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Incidence Of SLAP Lesions In A Military Population

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ABSTRACT

Objectives

SLAP (superior labrum anterior and posterior) lesions are a recognised cause of shoulder pain and instability. They can occur following a direct blow, biceps traction and compression injuries, and are commonly seen in overhead athletes. Military personnel are physically active and often subjected to trauma. We assessed the incidence of SLAP lesions within a military population presenting with shoulder symptoms.

Methods

A retrospective review, of all shoulder arthroscopies performed by a single surgeon between June 2003 and December 2004 at a district general hospital serving both a military and civilian population, was undertaken. The presentation and incidence of SLAP lesions were recorded for both military and civilian patients.

Results

One hundred and seventy eight arthroscopies were performed on 70 (39.3%) military and 108 (60.7%) civilian patients. The average age was 42.3 (range 17-75), 50 females and 128 males were included. Indications for arthroscopy included pain (75.3%), instability (15.7%), pain and instability (7.9%), or "other symptoms" (1.1%). 39 SLAP lesions (22%) were found and grouped according to the Snyder classification – 20.5% type 1, 69.3% type 2, 5.1% type 3, 5.1% type 4. Patients with a history of trauma or symptoms of instability were more likely to have a SLAP lesion ($p<0.0001$). The incidence of SLAP lesions in the military patients was 38.6% compared to 11.1% in civilian patients ($p<0.0001$). After allowing for the increased incidence of trauma and instability in the military, SLAP lesions were still more common in the military patients ($p<0.001$).

Conclusions

There is a higher than average incidence of SLAP lesions in military patients compared to civilian patients. They tend to present with a history of trauma, as well as symptoms of pain and instability. Given the high incidence in military personnel, this diagnosis should be considered in military patients presenting with shoulder symptoms, and there should be a low threshold for shoulder arthroscopy.

Introduction

Shoulder complaints are prevalent, with shoulder pain being one of the most common types of musculoskeletal pain seen by general practitioners. By virtue of its anatomy and biomechanics, the shoulder is the most unstable and frequently dislocated joint in the body. Stability is maintained by several factors, including the labrum, a fibrocartilaginous structure on the glenoid rim. Pathology of the superior labrum, where the long head of biceps takes origin, was first described by Andrews *et al* (1) in a group of throwing athletes who had anterosuperior labrum tears, anterior to the biceps anchor, that were thought to have arisen as a result of repetitive traction from the biceps tendon on the labrum. In 1990, Snyder *et al* used the term "superior labrum anterior and posterior" (SLAP) lesion to describe a more extensive superior labral tear that begins posteriorly and extends anteriorly to include the anchor of the long head of biceps tendon (2). Snyder classified these lesions into four types (Figures 1-5) (2). Type 2 SLAP lesions are the most common (3).

The exact incidence of SLAP lesions is uncertain, although literature to date suggests an incidence ranging from ~4-26%, with 6% being the most commonly quoted incidence in patients undergoing a shoulder arthroscopy (2,4-7).

Military personnel are physically active and commonly injured. Although, lower limbs are

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the most common site of injury, they are known to sustain upper limb injuries, including shoulder dislocations and instability (8,9). The aim of this study was to determine whether military patients presenting with shoulder symptoms have a higher incidence of SLAP lesions compared to civilian patients.

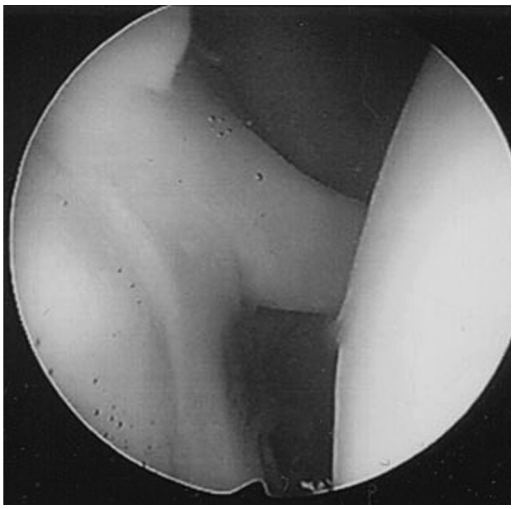

Fig 1. Normal appearance of superior glenoid labrum with biceps tendon attaching to its superior margin.

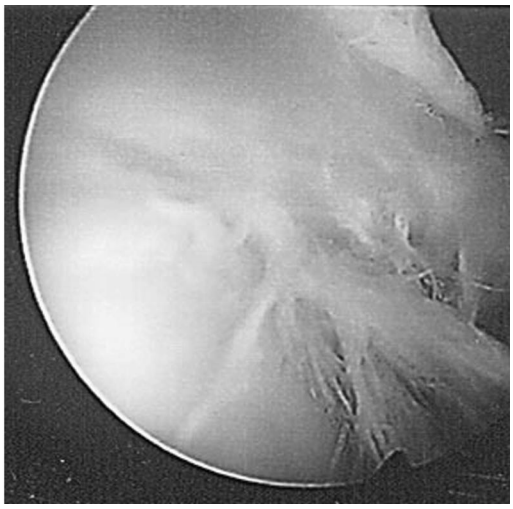

Fig 2. Type 1 SLAP lesion - showing marked fraying and degeneration of the superior labrum with firm attachment of the peripheral labrum and biceps tendon.

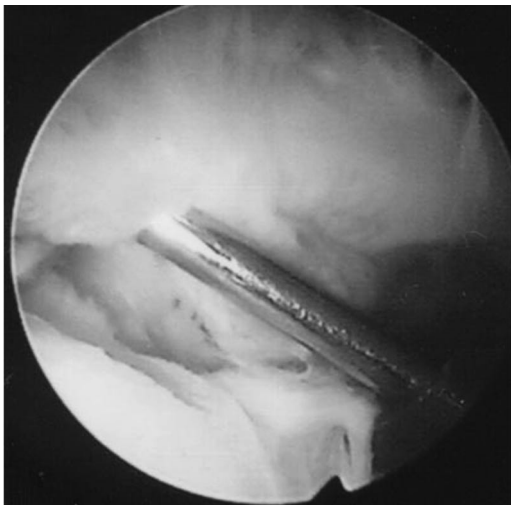

Fig 3. Type 2 SLAP lesion - showing marked fraying and detachment of the superior labrum (and attached biceps tendon) from the glenoid .

Fig 4. Type 3 SLAP lesion - showing a bucket-handle tear of the superior labrum.

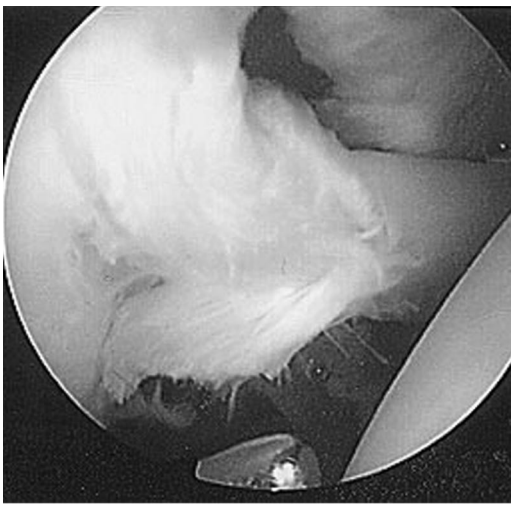

Fig 5. Type 4 SLAP lesion - showing a bucket-handle tear of the superior labrum extending into the biceps tendon (bucket-handle tear already partially resected in this image).

Methods

A retrospective review was undertaken of the medical records and operative notes of all shoulder arthroscopies performed by a single surgeon at a district general hospital, serving both a military and civilian population, between June 2003 and December 2004. The presentation and incidence of SLAP lesions were recorded for both military and civilian patients.

All patients had a general anaesthetic with or without an interscalene block. After initial examination under anaesthetic for mobility and laxity, arthroscopies were performed by the senior author (JC), with the patients in the beachchair position. Using a standard posterior portal and 30° arthroscope a systematic arthroscopic examination, including probing, was performed in all cases, with documentation of the intra-articular findings: gleno-humeral surfaces, labrum, biceps tendon, cuff and bursa. For labral repairs a lateral portal was used: debridement was carried out with a 4.0mm shaver (Ultra Aggressive Cutter, Future) and repairs were performed with Mitek anchor sutures (1.3mm Micro Quick Anchor, Mitek Worldwide, Ethicon, Norwood, MA) or Suretac bio-absorbable tacks (Suretac Rapid Delivery Systems, Smith & Nephew, Andover, MA).

For statistical analysis we used the Chi-squared test.

Table 1. Demographics and presentation of SLAP lesions.

	Military	**Civilian**
Number of SLAP lesions	27 (26 male, 1 female)	12 (8 male, 4 female)
Incidence of SLAP lesions	38.6%	11.1%
Age (years)		
Average	31.9	41.5
Male	32.7	31.8
Female	21	61
Presentation:		
Pain	10 (37%)	7 (58.3%)
Instability	9 (33.7%)	2 (16.7%)
Pain+instability	8 (29.6%)	3 (25%)
History of trauma	23 (85.2%)	9 (75%)

Results

A total of 178 shoulder arthroscopies were performed on 70 (39.3%) military and 108 (60.7%) civilian patients. The average age was 42.3 (range 17-75, male 39.7 years, female 48.9 years, military 31.8 years, civilian 49.1 years), 50 females and 128 males were included. Indications for arthroscopy included pain (75.3%), instability (15.7%), pain and instability (7.9%), or "other symptoms" (1.1%).

39 SLAP lesions (22%) were found and classified according to Snyder *et al* ('90) - 8 (20.5%) type 1, 27 (69.3%) type 2, 2 (5.1%) type 3, 2 (5.1%) type 4. Patient demographics concerning SLAP lesions are given in Table 1.

Overall, 69.2% of these SLAP lesions were found in military personnel. This higher incidence of SLAP lesions in the military patients compared to civilian patients was statistically significant ($p<0.0001$). Patients with history of trauma were more likely to have SLAP lesions ($p<0.0001$), as were patients with symptoms of instability ($p<0.0001$). Even after taking into account the higher incidence of trauma and symptoms of instability in the military patients, SLAP lesions are more common in the military ($p<0.001$).

We also noted a high incidence (90%) of associated pathology amongst patients with SLAP lesions. Cuff pathology (inflammation or cuff tears) was most commonly found with type 2 SLAP lesions (83%), as were Hill-Sachs lesions, Bankart lesions, and anterior instability (69%, 63% and 67%, respectively). Those patients with SLAP lesions had a higher incidence of anterior instability/laxity on examination under anaesthetic, Bankart and Hill-Sachs lesions, compared to those that did not have SLAP lesions.

The superior labral pathology was treated arthroscopically in 28/39 (72%) patients - 3/8 type 1 lesions, 21/27 type 2 lesions, all type 3 lesions and type 4 lesions. SLAP lesions were treated if they were felt to be contributing to the main condition/complaint. Treatment was determined by the type of lesion. Type 1 and 3 lesions were debrided with a shaver, whereas types 2 and 4 were debrided and repaired using either anchor sutures or bio-absorbable tacks. 13 of the patients with SLAP lesions went on to have an open stabilisation, and 11 had arthroscopic subacromial decompressions.

Overall we experienced 2 post-operative complications (both military patients without SLAP lesions) - minor wound infections successfully treated with antibiotics. No complications following SLAP repairs were noted.

Discussion

Although once thought to be uncommon, SLAP lesions are a clinically important cause of shoulder disability (2,5). In our study we noted a higher (22%) than average incidence (~6%) of SLAP lesion due to the high incidence (38.6%) of SLAP lesions amongst military patients - the incidence in the civilian population was 11.1% which is more comparable to other published studies (2,4-7). The wide variation quoted in the literature may be due to inter-observer variation, anatomic variants, surgical experience, patient population and overestimation of type 1 lesions. With regard to the difference between our groups (i.e. military versus civilian), the potential problem of inter-observer variation was

eliminated in our study as only one surgeon was involved. Although our study was a retrospective study, most other series to date have also been retrospective (2-5), and a prospective study on patients undergoing a shoulder arthroscopy by Kim *et al* (6) demonstrated a higher than average incidence of SLAP lesions of 26%, which is similar to our results. Otherwise, a male predominance and similar age distribution (average age 34.8 years) were noted to those in Snyder's study (4), as well as a comparable distribution of SLAP lesion subtypes. Our findings show that military personnel are a subgroup of the population who are more likely to have a SLAP lesion in association with shoulder symptoms.

Previously, overhead athletes have been identified as a subgroup of the population who are particularly prone to developing SLAP lesions (2,3,5,6). Here they are thought to occur as a result of repetitive traction on the biceps tendon or via the "peel-back" mechanism as described by Burkhart and Morgan (10). They theorized that when the shoulder is in external rotation and abduction, the biceps tendon vector force shifts from an anterior-horizontal direction to a more vertical and posterior direction, with the resulting torsional force on the posterior labrum peeling it back. Although SLAP lesions can be associated with a history of such repetitive overhead motion, there is often a history of antecedent trauma, such as a superior or inferior traction injury, direct blow to the shoulder, or compressive injury onto a forward flexed abducted arm (1-7) - our results concurred with this. We noted a high incidence (85.2%) of antecedent trauma - often an isolated event, amongst the military personnel presenting with shoulder symptoms. Additionally, military personnel are exposed to (repetitive) strenuous physical activities, also potentially placing them at an increased risk of developing SLAP lesions. Insidious onset of SLAP lesions can occur and did so in 21% (15% of military SLAP patients and 33% civilian SLAP patients) of our patients - these results are comparable to those of Snyder *et al* (4).

The clinical diagnosis of SLAP lesions is difficult, especially as they are often associated with other shoulder pathology or abnormalities. They present with vague uncharacteristic symptom complexes, including pain, especially with overhead activities, clicking, instability or weakness, and our study concurred with this (2,5,11,12). There are numerous clinical tests for SLAP lesions, but as Tennent *et al.* (13) point out, none of them are absolutely diagnostic or have as yet undergone anatomic study to assess the effect of the tests on the biceps/labral complex. Magnetic resonance imaging (+/-arthrography) requires knowledge of normal labral variants and has a variable specificity and sensitivity (14). The definitive way of diagnosing SLAP lesions is by shoulder arthroscopy.

Our patients presented with symptoms of pain, instability or a combination of both. The relatively shallow configuration of the gleno-humeral joint and large range of movement, predispose the shoulder to injury. Although, the stability of the glenohumeral joint is largely maintained by complex interactions of the ligaments and muscles around the joint, the labrum contributes stability by providing depth to the labrum. The superior labrum has a more meniscoid attachment to the glenoid rim compared to the remainder of the labrum and may thus be more susceptible to both degenerative as well as traumatic lesions. Additionally, this portion of the labrum is functionally important as it serves as an anchor for the insertion of the biceps tendon onto the glenoid. The biceps tendon plays an important role as a dynamic stabiliser of the gleno-humeral joint by reducing anterior humeral head translation, and by decreasing strain in the antero-inferior band of the inferior glenohumeral ligament during abduction and external rotation (15,16). Our results show that patients with symptoms of instability have a higher incidence of SLAP lesions ($p<0.0001$). Whether SLAP lesions are the cause or result of shoulder instability has not yet been definitively established. However, Burkart *et al* (17) have shown that repair of a type 2 SLAP lesion restores greater gleno-humeral stability, more so to inferior than anterior translation.

Different types of SLAP lesions are typically associated with different clinical features and intra-articular pathology (6). Type 1 lesions are considered to be degenerate lesions, that contribute little to clinical symptoms (12), but are typically associated with rotator cuff disease (6). They have also been described in atraumatic shoulder instability (18). Type 3 and 4 lesions are associated with traumatic instability, and type 2 lesions are variably associated with a mixed clinical picture depending on patient age (6). SLAP 2 lesions with a posterior component develop postero-superior instability and anterior pseudolaxity (3). This chronic superior instability leads to secondary lesion-location specific rotator cuff tears. Our findings are consistent with other studies with regards to associated intra-articular pathology. Younger patients with instability and a history of trauma had a high incidence of Bankart and Hill-Sachs lesions as well as anterior instability/laxity, whereas the older patients presenting with pain, with or without a history of trauma tended to have cuff disease or osteoarthritic changes.

Conclusion

We have identified another subgroup of the population, who by the nature of their

employment, have a higher than average incidence of SLAP lesions. There should be a high index of clinical suspicion for a SLAP lesion in military personnel presenting with shoulder problems, especially in the presence of a history of antecedent trauma and symptoms of instability and/or pain. Shoulder arthroscopy should feature in their management plan. Generally, a low threshold for shoulder arthroscopy should be maintained when faced with any young, physically active person with a painful or unstable shoulder, following trauma.

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