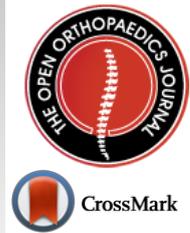




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RESEARCH ARTICLE

The Latarjet Procedure: Effective and Safe

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Abstract:

Background:

The Latarjet procedure is used to treat recurrent anterior shoulder instability in patients with bony glenoid loss and/or failed previous stabilisation surgery. It has reportedly high success rates, but recent publications have reported concerns of high complication rates. This study aims to assess the complications and outcomes of the Latarjet procedure in our institution, with a minimum 2-year follow-up and compared it to the current literature.

Methods:

Patients who underwent the procedure over a 36-month period were included in this study (n=81). Seventy-three (90%) patients in our cohort competed in amateur to professional level sports. The indications for surgery were recurrent instability with associated bony glenoid deficiency and/or previous failed arthroscopic stabilisations. The Oxford Shoulder Instability, Constant Shoulder and QuickDASH scores were recorded pre- and post-operatively, along with post-operative complications and failures.

Results:

Eight (9.9%) complications were recorded: three re-dislocations, two deep infections, one haematoma, one screw breakage and one case of biceps tendinopathy. The mean pre-operative Oxford Shoulder Instability Score improved from 23.2 ± 10.1 to 37 ± 9.2 following the procedure. The mean Constant Shoulder and quickDASH scores also improved from 55.1 ± 21.2 and 30.3 ± 24.3 to 88.1 ± 9.2 and 17.7 ± 23.5 respectively. 98.6% of the patients returned to their pre-injury level of sports.

Conclusion:

From this study it can be concluded the Latarjet procedure is an effective surgical treatment for recurrent anterior shoulder instability associated with bony glenoid loss, even in high contact professional athletes. Complication rates are lower than previous recent studies have stated.

Keywords: Latarjet procedure, Shoulder, Instability, Dislocation, Sports, Bony glenoid loss.

Article History

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1. INTRODUCTION

The Latarjet procedure, first described by Michel Latarjet in 1954 [1], is used for recurrent anterior instability of the glenohumeral joint, most commonly associated with glenoid bone loss, or following failed soft tissue stabilisation procedures. However, in current trends, some surgeons perform the Latarjet procedure on first-time dislocations, particularly on individuals who are deemed high risk for ongoing instability. Large bony defects (either bony Bankart lesions or Hill-Sachs lesions), young age at first dislocation, male sex, previous episodes of instability and participation in higher-level sporting

activities have all been shown to increase the likelihood of ongoing instability, with age and sex being the most reliable predictive factors [2 - 5].

The Latarjet procedure involves passing an osteotomised coracoid process graft with attached conjoint tendon through a horizontal splitting of the subscapularis tendon and securing the graft onto the anterior surface of the glenoid where the bony defect has occurred [1].

The procedure works in three ways to improve anterior stability at the glenohumeral joint as described by Patte [6] as: bony defect correction, “sling” formation from the subscapularis and conjoint tendons improving stability when the arm is abducted and externally rotated and finally, capsular reconstruction using the coracoacromial ligament [7, 8].

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In a recent systematic review, patient-reported outcomes of good to excellent in 90% of patients were seen [9]. However, recent studies examining the outcomes of the Latarjet procedure cite high rates of complications, particularly infection, recurrent instability and neurological injury. Shah *et al.*, published complication rates of 25% in a retrospective review of 48 Latarjet procedures, with a neurological injury rate of 10%, a recurrent instability rate of 8% and the infection rate of 3% [10]. A systematic review by Griesser *et al.*, examining 1904 shoulders suggests a similar total complication rate of 30%, with a neurological injury rate of 1.8%, a recurrent instability rate of 5.8% (confirmed anterior dislocation rate of 2.9%), and an infection rate of 1% [11]. Another recent systematic review by Cowling *et al.*, showed a similarly low rate of infection of 1.34% and a neurological injury rate of 0.51%, but a re-dislocation rate of 3.8% (excluding a study of epileptic patients) [12]. Frank *et al.*, analysed their Latarjet procedures for their 90-day complication rate, which was found to be 7.5% in 133 shoulders, however, no patient-reported outcome measures were assessed [13].

We aimed to retrospectively analyse our Latarjet procedures performed at our institution for mid-term complications, with a minimum of 2-year follow up, and assess patient-reported outcomes. Our patient cohort consisted of predominantly athletic individuals competing in contact sports, which is a risk factor for ongoing instability following arthroscopic stabilisation [5]. This is an important patient factor to consider as these individuals may require more robust primary stabilising procedures, such as the Latarjet procedure.

2. MATERIALS AND METHODS

Overall, 81 Latarjet procedures were performed on 81 patients (mean age 24 years \pm 7.4) over a 36-month period (between June 2012 and June 2015). In total, 73 of 81 patients (90%) of our patient population participated in competitive sports. The indication for surgery was recurrent shoulder instability with any anterior-inferior bony glenoid deficiency and/or previous failed arthroscopic stabilisations. Pre- and post-operative patient-reported outcome measures were used to determine the functional outcome and patient satisfaction. Post-operative scores were taken at final follow-up appointments. The Oxford Shoulder Instability score [14], ranging from 0 (maximum disability/symptoms) to 48 (no disability/symptoms), the Constant Shoulder score [15], ranging from 0 (maximum disability/symptoms) -100 (no disability/symptoms), and quickDASH [16] score ranging from a score of 0 (no disability/symptoms) to 100 (maximum disability/ symptoms), were all analysed. We also analysed postoperative complications, re-operation rates, and re-dislocation rates. Patients were followed up for a minimum of 2 years for complications. All the patients in this study signed consent forms for their anonymised data to be utilised for scientific and research purposes.

3. RESULTS

Overall, 81 open Latarjet procedures were included in our analysis with 96.3% (n=78) males and 3.7% (n=3) females. Patients were followed up for a minimum of 2 years for complications (range 24-60 months). In total, 73 of 81 patients

(90%) participated in regular sporting activity. In total, 56 of 81 patients (69%) of our cohort played rugby from amateur to professional level. (Table 1) shows a summary of sporting activity played. The mean age at the time of the Latarjet procedure was 24 years (15-50 years).

Eighteen (22%) of the Latarjet procedures were performed as a primary operation, whilst 63 (78%) were revisions, with all primary operations being failed arthroscopic stabilisations. Mean time from injury to surgery was 241 days (3-1590 days). There were a similar number of right and left shoulders (41 and 40 respectively), with a majority 75.3% (n=61) of patients being right hand dominant. 53% (n=35) had injured their dominant limb.

Table 1. Summary of Sporting Activity.

Sport	Male	Female	Total
Rugby	56	0	56
Football	8	0	8
Horse riding	3	2	5
Other	4	0	4
None	3	1	4
Not documented	4	0	4
Total	78	3	81

3.1. Patient-Reported Outcome Scores

All outcome measure scores improved postoperatively and were measured at the final follow-up. Our cohort of patients were highly active individuals, with 74 (91%) competing in high level/professional sports. All the patients except 1 (1.2%) were able to return to sporting activity at a pre-injury level. Mean time from operation to return to the sport activity was 126 days (83-270 days). (Table 2) shows the pre- and post-operative scores for each outcome measure.

Table 2. A Summary of patient outcome scores.

Outcome Score	Mean Pre-Op Score	Mean Post-Op Score	p Value
QuickDASH	31.22	5.46	p = 0.013
Constant	55.18	83.69	p = 0.024
Oxford Instability	22.0	45.22	p = 0.027

3.2. Postoperative Complications

We report a 9.9% (n=8) complication rate following 81 Latarjet procedures. All 8 of these patients required surgical intervention.

3.3. Infection

Overall, 2 out of 81 patients (2.5%) were found to have deep infections requiring washouts. One of these patients then went on to non-union of the coracoid which was treated with a CT guided osseograft injection, which subsequently united and he made a return to professional rugby within 6 months of the injection. The second patient with a deep infection went on to develop non-union, with screw breakage and required revision to an Eden-Hybinette procedure. He too returned to professional Rugby 4 months later.

3.4. Screw Failure

One patient attended with increasing shoulder pain, and had a non-union of the graft with osteolysis and screw breakage diagnosed on CT scan. He went on to have this revised to an Eden-Hybinette procedure, which unfortunately also failed and was unable to return to professional rugby.

3.5. Re-dislocation

Overall, 3 patients (3.7%) had recurrent dislocations, however, all these were traumatic dislocations during sports. The first patient sustained screw displacement during the dislocation which required a successful revision Latarjet procedure. The second and third patients sustained anterior labral tears during the dislocations, diagnosed on CT scan, with both being successfully repaired arthroscopically, allowing them to return to their professional sporting careers (football and rugby).

3.6. Neurovascular Complications

There were no reported cases of any neurological complications in our patient cohort. One patient (1.3%) developed a postoperative haematoma which required exploration and ligation of the cephalic vein the same day as the Latarjet Procedure, which resulted in no further problems.

One final patient developed biceps tendonitis 5 months post-operatively for which she underwent arthroscopic biceps tenodesis.

4. DISCUSSION

The Latarjet procedure can result in potentially serious complications, however, our results are reassuring and suggest much lower complication rates than the current literature has suggested.

In our study, the mean age of patients undergoing the Latarjet procedure was 24 years (15-50 years) which is similar to that of a large systematic review of 1,904 shoulders (25.9 years (8-69years) by Griesser *et al.* [11] Seventy-eight (96.3%) patients were male in our study, which is similar to other studies. Griesser *et al.*, reported early complication rates of up to 30% with this procedure, however, in our study we found a markedly lower total complication rate of 9.9%. They found a total infection rate of 1.3%, which is half of the findings in our study of 2.5%.

Shah *et al.* [10], report a total complication rate of 25% in their study of 45 Latarjet procedures, with a 6% rate of infection. However, all infections were superficial and settled with antibiotic therapy, compared to our 2 deep infections, requiring surgical intervention. Shah *et al.* [10], also reported a 10% rate of neurological injury (two musculocutaneous nerve, two axillary nerve and one radial nerve injury). Our study of 81 Latarjet procedures reports no cases of neurological injury. Causes of neurological injury include traction, accidental suture ligation and patient mal-positioning [7, 17], which suggests that careful patient set up and meticulous operative technique can avoid such injuries.

In our study, we observed 3 recurrent dislocations (3.7%), but no other reports of “instability” or subluxations (total recurrent instability rate of 3.7%). All 3 re-dislocations in our

study were traumatic occurring during contact sporting activity. Mizuno *et al.* [18], in a long-term study of 68 Latarjet procedures, had a similar recurrent dislocation rate of 2.9%, but also a recurrent rate of subluxation without frank dislocation of 2.9% (total recurrent instability 5.8%). Shah *et al.* [10], in a study of 45 Latarjet procedures, reported a total recurrent instability of 8% (6% “instability without frank dislocation”, 2% re-dislocation). It could be argued in our study that, as all re-dislocations were traumatic following high-contact collisions in sport, they may well have dislocated in a previously unaffected shoulder.

Frank *et al.*, assessed 90-day complication rates following 133 Latarjet procedures and found an overall complication rate of 7.5% [13]. This included 2 recurrent dislocations (1.5%), both requiring revision surgery, and 2 deep infections (1.5%) requiring washouts. Interestingly their early recurrent dislocations were seen in low demand female patients. They also reported one (0.75%) musculocutaneous nerve injury which required decompression and nerve grafting. Revision surgery is more complex than primary surgery, and this may affect complication rates. Sixty-three (78%) of our patient cohort underwent Latarjet procedures following failed arthroscopic stabilisations. Patient cohorts of both Frank *et al.*, and Shah *et al.*, were similar to ours, with 69% and 73% respectively, having undergone at least 1 prior ipsilateral shoulder surgery and despite the complexity of revision surgery, we report a relatively low complication rate, compared to the literature [10, 13].

All 8 patients in our study who experienced complications required surgical intervention, and of these 8, 5 were professional athletes. Of those 5 athletes, 4 were able to return to their sport at a professional level despite the complication that they had. The other 3 patients were not professional athletes, however, only 1 patient continued to experience problems at the final follow up. Return to sporting activity is an important outcome measure for Latarjet procedures; in our study, a total of 73 patients (90%) participated in competitive sports, of which, 56 patients (68%) played rugby from amateur to professional level. Only one patient (1.2%) was unable to return to professional level sport. This is markedly lower than rates of 20% failure to return to professional level sports in a long-term follow-up study by Allain *et al.* [19]

In our study, we report a re-operation rate of 9.9%, which is equal to our complication rate, as all our complications required surgical intervention; the large systematic review by Griesser *et al.*, reported a re-operation rate of 7% [11].

5. LIMITATIONS AND STRENGTHS

We report on a relatively low number of Latarjet procedures and in a retrospective nature. Our patient cohort is also specific, with 73 patients (90%) participating in competitive sports, and therefore, our conclusions cannot be applied to low demand patients. That said, we have demonstrated low rates of recurrent instability even in high demand contact athletes, and we hypothesize that if the Latarjet procedure is effective in these patients, it will withstand daily activities of lower demand patients. We report on patient-reported outcomes assessing patient satisfaction, and complications with a minimum of 2-year follow-up. We had no losses to follow up, ensuring our complication and re-dislocation rate are not falsely low.

CONCLUSION

The goal of this retrospective analysis was to assess the mid-term outcomes of the Latarjet procedure. We focused on postoperative complications, recurrent instability and functional outcome scores and compared them to current literature. Our study reveals a complication rate of 9.9% which is lower than the current literature for the Latarjet procedure. Shoulder outcome scores showed improved function and shoulder stability, reduced disability and allowed almost all individuals to return to high-level contact sports.

This study demonstrates that the Latarjet procedure remains an excellent operation for patients with recurrent anterior glenohumeral instability and/or failed arthroscopic stabilisations including the high contact professional athlete, with low complication rates and an excellent rate of return to sport.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

All patients in this study signed consent forms for their anonymised data to be utilised for scientific and research purposes.

HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are the basis of this research.

CONSENT FOR PUBLICATION

Data was analysed retrospectively and there was no change in the patients' standard of care decision making.

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None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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