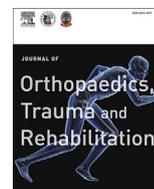




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Original Article

Slap Lesions in Middle-aged Patients: Biceps Repair or Tenodesis? What Should We Perform for Long Biceps Tendon?

盂唇前後延伸撕裂(SLAP)的中年患者：選擇二頭肌修復或肌腱固定術？ 我們應該對二頭肌長肌腱(long biceps tendon)作什麼手術？



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ABSTRACT

Background/Purpose: Superior labrum anterior and posterior (SLAP) lesion repair poses a significant discussion due to its high failure rate. The purpose of this study was to determine in which indications it is better to perform a tenodesis than a straight anatomical repair. The hypothesis was that in middle-aged patients and in those who did not suffer from a traumatic lesion, it is better to perform a long biceps tendon (LBT) tenodesis than a straight anatomical repair.

Methods: A total of 22 patients between the ages of 19 years and 55 years who underwent SLAP lesion repair between 2007 and 2011 were reviewed. The cases were divided into the following two groups: those with an isolated SLAP lesion (15 patients) and those with both a SLAP and a Bankart lesion (7 patients). This was a level IV longitudinal and retrospective study.

Results: Eight patients had persistent postoperative pain, which required to be revised from an anatomical repair to an LBT tenodesis. All of these patients were in the isolated SLAP lesion group. The average time between primary surgery and revision was 21.6 months. Patients over the age of 45 years had significantly poorer results after the repair.

Conclusion: Biceps tenodesis is a feasible therapeutic alternative to anatomical repair for the treatment of SLAP lesions in middle-aged patients; the reinsertion failure rates for this type of lesion are rather discouraging due to the high percentage of revision surgeries that must be carried out after the primary intervention.

中文摘要

背景：盂唇前後延伸撕裂(SLAP)在文獻上有很多討論，原因是修復的失敗率很高。本研究的目的，是要確定什麼適應症進行肌腱固定比直接解剖修復更好。我們的假說是，在中年和沒有創傷的患者，進行二頭肌長肌腱(LBT)的肌腱固定比直接解剖修復更好。

方法：我們回顧了2007年至2011年間，22例盂唇前後延伸撕裂的患者，年齡在19至55歲。患者被分為2組：只有盂唇前後延伸撕裂(15例)和同時患有盂唇前後延伸撕裂和班卡氏盂唇損傷(Bankart lesion)(7例)。

結果：8例因為術後持續疼痛，需要由解剖修復翻修為LBT肌腱固定。所有這些患者都是屬於只有盂唇前後延伸撕裂的組別。初次手術和二次手術之間的平均時間為21.6個月。年齡大過45歲的患者接受解剖修復後的成效明顯較差。

結論：二頭肌長肌腱固定術是除了解剖修復以外，在中年患者身上一種可以用來治療盂唇前後延伸撕裂的方法。在這個組別進行解剖修復，在初次手術後需要翻修的比率很高。

證據等級：四級縱向和回顧性研究。

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Introduction

Superior glenoid labral lesions were first described by Andrews et al¹ in athletes who participated in overhead-throwing sports. Later, Snyder et al² classified these labral ruptures with the acronym superior labrum anterior and posterior (SLAP) lesions. These ruptures are thought to be caused by a direct compression force to the labrum between the superior glenoid and the tubercle from an acute traumatic episode or due to repetitive trauma such as is the case with athletes who participate in overhead-throwing sports or people with overhead works. These types of lesions can also be the result of traction to the arm where the mechanism of injury is eccentric contraction of the biceps.^{1–3} Their prevalence varies depending on the patient population studied but has been reported to be between 1.2% and 23%. Other than a distinct traumatic event, sporting activities are the most common cause of SLAP lesions.^{4–8} Associated symptoms can be nonspecific, can mimic other intra-articular injuries, and can be debilitating in younger, active patients.⁹ Nonoperative treatment for type II SLAP lesions commonly fails^{6,10} and operative treatment is often indicated, especially in young, athletic patients.¹¹

Type II is usually the most common type of SLAP lesion and is described as a detachment of the superior glenoid labrum that affects the attachment of the long biceps tendon (LBT).² Frequently, SLAP lesions are also seen in conjunction with other shoulder injuries such as partial rotator cuff tears (partial articular supraspinatus tendon avulsion lesions), glenohumeral instability, or subacromial impingement, among others. Nevertheless, these lesions are also seen on their own. Initially, these lesions were treated with arthroscopic debridement and although an initial improvement was seen in these patients, the long-term results were poor.^{12,13} Currently, direct repair of these lesions is being carried out using different types of stabilization techniques. However, the functional results and patient satisfaction with these treatments are varied and range anywhere from 50% to 97%.^{8,9,14–18} Biceps tenodesis is recommended as the primary alternative in treating these types of lesions, whether they are intra-articular or located in the bicipital groove (not in the labrum), and this treatment has shown very good results.¹⁴

The purpose of this study was to determine in which indications it is better to perform a tenodesis than a straight anatomical repair. The hypothesis was that in middle-aged patients and in those who did not suffer from a traumatic lesion, it is better to perform an LBT tenodesis than a straight anatomical repair.

Patients and methods

Study design

This was a longitudinal and retrospective study that looked at anatomical repair surgeries of SLAP lesions that were carried out between January 2007 and June 2011. There were a total of 22 patients included in the study, 18 of which were men (81%) and four of which were women (18%), with average age of 35.9 years ranging from 19 years to 55 years. The cause of all the lesions was a distinct traumatic event (accidental fall, sports-related accident, or traffic accident). The inclusion criteria were pain in the shoulder during daily activities or while doing sport; no response after 6 months of conservative treatment, which included modifications in posture, anti-inflammatory medication, and a specific rehabilitation protocol; and arthroscopic confirmation of an SLAP lesion. Institutional Review Board or Ethical Committee approval related to the study was not applicable, as this was a retrospective study.

The patients were divided into two groups, namely, Group A and Group B. Patients who had an isolated SLAP lesion were classified in

Group A (15 patients) and patients who had associated lesions, which consisted of an SLAP lesion coupled with a Bankart lesion, were classified in Group B (7 patients). Other associated pathologies were excluded.

The study took into account the period between the primary surgery and the revision surgery, the pathology that was found at the moment the surgical intervention was carried out, and the tenodesis technique that was performed. For the statistical analysis, the Pearson Chi-square test was used for nonparametric variables.

Surgical technique

SLAP repair

Arthroscopic surgery was performed with the patient placed in the lateral decubitus position. All patients received general anaesthesia with a local interscalene block. After administration of standard preoperative antibiotics, the extremity was prepared and draped in sterile fashion. A posterior viewing portal was placed 2 cm inferior to the posterolateral corner of the acromion and a standard anterior portal was placed under direct visualization (anteriorly and 1 cm lateral to the coracoid), with the cannula inserted just inferior to the biceps. Standard diagnostic arthroscopy included evaluation of the entire glenoid labrum, biceps tendon, articular surface of the glenoid and humeral head, glenohumeral ligaments, subscapularis tendon, and rotator cuff. A SLAP lesion was diagnosed intraoperatively if the superior aspect of the labrum posterior to the biceps attachment was detached from the labrum. When a type II SLAP lesion was found, a lateral portal was made under direct visualization just posterior to the biceps tendon at the anterior margin of the supraspinatus in the rotator interval. The superior glenoid was abraded down to a gently bleeding bony bed posterior to the biceps anchor footprint with a 4.0-mm shaver (Figure 1).

Two single-loaded 3.5-mm TWINFIX Ti suture anchors (Smith & Nephew Endoscopy, Inc, Andover, MA, USA) were placed anterior and posterior to the biceps footprint, approximately 5–7 mm apart with the knot at the opposite side of glenoid cartilage. After completion of the repair, portal incisions were closed with a simple inverted interrupted suture and a sterile dressing was applied.

The rehabilitation protocol involved using a shoulder sling for the first 2 weeks, removing the arm solely for pendulum exercises and personal hygiene. Discontinuation of the sling occurred at 2 weeks, with the initiation of passive and active assisted exercises at 4–6 weeks. At 2–3 months, a strengthening program was

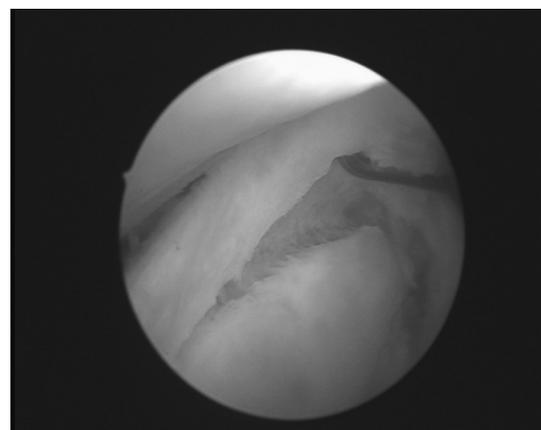


Figure 1. The superior glenoid was abraded down to a gently bleeding bony bed posterior to the biceps anchor footprint.

initiated, with return to throwing and sports-related activities starting no earlier than 4 months.

Tenodesis technique

The arthroscopic biceps tenodesis was performed according to the technique described by Boileau et al¹⁴ using interference screw fixation. After biceps tenotomy, the tendon was exteriorized and doubled on a suture; the biceps tendon was then pulled into a humeral socket drilled at the top of the bicipital groove and fixed using a bioabsorbable interference screw (BioRCI S&N) (Smith & Nephew Endoscopy, Andover, MA, USA) under arthroscopic control (Figure 2). We used the interference screw fixation technique in the bicipital groove because it is more rigid than the suture anchor technique. Furthermore, the healing of the tendon is better in the cancellous bone of the tunnel, than in the cortical bone of the suture anchor technique.

Results

In the multiple lesion group, the seven patients presented a type II SLAP lesion with an associated Bankart lesion. All of these patients had a good postoperative evaluation and surgical revision was not necessary. Furthermore, they were all able to resume normal daily activities without experiencing any further luxations.

Of the 15 patients who were included in the isolated lesion group (14 type II SLAP lesions and 1 type IV SLAP lesion), seven of the patients had a good evolution and did not require revision surgery (Constant Scale score > 80 points). Nevertheless, eight of the patients had poor results with persistent pain over 1 year after the primary surgery with no response to specific rehabilitation treatment (Constant Scale score < 50 points). As a result, a follow-up surgery was required and revision tenodesis was carried out. These eight patients represented 53.3% of the total number of patients in this group who experienced recurrence of pain. When comparing the two groups significant differences were found ($p = 0.023$). The average time between the primary intervention and the revision surgery was 21.6 months (range, 13–29 months). No statistically significant differences were found when comparing the sex of the patients ($p = 0.562$).

When analysing age and recurrence rates, there were differences with respect to the age at which the complications presented themselves, with the oldest patients in the study showing a worse evolution and requiring tenodesis revision, although these differences were not statistically significant ($p = 0.137$).



Figure 2. Biceps tenodesis at the top of the bicipital groove and fixed using a bioabsorbable interference screw. * = long head of biceps tendon; ** = interference screw.

However, if the groups are divided into patients older or younger than 45 years, then a statistically significant finding in relation to a poor evolution can be seen in the group of patients older than 45 years ($p = 0.037$). No complications due to infection were found.

The eight patients who underwent extra-articular tenodesis of the LBT showed very good results and were able to successfully return to their prior daily work and sports activities, with an average follow-up of 6 months after the last surgery. All of them showed a high rate of satisfaction following the procedure with a Constant Scale score >80 points.

Discussion

The suitable treatment options for SLAP lesions are currently under debate due to the differing results in the studies that have been published.^{7,19} The treatment of SLAP lesions up until now involved the reinsertion of the entire superior labrum.^{8–10,16–18} The results that have been published in different studies have not been all that satisfactory and poor results required the treatment to be revised from repair to tenodesis on the LBT. Some authors recommend tenodesis of the LBT as the primary treatment for isolated SLAP lesions.¹⁴

Promising results have been published for both biceps tenodesis and labral repair,²⁰ but the lack of a randomized design, standardized inclusion and exclusion criteria, and small study sizes may bias these conclusions.

The results of this study confirm what other published studies have found with respect to high rates of recurrence or persistent pain after isolated SLAP lesion repair. Extra-articular tenodesis in these patients showed very satisfactory results.¹⁴

However, as mentioned by Kim et al,⁷ when an SLAP lesion coexists with other clinical syndromes or anatomical pathological entities, it becomes difficult, if not impossible, to know if the success or failure of a given treatment is due to the management of the SLAP lesion itself or to the management of the other pathological entities.

With labral degeneration, a normal variant for patients older than the 40 years, repair of the labrum may not make much sense. Boileau et al¹⁴ noted that of the 10 patients treated with repair, treatment for three of the patients was revised to tenotomy or tenodesis, whereas 15 patients treated with primary tenodesis or tenotomy fared better, with only one poor result. Consistent with these results, treatment for two patients in this series was revised from repair to biceps tenodesis, which showed good results. Franceschi et al²¹ presented a prospective, randomized study of SLAP repair versus simple tenotomy in patients older than 50 years. In their study, no advantage of treatment with repair was found, and in fact, they had better clinical outcomes with tenotomy. Increasingly, SLAP repair, especially in older patients, seems to be a procedure to be approached with caution. In this type of patients, LBT tenotomy could be a useful treatment instead of tenodesis, but in our series tenodesis was performed. However, both techniques, tenodesis and tenotomy, are valid options for this pathology.

Neri et al¹⁵ retrospectively compared isolated arthroscopic repair of type II SLAP lesions in 25 patients younger than 40 years with 25 patients older than 40 years at a minimum 1-year follow-up. The authors reported good to excellent results regardless of age. Partial-thickness rotator cuff tears were identified in seven of the 25 patients (28%) in the under 40 years' age group and in 10 of 25 patients (40%) in the over 40 years' age group, and partial-thickness debridement was performed "as indicated". In addition, in the over 40 years' age group, eight of 25 patients (32%) were noted to have changes consistent with various stages of osteoarthritis and debridement was performed as necessary.¹⁵

Alpert et al²² also found no correlation between outcomes of SLAP lesion repairs and patients' age, although in the over 40 years' age group it took a longer time to reach satisfactory results. As a result, they recommended a more complete rehabilitation program.

Limitations of this study are the nonrandomized design, retrospective study, and relatively small sample size.

Conclusion

Keeping in mind the results that were obtained and the limitation of the study, we recommend extra-articular tenodesis as the best treatment for isolated SLAP lesions in middle-aged patients (aged > 45 years) and in those who have a nontraumatic aetiology.

Conflicts of interest

All contributing authors declare no conflicts of interest.

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