Return to sport and patient satisfaction after arthroscopic Bankart repair: a single-institution experience

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Abstract

Introduction: Arthroscopic Bankart repair is a widely accepted procedure to treat recurrent shoulder dislocation. This study aims to describe our experience with arthroscopic Bankart repair and its functional outcome.

Methods: 107 patients who underwent arthroscopic Bankart repair from 2008 to 2013 were followed up for a minimum of three years and reviewed by an independent observer. 80 consented to being interviewed using the Oxford Shoulder Instability Score (OSIS) and Simple Shoulder Test.

Results: 82 shoulders (two bilateral) were studied. Mean age at first dislocation was 19.4 ± 3.4 (12.0–31.0) years. Mean follow-up was 4.4 ± 1.3 (3.0–9.0) years and 2.5 ± 3.0 (0.1–15.4) years elapsed from first dislocation to surgery. 41 (50.0%) patients played overhead or contact sports and 44 (53.7%) played competitive sports before injury; 8 (9.8%) patients reported recurrence of dislocation, which was significantly associated with playing competitive sports before injury ($p < 0.039$), 5 (6.1%) underwent revision surgery and 22 (26.8%) reported residual instability after surgery. 49 (59.8%) patients returned to playing sports, 75 (91.5%) were satisfied with their surgery and 79 (96.3%) were willing to undergo the surgery again. 74 (90.2%) patients had two-year good/excellent OSIS, which was significantly associated with playing competitive sports before injury ($p = 0.039$), self-reported stability after surgery ($p = 0.017$), satisfaction with surgery ($p = 0.018$) and willingness to undergo surgery again ($p = 0.024$).

Conclusion: Arthroscopic Bankart repair yields good functional outcomes and is associated with high patient satisfaction, although not all patients return to sports.

Keywords: Arthroscopic Bankart repair, functional outcome, patient satisfaction, return to sports

INTRODUCTION

The glenohumeral joint is considered the most mobile joint in the human body. However, it lacks stability and, hence, is also one of the most commonly dislocated joints.[1] Almost 90% of glenohumeral dislocations are anterior-inferior dislocations.[2] In most cases, the glenohumeral joint dislocation causes a Bankart lesion, which is an avulsion of the glenoid labrum, whose primary role is to deepen the glenoid cavity to encompass the humeral head. Without surgical intervention, the presence of a Bankart lesion predisposes the joint to a 26% greater risk of recurrent dislocations.[3]

Although the results of arthroscopic Bankart repair are similar to those of an open repair,[4] we do not have local data on the number of patients who return to playing sports after surgery for recurrent shoulder dislocation.

It is important to recognise the cause of failure of as well as the risk factors involved in arthroscopic Bankart repair. This study aimed to review the risk factors associated with surgical failure, recurrence as well as revision and correlate

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the findings with patient-reported outcomes and functional scores.

METHODS

This study was approved by the institutional review board. In total, 107 consecutive patients with recurrent shoulder dislocations who underwent arthroscopic Bankart repair surgery from 2008 to 2013 were retrospectively studied. Two patients underwent bilateral surgery. Patients with large Hill-Sachs or bony Bankart lesions visualised on magnetic resonance imaging were excluded. 21 patients were uncontactable and three patients declined to participate in this study.

The surgeries were performed by four surgeons from our institution. The surgical procedure involved a general or regional anaesthesia, with the patient in the lateral decubitus position. After standard sterile preparation and draping, a posterior viewing portal was established, with two anterior working portals in the rotator interval. After performing a diagnostic glenohumeral arthroscopy, the anterior labrum was mobilised with an elevator and the repair was performed using suture anchors to reattach the labrum to the glenoid, and consisted of a combination of simple sutures and mattress sutures. The viewing portal was then changed to the anterior superior portal, where the humeral head was confirmed to be centred on the glenoid. The skin incisions were closed with non-absorbable sutures. All patients were discharged on Postoperative Day 1 with an arm sling in internal rotation for three weeks, allowing external rotation after six weeks. Strengthening exercises were started after eight weeks, and a return to unrestricted activities, including sports, was allowed after six months.

In total, 82 shoulders belonging to 80 patients were evaluated. The demographic and surgical data were obtained through the patients' medical records. All patients were sent a letter to their last known residence to notify them of the study two weeks prior to the telephonic interview, which was conducted by a single independent observer. The patients were asked about the condition of their shoulder, recurrence of instability and the positions that cause it. The primary outcome measures were patient-reported recurrence of instability in the form of a dislocation or subluxation, and return to sports. The secondary outcome measures were documented using the patient-reported outcome scores from the Oxford Shoulder Instability Score (OSIS) and the Simple Shoulder Test (SST). After the telephonic interview, the patients were sent an online link to complete the self-administered OSIS and SST. If any patient failed to complete the survey despite being sent three separate reminders over a three-week period, the independent observer would call the patients again to have them complete the questionnaire over the phone. Only six patients had filled the questionnaire over the phone.

A patient was defined as having recurrent instability if they reported any subluxation episodes, or a persistent feeling of shoulder 'looseness' or 'instability'. They were asked about the circumstances and arm position in which they felt that their shoulder was unstable. This group of patients was further split into two subgroups: subluxation and frank recurrent dislocation.

The OSIS and SST were used to measure the post-repair functional outcome. The OSIS was developed by Dawson *et al.*[5] in 1999 and was used to assess the outcome of treatment for shoulder instability. It is a simple 12-item questionnaire that can be self-administered by the patient. The questions are scored from 1 (least impairment) to 5 (most impairment) and the total is subtracted from 60 points. A further grading system to classify the absolute score was used, where values from 40 to 48 were deemed as excellent; 30 to 39 as good; 20 to 29 as fair and 0 to 19 as poor.

The SST is a short 12-item questionnaire. Unlike the OSIS, the SST is a simple binary item response that is easy to understand and administer.

Data was analysed using IBM SPSS Statistics for Windows version 23.0 (IBM Corporation, Armonk, NY, USA). Chi-square and Fisher's exact tests were used for categorical data values, and Student's *t*-test was used for continuous variables. A P value <0.05 was considered statistically significant.

RESULTS

A total of 82 shoulders (two bilateral) belonging to 80 patients were examined. The mean age of the patients was 21.8 ± 4.0 (range 16–35) years and the mean age at first dislocation was 19.4 ± 3.4 (range 12.0–31.0) years. The mean duration of follow-up was 4.4 ± 1.3 (range 3.0–9.0) years and 2.5 ± 3.0 (range 0.1–15.4) years had elapsed from the first dislocation to surgery. In total, 41 (50.0%) patients played overhead or contact sports [Table 1] and 44 (53.7%) played sports at a competitive level before injury. There were four female patients, representing 4.8% of our study population. Our patient demographics were representative of our national ethnicity distribution, with 75.9% Chinese, 19.3% Malay and 4.8% Indian, compared to our national average of 75%, 13% and 9%, respectively. Of the 82 shoulders evaluated, 47 (57.3%) were right shoulders and 34 (41.5%) were left shoulders.

Through the telephonic interviews, 8 (9.8%) patients reported a recurrent dislocation and 22 (26.8%) reported residual instability after surgery. 5 (6.1%) patients had to undergo a revision surgery; of these, three underwent a Latarjet procedure, one underwent revision Bankart surgery, and one underwent revision Bankart surgery and subsequently required a Latarjet procedure as well. The mean duration from primary

surgery to revision surgery was 4.8 ± 0.8 years. A total of 49 (59.8%) patients reported that they had returned to playing sports after surgery; 75 (91.5%) patients reported that they were satisfied with their surgery and 79 (96.3%) patients were willing to undergo the surgery again.

None of the factors were significantly associated with revision surgery, including atraumatic dislocation, number of dislocations, playing overhead or contact sports or playing competitive sports [Table 2].

We found that recurrence of dislocation after surgery was not associated with atraumatic dislocation, presence of Hill-Sachs lesion, bony Bankart lesion or SLAP lesion, ligamentous laxity, contact or overhead sports, number of dislocations or age at first dislocation, return to sports or patient satisfaction but was significantly associated with playing competitive sports before injury (p = 0.039) [Table 3].

Table 1: Details of contact or overhead sports played (*n*=41).

Sport	No. (%)
Soccer	14 (34.1)
Rugby	8 (19.5)
Basketball	6 (14.6)
Tennis	2 (4.8)
Swimming	2 (4.8)
Water polo	2 (4.8)
Badminton	2 (4.8)
Rock climbing	2 (4.8)
Dragon boat	1 (2.4)
Squash	1 (2.4)
Boxing	1 (2.4)

Table 2: Factors associated with revision surgery.

Factor	No. (%)		*P*
	Revision surgery (*n*=5)	No revision surgery (*n*=77)	
Atraumatic dislocation	0 (0.0)	4 (5.3)	1.000
Hill-Sachs lesion	3 (60.0)	47 (61.8)	0.639
Ligamentous laxity	1 (20.0)	26 (34.2)	0.660
Overhead or contact sports	3 (60.0)	38 (50.0)	1.000
Competitive sports prior to injury	2 (33.3)	7 (9.2)	0.090
Bony Bankart lesion on arthroscopy	1 (20.0)	5 (6.6)	0.330
SLAP lesion	2 (40.0)	7 (9.2)	0.093
No. of dislocations prior to surgery*	5.75±2.5	5.23±12.0	0.932
Age at dislocation (yr)*	17.6±3.7	19.6±3.4	0.211
Completion of physiotherapy	5 (100.0)	51 (67.1)	0.130
Return to sport	3 (60.0)	46 (60.5)	0.991
Willingness to undergo surgery again	5 (100.0)	74 (97.4)	0.653
Patient satisfaction	4 (80.0)	71 (93.4)	0.344

*Data presented as mean±standard deviation.

In total, 49 (59.8%) of our patients returned to sports after surgery. This was significantly associated with the absence of a history of atraumatic dislocation (p = 0.025) [Table 4]. Interestingly, return to sports was not associated with patient satisfaction [Table 4].

In total, 74 (90.2%) patients had a two-year good or excellent OSIS, which was not associated with the number of dislocations or age at dislocation, return to sports, ligamentous laxity, absence of recurrence and playing competitive sports

Table 3: Factors associated with recurrence of dislocation.

Factor	No. (%)		*P*
	Recurrence of dislocation (*n*=8)	No recurrence of dislocation (*n*=74)	
Atraumatic dislocation	0 (0.0)	4 (5.4)	1.000
Hill-Sachs lesion	4 (50.0)	46 (62.2)	0.474
Ligamentous laxity	2 (25.0)	25 (33.8)	0.712
Overhead or contact sports	6 (75.0)	35 (47.3)	0.264
Competitive sports prior to injury	3 (37.5)	6 (8.1)	0.039
Bony Bankart lesion on arthroscopy	1 (12.5)	5 (6.8)	0.480
SLAP lesion	2 (25.0)	7 (9.5)	0.216
No. of dislocations prior to surgery*	5.0±2.2	5.3±12.3	0.952
Age at dislocation (yr)*	18.0±3.6	19.6±3.4	0.205
Completion of physiotherapy	6 (75.0)	52 (70.3)	0.310
Return to sport	6 (75.0)	43 (58.1)	0.355
Willingness to undergo surgery again	8 (100.0)	71 (95.9)	1.000
Patient satisfaction	7 (87.5)	68 (91.9)	0.527

*Data presented as mean±standard deviation

Table 4: Factors associated with return to sports.

Factor	No. (%)		*P*
	Return to sports (*n*=49)	No return to sports (*n*=33)	
Atraumatic dislocation	0 (0.0)	4 (12.1)	0.025
Hill-Sachs lesion	34 (69.4)	16 (48.5)	0.062
Ligamentous laxity	15 (30.6)	12 (36.4)	0.640
Overhead or contact sports	27 (55.1)	14 (42.4)	0.368
Competitive sports prior to injury	4 (8.2)	5 (15.1)	0.473
Bony Bankart lesion on arthroscopy	3 (6.1)	3 (9.1)	0.679
SLAP lesion	5 (10.2)	4 (12.1)	1.000
No. of dislocations prior to surgery*	5.6±14.7	4.7±4.5	0.740
Age at dislocation (yr)*	19.4±3.3	19.5±3.7	0.899
Completion of physiotherapy	36 (73.5)	20 (60.6)	0.217
Willingness to undergo surgery again	49 (100.0)	30 (90.9)	0.062
Patient satisfaction	45 (91.8)	30 (90.9)	1.000

*Data presented as mean±standard deviation

before surgery [Table 5]. A good or excellent OSIS was significantly associated with playing of competitive sports prior to injury (p = 0.039), self-reported stability after surgery (p = 0.029), satisfaction with surgery (p = 0.018) and willingness to undergo the surgery again (p = 0.024).

We found that questions in the SST related to pain at night affecting sleep, ability to lift weights and ability to reach one's back were significantly associated with good or excellent OSIS [Table 6]. In addition, the mobility or ability to rest one's shoulder by the side and return to work was significantly associated with self-reported instability.

DISCUSSION

The results of early arthroscopic Bankart repair were disappointing, with a 21%–44% incidence of postoperative recurrence and instability.[5-7] Advances in technique and indications have slowly led to a shift in the outcomes of this procedure. Castagna *et al.*[8] published a literature review in 2016 that concluded that arthroscopic Bankart repair was as effective as open Bankart repair. In 2004, Fabbriciani *et al.*[9] demonstrated, in a randomised prospective study, that open Bankart repair was not superior to arthroscopic Bankart repair in stabilising the shoulder. Arthroscopic Bankart repair was associated with lower recurrent instability, lower revision rates, better functional scoring and higher return-to-work rates.[9-11] However, this procedure carries some challenges. Many studies have attempted to define what constitutes a successful arthroscopic Bankart repair. Gartsman *et al.*[12] have used functional scoring systems, such as the Rowe, to determine success. Others have used absolute revision and recurrence rates as a mark for failure.[11,12]

Table 5: Oxford Shoulder Instability Score and associated factors.

Factor	No. (%)		*P*
	Good/ excellent (*n* = 74)	Poor/fair (*n* = 8)	
Atraumatic dislocation	3 (4.1)	1 (12.5)	0.346
Hill-Sachs lesion	46 (62.1)	4 (50.0)	0.474
Ligamentous laxity	26 (35.1)	1 (12.5)	0.258
Overhead or contact sports	36 (48.6)	5 (62.5)	0.712
Competitive sports prior to injury	6 (8.1)	3 (37.5)	0.039
Bony Bankart lesion on arthroscopy	5 (6.8)	1 (12.5)	0.480
SLAP lesion	8 (10.8)	1 (12.5)	1.000
No. of dislocations prior to surgery*	5.7 ± 13.5	4.6 ± 4.9	0.830
Age at dislocation (yr)*	19.6 ± 3.4	18.3 ± 3.5	0.310
Completion of physiotherapy	52 (70.3)	6 (75.0)	0.310
Willingness to undergo the surgery again	73 (98.6)	6 (75.0)	0.024
Patient satisfaction	70 (93.2)	5 (62.5)	0.018
Self-reported instability after surgery	17 (23.0)	5 (62.5)	0.017
Recurrence of dislocation	7 (8.1)	1 (12.5)	0.577
Return to sport	47 (63.5)	2 (25.0)	0.055
Revision surgery	5 (6.8)	0 (0.0)	1.000

*Data presented as mean±standard deviation

Many risk factors causing recurrence have been identified. We found that a history of playing competitive sports before injury was associated with recurrence of instability. Risk factors such as young age, the level of athletic play, presence of a bony defect in the glenoid or humeral head, number of suture anchors and ligamentous laxity contribute to recurrence.[13] In a similar study from a local institution, the revision rate for arthroscopic Bankart repair was reported as 7.89%,[14] with the global average at around 7%–7.5%.[10,15] Our patients had a revision rate of 6.1%, which is comparable to the existing global and local data. We recognise that not all patients with recurrence of instability would be willing to undergo a revision procedure.

Among all the risk factors for recurrence of instability that have been identified in the literature, the presence of a bony lesion in the glenoid or the humeral head is the most significant.[16] Burkhart and De Beer first pioneered the concept of 'significant bone loss' affecting the glenohumeral joint stability.[17] This concept was refined over time, evolving from 'inverted pear-shaped glenoid' to 'engaging-type' lesions and now 'on and off track' lesions.[17,18] It has been suggested that patients with more than 25% glenoid bone loss or an engaging Hill-Sachs lesion should undergo more than a simple arthroscopic Bankart repair.[12,13,15] We did not find the presence of a bony Bankart lesion on magnetic resonance imaging to be associated with a revision. We acknowledge that our study does not adequately incorporate this data, as the extent of the lesion was not quantified, and our subsequent studies would involve quantifying the extent of the bony lesions.

The proportion of return to sports after surgery ranged from 48% to 100%.[19] The journey of return to sports involves many factors and is not based solely on the stability of the injured shoulder. In 2015, Tjong *et al.*[19] described that there are five main patient-derived themes that deter a patient from returning to sport, namely competing interests, kinesiophobia, psychological motivators, social support and advancing age.

Our study findings that state sports as a risk factor for recurrence of dislocation are in line with those of a systematic review by Randelli *et al.*[2] in 2012. In that study, competitive sports was recognised as a risk factor for recurrence after Bankart repair, but the type of sport (overhead or contact) was surprisingly not a risk factor.

A systematic review by Harris *et al.*[20] in 2013 concluded that the subjective and objective measures that are currently in use to assess outcomes and success are heterogeneous, and dislocation rate alone should not be considered as a measure. Thus, our study attempted to incorporate different areas of reported outcomes and correlate them with functional

Table 6: Comparison between Simple Shoulder Test and OSIS, and self-reported instability.

Question	No. (%)			
	OSIS good/excellent (*n*=74)		Self-reported instability (*n*=22)	
	Yes	*P*	Yes	*P*
Is your shoulder comfortable with your arm at rest by your side?	71 (95.9)	0.342	19 (86.4)	0.057
Does your shoulder allow you to sleep comfortably?	67 (90.5)	<0.001	16 (72.7)	0.100
Can you reach the small of your back to tuck in your shirt with your hand?	73 (98.6)	0.187	22 (100)	1.000
Can you place your hand behind your head with the elbow straight out to the side?	64 (86.5)	1.000	18 (81.8)	0.475
Can you place a coin on a shelf at the level of your shoulder without bending your elbow?	73 (98.6)	0.187	21 (95.5)	0.467
Can you lift 1 pound (450 g) to the level of your shoulder without bending your elbow?	73 (98.6)	0.187	21 (95.5)	0.467
Can you lift 8 pounds (3.6 kg) to the level of your shoulder without bending your elbow?	68 (91.9)	0.039	17 (77.3)	0.054
Can you carry 20 pounds (9 kg) at your side with the affected extremity?	63 (85.1)	<0.001	13 (59.1)	0.018
Do you think you can toss a softball underhand 20 yards (18 m) with the affected extremity?	59 (79.7)	<0.001	13 (59.1)	0.097
Can you wash the back of your opposite shoulder with the affected extremity?	57 (77.0)	0.005	10 (45.5)	0.002
Would your shoulder allow you to work full time at your regular job?	73 (98.6)	0.187	21 (95.5)	0.467

OSIS=Oxford Shoulder Instability Score

scores as well as patient-reported outcomes. We used online surveys, because the results obtained from phone-based questionnaires differ from those of self-administered questionnaires.[21]

Analyses of our secondary outcomes revealed that the absence of self-reported instability was significantly associated with good functional scores and patient satisfaction. A comparison of the individual questions in the SST revealed a marked difference in the difficulty of the tasks listed. Patients who are, in particular, unable to perform some of the more demanding tasks that involve their shoulders, such as tossing or carrying heavy weights, are much more likely to present with a low functional OSIS.

Our study has certain limitations. First, it was a retrospective study that lacked preoperative functional scoring. Second, the size of bony Bankart lesions and Hill-Sachs lesions was often not accurately quantified intraoperatively. Third, patients with significant bone defects visualised on preoperative imaging were treated with open Latarjet procedures in our institution and were, thus, excluded from this study; these factors probably explain the lack of significant influence of Hill-Sachs or bony Bankart lesions on recurrence of dislocation. However, many patients had good functional outcome scores with low recurrence after surgery. To overcome this limitation, future studies should incorporate functional scoring before surgery.

The strength of our study is the inclusion of data on return to sports after arthroscopic Bankart repair, including the level of engagement in sports before injury. A series from another local institution reported that 75% of patients returned to playing sports after undergoing an arthroscopic Bankart repair, although the pre-injury level of sporting activity was not reported.[22] We recognise that our patient population was heterogeneous and consisted of patients who played sports competitively as well as non-competitively.

In conclusion, our study demonstrated that arthroscopic Bankart repair is an effective surgical technique for the treatment of shoulder instability. Most patients who undergo this procedure retain good shoulder function even after more than three years of surgery. Self-reported instability as well as return to sports are significantly correlated to existing functional scores as well as failure of surgery. Hence, we believe that self-reported instability and return to sports are critical aspects of the overall evaluation of the surgical treatment and may be more sensitive indicators of the outcome.

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Conflicts of interest

There are no conflicts of interest.

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