgical repair of these lesions, especially in young patients (<36 years), is supported. Further work is necessary to determine the optimal treatment of older members of the armed forces with SLAP lesions.
Clinical Recommendations

SORT: Strength of Recommendation Taxonomy Grade

A: consistent, good-quality patient-oriented evidence
B: inconsistent or limited-quality patient-oriented evidence
C: consensus, disease-oriented evidence, usual practice, expert opinion, or case series

| Clinical Recommendation                                                                 | SORT Evidence Rating |
|----------------------------------------------------------------------------------------|---------------------|
| Surgical management for the treatment of SLAP tears in an active military population has been reliably shown to significantly improve functional outcome scores. | A                   |
| Surgical fixation of SLAP tears in an active military population is associated with a high failure rate. | B                   |
| Active military personnel younger than 36 years of age with SLAP tears are best treated with SLAP repairs. | A                   |
| Active military personnel older than 36 years of age with SLAP tears may be best managed with a biceps tenodesis. | B                   |

REFERENCES

1. Abbot AE, Li X, Busconi BD. Arthroscopic treatment of concomitant superior labral anterior posterior (SLAP) lesions and rotator cuff tears in patients over the age of 45 years. Am J Sports Med. 2009;37:1358-1362.
2. Andrews JR, Carson WG Jr, McLeod WD. Glenoid labrum tears related to the long head of the biceps. Am J Sports Med. 1985;13:557-561.
3. Boileau P, Parratte S, Charron C, Roussanne Y, Siau D, Bicknell R. Arthroscopic treatment of isolated type II SLAP lesions: biceps tenodesis as an alternative to reinsertion. Am J Sports Med. 2009;37:929-936.
4. Denard PJ, Ladermann A, Burkhart SS. Long-term outcome after arthroscopic repair of type II SLAP lesions: results according to age and workers’ compensation status. Arthroscopy. 2012;28:451-457.
5. Ek ET, Shi LL, Toropson JD, Freehill MT, Warner JJ. Surgical treatment of isolated type II superior labrum anterior-posterior (SLAP) lesions: repair versus biceps tenodesis. J Shoulder Elbow Surg. 2014;23:1059-1065.
6. Etud JG, Gaines RJ, White SM, Kurtz CA. Arthroscopic superior labrum anterior-posterior repair in military patients. J Shoulder Elbow Surg. 2007;16:508-505.
7. Franceschi F, Longo LG, Ruzzini L, Rizzello G, Maffulli N, Denaro V. No advantages in repairing a type II superior labrum anterior and posterior (SLAP) lesion when associated with rotator cuff repair in patients over age 50: a randomized controlled trial. Am J Sports Med. 2008;36:247-253.
8. Friel NA, Karas V, Slabaugh MA, Cole BJ. Outcomes of type II superior labrum, anterior to posterior (SLAP) repair: prospective evaluation at a minimum two-year follow-up. J Shoulder Elbow Surg. 2010;19:859-867.
9. Ide J, Maeda S, Takagi K. Sports activity after arthroscopic superior labral repair using suture anchors in overhead-throwing athletes. J Sports Med. 2005;35:507-514.
10. Kampa RJ, Clasper J. Incidence of SLAP lesions in a military population. J R Army Med Corps. 2005;151:171-175.
11. Katz LM, Hsu S, Miller SL, et al. Poor outcomes after SLAP repair: descriptive analysis and prognosis. Arthroscopy. 2009;25:849-855.
12. Keener JD, Brophy RH. Superior labral tears of the shoulder: pathogenesis, evaluation and treatment. J Am Acad Orthop Surg. 2009;17:627-637.
13. Kim SH, Hu KJ, Kim SH, Choi HJ. Results of arthroscopic treatment of superior labral lesions. J Bone Joint Surg Am. 2002;84-A:981-985.
14. Patterson BM, Creighton RA, Spang JT, Roberson JR, Kamath GV. Surgical trends in the treatment of superior labrum anterior and posterior lesions of the shoulder: analysis of data from the American Board of Orthopaedic Surgery certification examination database. Am J Sports Med. 2014;42:1904-1910.
15. Provencher MT, McCormick F, Dewing C, McIntire S, Solomon D. A prospective analysis of 179 type 2 superior labrum anterior and posterior repairs: outcomes and factors associated with success and failure. Am J Sports Med. 2015;43:880-886.
16. Rodosky MW, Harner CD, Fu FH. The role of the long head of the biceps muscle and superior glenoid labrum in anterior stability of the shoulder. Am J Sports Med. 1994;22:121-130.
17. Samani JE, Marston SB, Buss DD. Arthroscopic stabilization of type II SLAP lesions using an absorbable tack. Arthroscopy. 2003;19:19-24.
18. Strauss EJ, Salata MJ, Sjerson RA, et al. Role of the superior labrum after biceps tenodesis in glenohumeral stability. J Shoulder Elbow Surg. 2014;23:485-491.
19. Weber SC, Martin DF, Seiler JG 3rd, Harrast JJ. Superior labrum anterior and posterior lesions of the shoulder: incidence rates, complications, and outcomes as reported by American Board of Orthopedic Surgery Part II candidates. Am J Sports Med. 2012;40:1538-1543.

For reprints and permission queries, please visit SAGE’s Web site at http://www.sagepub.com/journalsPermissions.nav.