




## Short-term Complications of Open Latarjet Procedure for Recurrent Anterior Shoulder Dislocation

Amir Sobhani<sup>1</sup>, Seyed Nima Taheri<sup>1</sup>, Shayan Amiri<sup>2\*</sup> 

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### Abstract

**Background:** Anterior dislocation is the most common type of shoulder dislocation, and even after appropriate treatment, recurrence after a primary traumatic anterior dislocation is highly frequent. Surgical options for treating recurrent anterior dislocations mainly include Bankart arthroscopic and Latarjet open surgery. We aimed to evaluate the outcomes and complication rates of the open Latarjet procedure in a series of patients with recurrent anterior shoulder dislocation.

**Methods:** A total of 55 patients with recurrent anterior shoulder dislocation who underwent an open Latarjet procedure were included in this retrospective cohort study. Shoulder range of motion and postoperative complications, including neurapraxia, re-dislocation, hematoma, infection, dehiscence, implant failure, and pain, were evaluated.

**Results:** The mean age of the patients was  $27.7 \pm 6.5$  years. The mean time interval after the first dislocation was  $3.4 \pm 2.7$  years. The mean preoperative and postoperative forward flexion ( $P = 0.200$ ), abduction ( $P = 0.200$ ), external rotation ( $P = 0.066$ ), and internal rotation ( $P = 0.310$ ) were not significantly different. Postoperative complications included 1 case of postoperative musculocutaneous nerve neurapraxia, 1 case of re-dislocation, 1 case of wound dehiscence, and 2 cases of screw breakage. Postoperative pain was also recorded in 11 (20%) patients that were either in the form of occasional night pain ( $n = 6$ ) or activity-dependent pain ( $n = 5$ ).

**Conclusion:** Open Latarjet procedure is an efficient procedure for the treatment of recurrent anterior shoulder dislocation. However, its rate of complications remains relatively high, and surgeons must consider this drawback in their decision-making and address patients' expectations.

**Keywords:** Recurrent Anterior Shoulder Dislocation, Open Latarjet Procedure, Surgical Complications

**Conflicts of Interest:** None declared

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### Introduction

Due to its high mobility, the shoulder joint is very susceptible to dislocation, accounting for up to 50% of major joint dislocations (1). Anterior dislocation is the most com-

mon type of shoulder dislocation, comprising approximately 85% to 98% of shoulder dislocations (2). The frequency of recurrence after the primary traumatic anterior

**Corresponding author:** Dr Shayan Amiri, [amiri.shay@iums.ac.ir](mailto:amiri.shay@iums.ac.ir)

<sup>1</sup> Bone and Joint Reconstruction Research Center, Department of Orthopedics, School of Medicine, Iran University of Medical Sciences, Tehran, Iran

<sup>2</sup> Shohadaye Haftom-e-tir Hospital, Department of Orthopedics, School of Medicine, Iran University of Medical Sciences, Tehran, Iran

#### ↑What is “already known” in this topic:

The most common type of shoulder dislocation is anterior dislocation, and recurrence is very common after a primary traumatic anterior shoulder dislocation. Surgical options for treating recurrent anterior shoulder dislocations mainly include Bankart arthroscopic and Latarjet open surgery.

#### →What this article adds:

The complication rate after this procedure is controversial, as a meticulous performance of surgical procedures and a good understanding of the local structures have been attributed to a lower rate of complications. Thus, further studies have been suggested for a proper insight into the complications of the Latarjet procedure. This information will help surgeons address the patients' expectations and decide on the proper surgical procedure. This study evaluates the complications and results of the open Latarjet procedure in patients with recurrent anterior shoulder dislocation.

shoulder dislocation is high even after appropriate treatment, and a recurrence rate exceeding 70% is reported (3). Recurrent shoulder dislocation significantly reduces the quality of life of the affected patients who are generally young and athletic (4). In addition, the risk of posttraumatic osteoarthritis is high in such patients (5). Therefore, optimizing available therapeutic approaches is critical in reducing short- and long-term complications of anterior shoulder dislocation.

Surgical options for treating recurrent anterior shoulder dislocations mainly include intra-articular arthroscopic repair, described by Bankart (6), and extra-articular open surgery, described by Latarjet (7). Several factors, such as age, activity level, the mechanism of injury, and the extent of glenoid involvement, should be considered when selecting the type of surgery (8). Even though deciding on the optimum surgical procedure for a particular patient could be challenging (9).

The rate of recurrence and complications are 2 determining factors in selecting surgical procedures. While the recurrence rate after an open Latarjet procedure is as small as 1% (10), the rate of complications after this procedure is a matter of concern, and a rate of up to 30% has been reported (11). However, the complication rate after this procedure is controversial, as a meticulous performance of surgical procedures and a good understanding of the local structures has been attributed to a lower rate of complications (9). Therefore, further studies are required to achieve an appropriate insight into the complications of the Latarjet procedure. This information will help surgeons address the patients' expectations as well as decide on the proper surgical procedure. In this study, we aimed to evaluate the complications and results of the open Latarjet procedure in a cohort of 55 patients with recurrent anterior shoulder dislocation.

### Methods

This historical cohort study was approved by the ethics committee of our institute, and patients provided written informed consent to use their medical for publication. Consecutive patients with recurrent anterior shoulder dislocation who were treated with open Latarjet procedures between April 2015 and May 2020 were evaluated for the study's eligibility criteria. Inclusion criteria were history of at least 2 shoulder dislocations, age older than 16 years, glenoid defect of 20% or more in computed tomography (CT) scans, no history of previous destabilizing shoulder surgery, and absence of concomitant musculoskeletal or neuromuscular injury of the involved shoulder such as rotator cuff tear. Patients with large Hill-Sachs lesions (>35%), multidirectional or voluntary instability, epilepsy, and any psychiatric disorder affecting the outcome of the surgery were excluded from the study. Patients with a follow-up of <1 year were also excluded from the study. Finally, 55 patients were identified as eligible for the study.

The Latarjet-Bristow procedure (Walsch technique) (12) with a deltopectoral approach was used for all patients. The coracoid process was osteotomized slightly distal to the origin of the pectoralis minor tendon without predrilling. The subscapularis tendon was dissected along its fibers from the upper two-thirds to the lower one-third. The joint

capsule was examined for the presence of free bodies or any other associated pathology. The glenoid margin was palpated to find the proper place to insert the screw. Two parallel holes were made in the neck of the scapula with the help of a 2.5-mm drill. Two holes were also made in the bone graft obtained from the coracoid process with the same drill. Two 4-mm cancellous screws were used to fix the tip of the coracoid graft to the neck of the scapula through the space created between the subscapularis muscle.

After the operation, the shoulder was immobilized using a cushioned sling in a position of neutral rotation for 6 weeks. Lateral rotation exercises were instructed to patients and asked to start on the first day after the surgery. The follow-ups were 1, 3, and 6 weeks after the surgery and every 2 months afterward up to 1 year. Surgical complications—such as hematoma, infection, wound dehiscence, and re-dislocation—were evaluated in each follow-up session. The shoulder range of motion (ROM) was evaluated at the final follow-up session and compared with the preoperative ROM. Radiologic evaluations were done using CT scanning and included the assessment of graft consolidation, graft fracture, material migration, and screws' status.

### Statistical Analysis

SPSS for Windows Version 16 (SPSS Inc) was used for the statistical evaluation of the data. Descriptive data were presented as mean  $\pm$  standard deviation or number and percentage. A comparison of the mean values between pre- and postoperative ROM was made using a paired t test if normally distributed and a Wilcoxon signed-rank test in case of non-normal distribution. Statistical significance was set at  $P < 0.050$ .

### Results

A total of 55 consecutive patients with recurrent anterior shoulder dislocation who underwent the open Latarjet procedure were included in the analysis. All the included patients were men. The mean age of the patients was  $27.7 \pm 6.5$  years (range, 17-54 years). Sports trauma was the most common etiology of the initial dislocation ( $n = 34$ ). The mean age of the first dislocation was  $24.3 \pm 6.6$  years (range, 9-46 years). The mean time interval between the first dislocation and surgical treatment was  $3.4 \pm 2.7$  years (range, 1-11 years). The mean number of dislocations was  $24.5 \pm 25.6$  (range, 2-100 years). The characteristic features of the patients are demonstrated in Table 1 in more detail.

The mean preoperative forward flexion was  $180 \pm 4.9^\circ$ . The mean postoperative forward flexion was  $177.3 \pm 15.8^\circ$  (Figure 1a). This difference was not statistically significant ( $P = 0.200$ ). The mean preoperative abduction was  $180 \pm 4.1^\circ$ . The mean postoperative abduction was  $177.5 \pm 14.3^\circ$ . This difference was also not statistically significant ( $P = 0.200$ ). The mean external rotation was  $59.8 \pm 1.6^\circ$  before the surgery and  $57.9 \pm 8.4$  at the last follow-up ( $P = 0.660$ ) (Figure 1b). Also, the mean preoperative and postoperative internal rotation assessed by the vertebral-level method was not significantly different ( $P = 0.870$ ) (Figure 1c).

**Table 1.** Characteristic features of patients with recurrent anterior shoulder dislocation treated with open Latarjet procedure

Variable	Patients (n =55)	Percentage
Gender		
Male	55	100
Female	0	0
Dominancy		
Non-dominant	22	40
Dominant	33	60
Etiology		
Sport trauma	34	61.8
Falling down	8	14.6
Tramadol induced seizure	11	20
Car accident	2	3.6
Age of first dislocation	24.3±6.6	
Time interval from the first dislocation to surgery, year	3.4±2.7	
Mean number of dislocation	24.5±25.6	

Data are presented as mean ± SD or number (%).

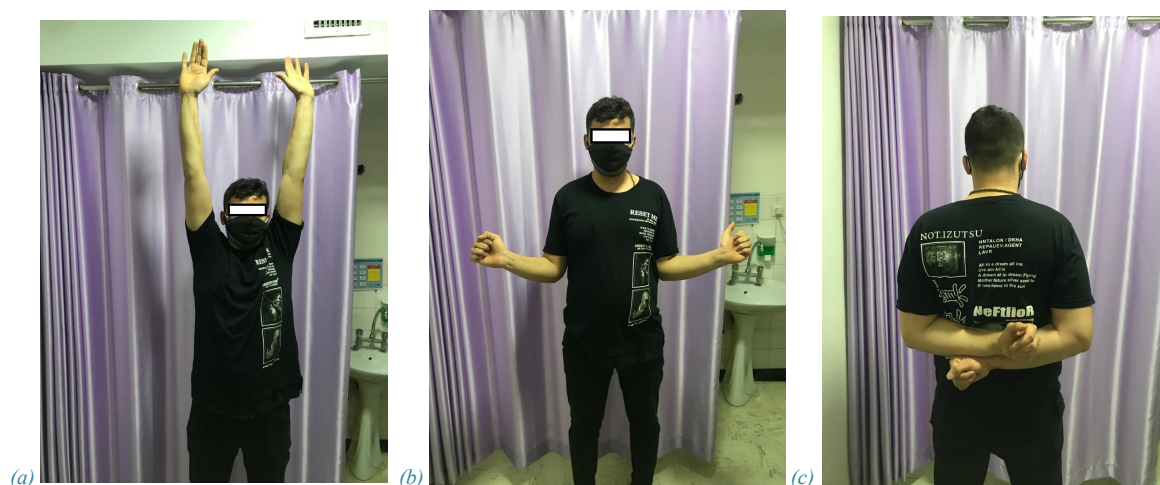


Figure 1. (a) Postoperative forward elevation; (b) postoperative external rotation; (c) postoperative internal rotation

### Complications

No intraoperative complication was recorded in the present series. Postoperative musculocutaneous nerve neurapraxia occurred in 1 patient, which was spontaneously resolved after 3 months. Re-dislocation occurred in 1 patient after a car accident. Wound dehiscence was observed in 1 patient. Screw breakage occurred in 2 patients, which was traumatic in 1 patient. Union of the graft was observed in postoperative radiographs and CT scans of all patients (Figure 2). Postoperative infection, hematoma, graft fracture, or material migration was not seen in any of the patients. Eleven (20%) patients had postoperative pain, which was in the form of occasional night pain in 6 patients and activity-dependent pain in 5 patients.

### Discussion

In this study, we evaluated the results and complications of open Latarjet surgery in the treatment of 55 patients with recurrent anterior shoulder dislocation. Based on our results, the shoulder ROM was not different before and after treatment. Postoperative complications were recorded in 16 (29.1%) patients, which included musculocutaneous nerve neurapraxia,

re-dislocation, wound dehiscence, screw breakage, and

persistent pains in 1, 1, 1, 2, and 11 patients, respectively.

There is no clear consensus on the complication rate of the open Latarjet procedure. Hematoma is an uncommon complication after an open Latarjet procedure, which is seen in 1% to 2% of the patients (13). No case of hematoma was recorded in the present series. The rate of postoperative infection has been reported to be around 1.5% after an open Latarjet procedure (13). No postoperative infection was recorded in the present study. The only wound complication of the present study was a case of wound dehiscence that was spontaneously resolved.

Stiffness and reduced external rotation have rarely been reported after the open Latarjet procedure (13). The mean pre- and postoperative shoulder ROM was not significantly different in the present series. However, the shoulder ROM was restricted in all directions in a patient who experienced re-dislocation after a car accident.

Nonunion of the coracoid process is an acknowledged complication of the Latarjet procedure, with an incidence of 1.5% to 9% (11, 12, 14, 15). No case of nonunion was seen in the present series, which could be attributed to the double screw fixation of the graft (9).

The rate of re-dislocation after the open Latarjet procedure remains as low as 1% to 3% if the technique is appropriately performed (12, 13). Re-dislocation occurred in 1

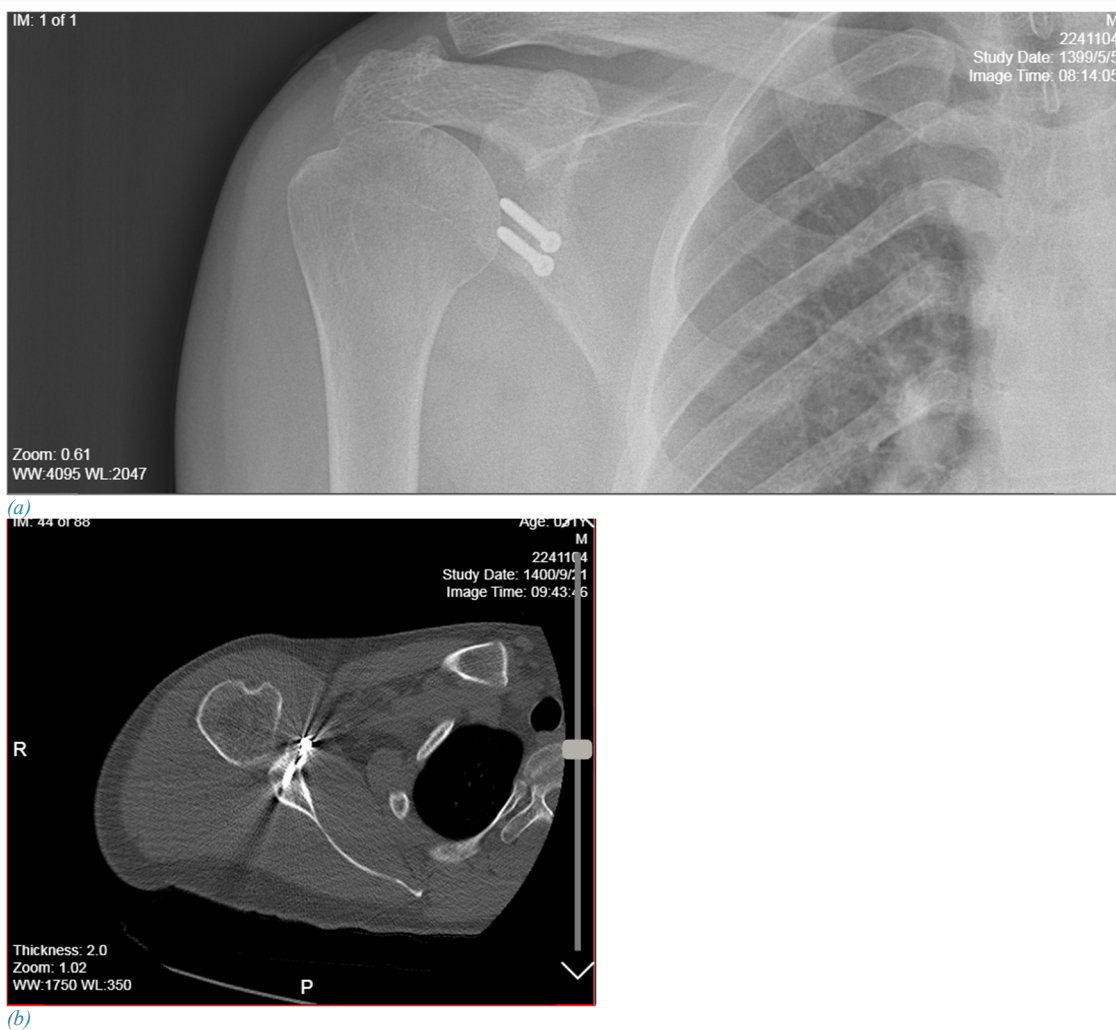


Figure 2. (a) Postoperative anteroposterior radiograph and (b) axial view computed tomography scan showing the graft union

patient (1.8%) of the current series, which was due to a traumatic accident.

Although neurovascular injuries have been reported to occur at an approximate incidence of 1% (10), an incidence rate of up to 20% has also been reported in some studies (11, 13). The neurovascular injury seen in 1 (1.8%) patient of the present series was a case of musculocutaneous nerve neurapraxia, which spontaneously resolved after 3 months.

Intraoperative graft fracture was reported to be about 1.5% in the study of Griesser et al (11). However, no case of graft fracture was recorded in the present series. This difference could be attributed to the meticulous harvest and preparation of grafts to avoid excessive decortication. The rate of intraoperative neurovascular injuries has been reported to be 1.4% (11). The intraoperative neurovascular injury did not occur in any patients of the current series.

Persistent pain is one of the most frequent complications after the Latarjet procedure and is also a main cause of dissatisfaction (16). In the study by Marjanovic et al, 9% of the patients had persistent pain at up to 14 years of follow-up (17). Persistent pain was reported by 11 (20%) patients of the present series, which

was in the form of night pain in 6 patients and activity-

dependent pain in 5 patients (18).

The overall rate of complications varies between the studies. Shah et al have reported a complication rate of 25% after the open Latarjet procedure (19). Griesser et al have reported a complication rate of 30% (11). However, a recent systematic review by Longo et al reported an overall complication rate of 15% after the open Latarjet procedure (20). The overall rate of complication was 29.1% in the present series. One reason for the different rates of complication between studies could be the difference in the follow-up period of the studies, as long-term complications such as osteolysis and arthritis are only evaluated in studies with longer follow-ups. Careful patient selection and adequate surgical techniques are 2 other main factors affecting the rate of complications after the open Latarjet procedure. Blog and Boileau aimed to provide a simple 10-point pre-operative score to select patients for either arthroscopic or open shoulder repair. Factors such as age, competitive contact sport, overhead activities, shoulder hyperlaxity, and characteristics of Hill-Sachs lesion were considered in this scoring system. According to their evaluation, patients with a score of over 6 had a recurrence risk of nearly 70%. They

suggested performing the Bristow-Latarjet procedure instead of the arthroscopic Bankart repair (8). When it comes to the surgical technique, correct positioning of the bone graft is of crucial importance in the success of the Latarjet procedure so that a position too lateral is associated with early osteoarthritis (21, 22), and a position too medial may result in a higher risk of recurrence (23, 24). The cortical-button arthroscopic Latarjet procedure did not prove its superiority over the open Latarjet procedure. A CT scan can also be a proper assessment for diagnosing the calcific tendinitis (25-27).

This study was not without limitations. The main limitations of this study were the retrospective design and the small number of patients, which did not allow subgroup analysis of the results. Short-term follow-up of the patients could be regarded as another limitation of this study.

### Conclusion

The open Latarjet procedure is an efficient procedure for the treatment of recurrent anterior shoulder dislocation. However, the complication rate of the open Latarjet procedure remains high. Therefore, surgeons should be aware of this drawback and use it in their decision-making as well as address the patients' expectations.

### Authors contribution

Conception and design: Amir Sobhani Eraghy

Interpretation of data: Seyed Nima Taheri

Drafting the article or revising: Shayan Amiri

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### Ethical Considerations

The ethics committee of our university approved this study.

### Conflict of Interests

The authors declare that they have no competing interests.

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