

Latarjet Procedure for Anterior Shoulder Instability- Our Experience at a Tertiary Care Center

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Abstract: ***Background and Objective:** Shoulder joint has a unique anatomy and is inherently unstable which increases the propensity of dislocations. Anterior shoulder instability is commonly observed in sportsmen involving pathology in the glenoid or humeral head or both Arthroscopic Bankart repair and Latarjet procedure are the standard accepted procedures for recurrent anterior shoulder instability. Here we analyze the functional outcome of Latarjet procedure for recurrent anterior shoulder instability. **Methodology:** A cohort of 25 patients formed the basis of this prospective study which was done in a tertiary care center, Victoria Hospital, Bangalore Medical College and Research Institute, Bangalore at Karnataka, India who underwent Latarjet procedure for recurrent anterior glenohumeral instability during November 2021 to May 2023. Clinical outcomes at a mean of one, three and six months postoperatively assessed by the Rowe score, ASES score and Quick DASH. Standardized anteroposterior and axial radiographs were used to assess the graft position and union. **Results:** Follow up done at 1 month, 3 month and 6 month showed progressive improvement in Range of motions, Apprehension relief, pain relief, return to normal activities and no any recurrence of instability and improved assessment scores. At the end of 6 months follow up 18 patients had excellent and remaining had good results in terms of ROWE scoring. **Conclusion:** For recurrent anterior shoulder instability, Latarjet procedure showed satisfactory result in terms of stability and range of motion mainly with significant bony defect of glenoid.*

Keywords: Anterior Shoulder Instability, Latarjet procedure, Glenoid bone loss, ROWE score, Quick DASH score, ASES score

1. Introduction

Shoulder is the most mobile joint in the body. This mobility comes at the expense of increased tendency to dislocate, with the dislocation often occurring in the anterior direction. Shoulder dislocations account for nearly 50% of all dislocations, with a 2 % incidence in the general population.

Anterior instability is a difficult clinical problem that is treated by a variety of open and arthroscopic methods with good results. Bankart repair remains a popular option. However, in those situations involving irreparable ligamentous damage or bony deficiency, this technique may be insufficient to stabilize the shoulder¹. One of the principal methods of open treatment for this problem is the Latarjet procedure², as described in his article in 1954. It has proven to be a durable and reliable method of treatment for anteroinferior instability of the glenohumeral joint. Several authors have reported on the long-term outcomes of this procedure with satisfactory results.³

Numerous studies have shown that bony Bankart or humeral avulsion of the glenohumeral ligament (HAGL) lesions treated by Bankart repair (open or arthroscopic) may result in unsatisfactory outcomes.^{4,5} In those cases with bony defects, ligamentous insufficiency, HAGL lesion, or previous failure of Bankart repair, the Latarjet procedure, which includes the transfer of the coracoid process, has been advocated as a very popular method of treatment for anterior instability.⁶ The Latarjet procedure is a reliable method of treatment for anterior instability, with good results reported in many studies.^{7,8}

The Latarjet reconstruction can successfully restore shoulder

stability in joints with a significant bony defect of the glenoid even in elderly patients. It is effective in situations in which soft-tissue reconstruction is not a reasonable option.⁹

The aim of the study is assess the functional outcome in patients undergoing Latarjet procedure for recurrent anterior shoulder instability using ROWE Score and to assess the complications of the procedure.

2. Methodology

After obtaining ethical clearance, patients fulfilling the inclusion/exclusion criteria were included in the study after obtaining a written informed consent.

Inclusion Criteria

- 1) Age of patients >18 years of either sex.
- 2) Patients willing to give voluntary written informed consent.
- 3) Patients with Recurrent Shoulder Dislocation with Bony Bankart or Hill Sachs lesion

Exclusion Criteria:

- 1) Patients who do not give consent or unwilling for follow up.
- 2) Patients less than 18 years of age
- 3) Any Anterior Dislocation along with any associated fracture.
- 4) Single episode of Shoulder Dislocation.
- 5) Posterior Instability of Shoulder/SLAP tear

25 cases with a recurrent shoulder dislocation meeting the inclusion criteria were included in the study.

- Collection of data of patients presenting with recurrent shoulder dislocation was done and recorded in case record form.
- All patients were treated surgically with a standard Latarjet procedure
- Post operatively wound healing, complications, time for union, weight bearing, range of motion of shoulder joint, mobilization will be assessed.
- Clinical and radiological examination repeated post operatively and at the end of 1month, 3month and 6months. Patients were followed up at 1 month, 3month and 6months. Assessment done using ROWE score, Quick DASH Score, ASES score at each follow up.

Post-Operative Xray of Latarjet Procedure



3. Results

A total of 25 patients were evaluated in the study whose mean age was 34.20 (+/- 10.98) years. In this study 6 patients

were less than 25 years (24%); 9 were between 26-35 years (36%) who were the majority; 5 were between 36-45 years (20 %); 5 were above 45years (20%). All the patients in the present study were males (96%) except for one female (4%).

Table 1: Distribution of the Subjects Based on Mode of Injury

Mode of injury	Frequency	Percent
FALL	11	44.0
RTA	7	28.0
SPORTS INJURY	7	28.0
Total	25	100.0

History of fall accounted as the preceding cause (mode of injury) for 1st episode of shoulder dislocation in majority of patients (44%) while the sports injury and RTA accounted 28% each respectively.

In the present study 20% of the patients had less than 5 episodes of dislocation. Majority of the patients (48%) had reported between 5-10 dislocations while 32% of the patients experienced more than 10 dislocations prior to surgery.

Majority experienced first recurrence within a year from first dislocation. The mean age at the time of surgery was 34.2 years. Majority of them (N- 16) underwent surgery within 2 years from 1st dislocation, whereas 9 patients underwent Latarjet surgery after 2 years from first episode of shoulder dislocation. The average surgery time was 43.6 minutes (Range 30- 70 minutes). The average intraoperative blood loss was 77.4 ml (Range 60- 100ml).

Table 2: Comparison of the ROM at different time intervals using repeated measures ANOVA

ROM	Time intervals	N	Minimum	Maximum	Mean	S.D	p value
FE	Pre-op	25	120	160	172.8	23.895	0.001*
	1 month	25	130	160	77.6	9.695	
	3 months	25	140	160	146.4	9.073	
	6 months	25	140	160	174.4	8.698	
CBA	Pre-op	25	40	50	47.2	4.583	0.001*
	1 month	25	40	50	47.2	4.583	
	3 months	25	50	50	50	0	
	6 months	25	50	50	50	0	
ER1	Pre-op	25	60	70	69.2	2.768	0.001*
	1 month	25	10	30	24	5.773	
	3 months	25	40	50	44.8	7.141	
	6 months	25	40	70	59.2	8.621	
ER2	Pre-op	25	80	100	87.8	5.78	0.001*
	1 month	25	20	40	29.2	5.715	
	3 months	25	50	60	54.2	4.252	
	6 months	25	70	90	75	5.773	
IR	Pre-op	25	40	60	55.8	5.715	0.001*
	1 month	25	55	60	58.2	2.449	
	3 months	25	65	70	68.6	2.291	
	6 months	25	65	70	69.6	1.384	
AB	Pre-op	25	170	180	178.4	3.74	0.001*
	1 month	25	50	60	56.8	4.76	
	3 months	25	80	110	95.6	9.16	
	6 months	25	160	180	175.6	6.5	

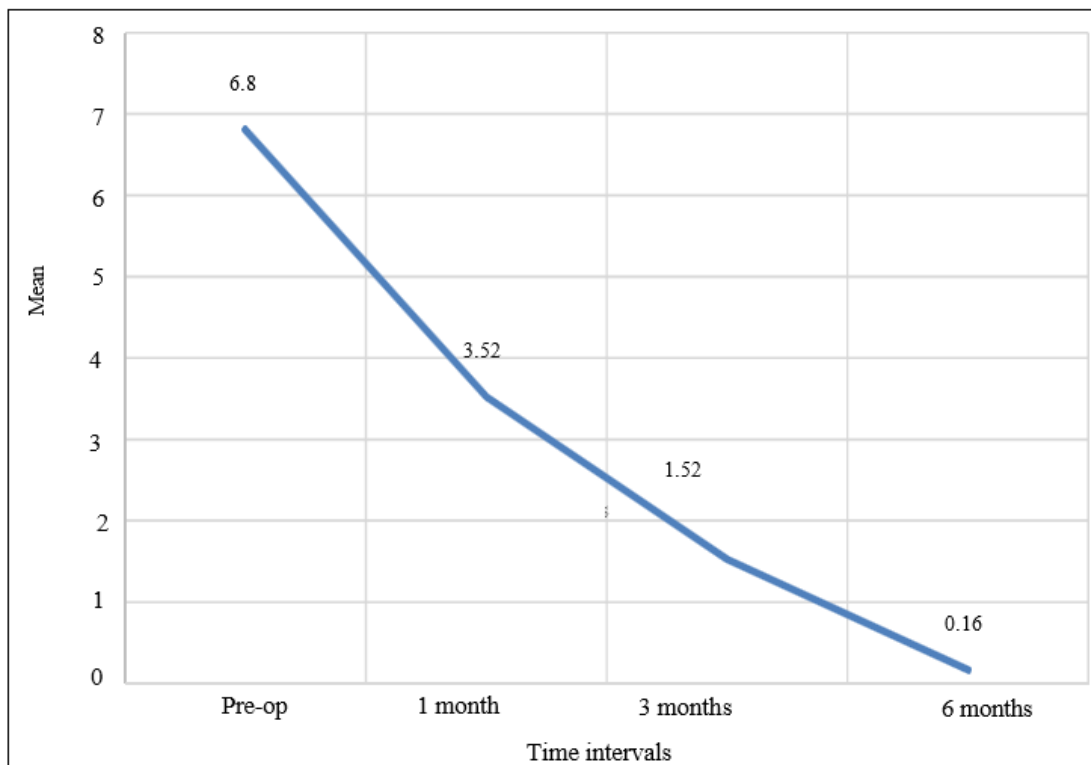
Range of movements was assessed are shown in table. Forward Elevation (FE), Cross-Body Adduction (CBA),

External Rotation with arm in adduction (ER1), External Rotation with arm in 90-degree abduction (ER2) Internal

Rotation (IR) and Abduction (AB) were found to be 172.8 (+/- 23.89), 47.2(+/-4.5), 55.4 (+/-6.4), 74.8 (+/-3.9), 55.8 (+/-5.7), and (178.40 +/- 3.74) respectively pre-operatively. Significant improvement in range of motion was observed with follow-ups at 1 month, 3 months and 6 months. It was observed that all patients achieved at least 75° of external rotation with arm in abduction by the end of 6months. At final follow-up at 6 months FE, CBA, ER1, ER2, IR and AB were found to be 174.40(+/-8.7), 50 (+/- 0), 59.2 (+/-

8.6),75.0 (+/- 5.7),69.6 (+/- 1.4) and 175.6(+/-6.50) respectively.

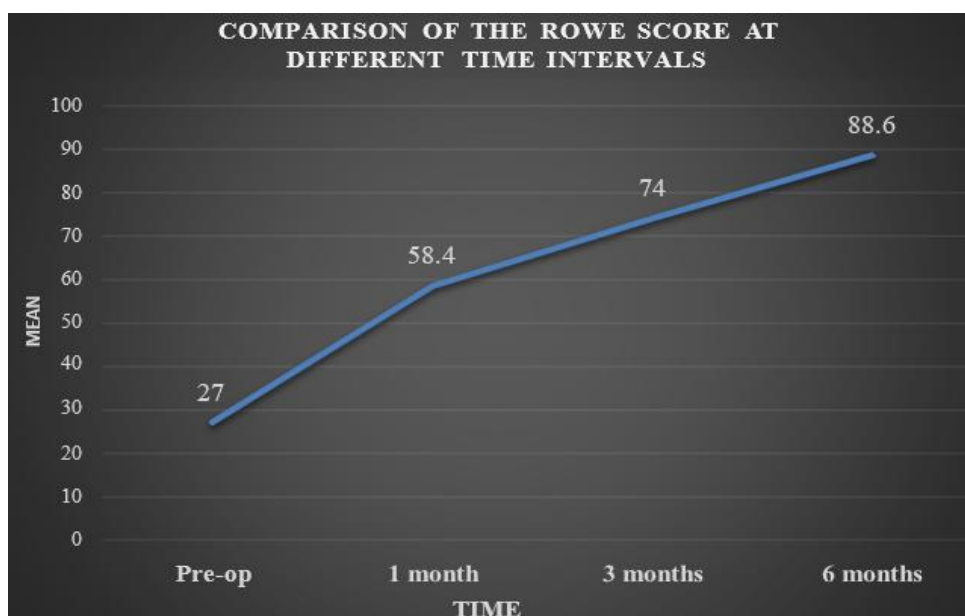
Mean VAS score among the patients in the study also reduced from pre-op value of 6.8 to 3.5, 1.5 and almost 0 at 1 month, 3 months and 6 months post-op respectively and this reduction in pain was found to be highly significant.



Graph 1: Comparison of the VAS Scores at Different Time Intervals

ROWE score which takes into account the stability, motion and function of the patient was found to have a highly significant improvement with follow ups at 1 month, 3

months and 6months with scores of 58.4 (+/- 5.35), 74.0 (+/- 6.6) and 88.60 (+/- 6.38) respectively.



Graph 2: Comparison of the Rowe Score at Different Time Intervals

Majority of the patients (N-17, 68 %) had excellent functional outcome and 8 patients (32%) had good outcome. The American Shoulder and Elbow Surgeons (ASES) Shoulder Score which is both a physician-rated and patient-rated scoring system showed a highly significant improvement at post-op follow ups as determined using

repeated measures Anova. The post-op scores at 1month, 3 months and 6 months were 68.48 (+/-7.78), 81.06 (+/-4.17), and 90.26 (+/-3.93) respectively. The mean pre-op ASES score was 48.01 (+/-6.00)



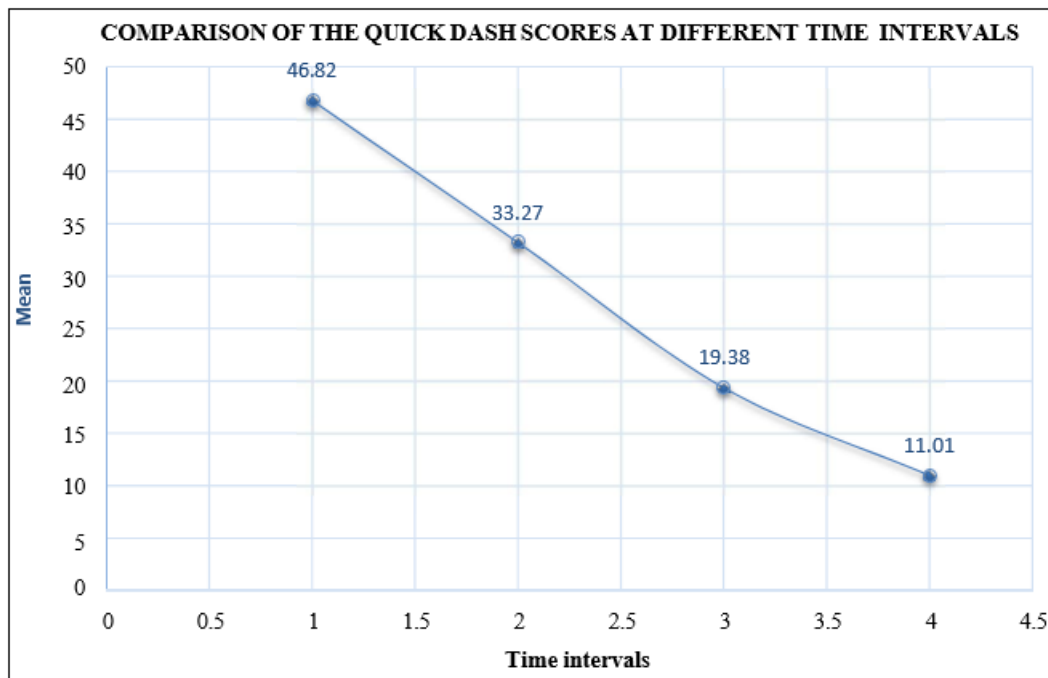
Graph 3: Comparison of the ASES Scores at Different Time Intervals



Post-operative Range of Movement Clinical Picture and Xrays

The Quick DASH score also showed highly significant improvement in patient satisfaction and ROM as determined using repeated measures Anova, with postop scores at 1

month, 3monthsand 6 months being 33.27 (+/-7.18), 19.38 (+/-5.27), and 11.01 (+/-4.25) respectively. The mean pre-op Quick DASH score was 46.82 (+/-8.22)



Graph 4: Comparison of the Quick Dash Scores at Different Time Intervals

4. Discussion

In the routine orthopaedic practice, recurrent anterior shoulder instability is the commonest type of instability encountered for which patients seek treatment. The Latarjet procedure is a mainstay for the treatment of recurrent shoulder dislocations especially those associated with bony Bankart's and multiple dislocations.

The primary goal of any stabilization procedure is to prevent recurrent instability with the goal of improving function, return to pre injury levels and to reduce long-term morbidity.

The primary stabilizing mechanism, the "sling effect", provided by the conjoint tendons, the dynamic by the lower subscapularis and bone block by the coracoid transfer, contributes a significant portion of glenohumeral stability

It is obvious that anatomic repair of the underlying pathology is the preferred procedure in anterior shoulder instabilities with Bankart lesion. But, Bankart procedure is not the ideal surgery in conditions like contact or competitive sports, athletes, significant bone loss or fracture of glenoid or humeral head, chronic erosion of glenoid rim, mid substance complete tear of glenohumeral ligament, humeral avulsion of glenohumeral ligament, deficient capsule and complete radial tear of labrum. Hence bony procedures should be preferred and performed in these patients.

Here, in this study, we review our experience with one such bony procedure – Latarjet procedure in recurrent anterior shoulder instability, meeting our criteria, which was originally described in 1954. This short-term prospective study highlights the importance of screening of patients for bone deficiency, treating them with Latarjet procedure and evaluating their functional outcome.

Recurrent instability is more likely to occur in young patients, of male sex and have bone defects or ligament

laxity. Latarjet surgery is reported as good or excellent satisfied procedure in preventing the future instability because of low post-operative recurrence rates of shoulder dislocation.

The present study consisted of 25 patients, with a mean age of 34.20 (+/-10.98) (range 18–57). Most patients (96%; n = 24) were males and the dominant shoulder was affected in 60% (n = 15) of the cases. In the study by Hovelius et al⁷, mean age at surgery was 27 years, (SD, 8.0; range, 15-57 years) while in the study by Banas et al.¹⁰ the average age at the time of the procedure was 22 years (range, 16-42 years) which is comparable to the present study.

In the by Banas et al.¹⁰ football accounted for 32% of the initial injuries, baseball had 11%, wrestling had 11%, skiing had 9%, and basketball had 7% of the injuries.

Hovelius et al.⁷ found sports injury (61.8%), fall (33%), RTA (5%) as the cause for first dislocation. In the present study history of fall accounted for 44% (n =11) of the preceding cause (mode of injury) for 1st episode of shoulder dislocation while the sports injury and RTA accounted 28% (n=7) each respectively. Postoperatively, patient was assessed at intervals of 1 month, 3 months and 6 months using ROWE score, Quick Dash score, ASES score and VAS score.

4mm Malleolar screw was used in 15 patients (60%) to fix the graft, while in rest of them 4.5mm CC screw was the implant of choice. The average intraoperative blood loss was 77.4 ml (Range 60- 100ml) which is greater as compared to arthroscopic surgery. The average surgery time was 43.6 minutes (Range 30- 70 minutes) which is of shorter duration as compared to most of the arthroscopic Bankart surgery which usually takes longer duration with steep learning curve.

Studies	No. of patients (No. of shoulders)	Excellent (%)	Good (%)	Fair (%)	Poor (%)
Banas et al., 1993	79 (79)	74	11	9	2
Allain et al., 1998	56(58)	64	24	9	3
Hoveliuss et al., 2004	113(118)	71	15	11	4
Edouard et al., 2010	20(20)	95	0	0	5
Di Giacomo et al., 2011	26(26)	69	23	8	0
Our study	25(25)	68	32	0	0

Hoveliuss et al.⁷ published a prospective study of 118 patients who were followed for an average of 15.2 years postoperatively from a Latarjet procedure. They found a 3.4% rate of recurrent dislocations and a 10% rate of subluxations; 98% of the patients were functionally satisfied with the procedure. Burkhart et al.¹⁷ found only 4 recurrent dislocations in 102 patients in the early postoperative period. Young and Walch¹² commented on over 2000 cases at their institution, with only a 1% rate of recurrent instability, 83% return to preinjury level of play, and, based on the Rowe score, 76% of patients achieved good results. Non-union occurred in approximately 3% of patients. In our study comprising of 25 patients who were followed up for 6 months, no recurrence, subluxation or apprehension was noted.

Our study, with a follow up for 6 months, showed excellent satisfaction in about 68% and 32% had good outcome with Rowe scores. ROWE score improved from 27.75 preoperatively to 88.60 post operatively with an improvement of additional 60.85 points. 68% of them presented with excellent scores postoperatively while 32 % had good score. There were no recurrences reported. In our study, in spite of our patients with various occupations and seeking treatment after multiple dislocations, we found that none of them had poor or fair outcome based on Rowe scoring.

In the study by Rossi LA et al.¹⁵ subjective pain during sports improved from a preoperative VAS score of 3.3 to a postoperative score of 1.2 ($p < .01$). In the present study mean VAS score among the patients in the study also reduced from pre-op value of 6.8 to 3.5, 1.5 and almost 0 at 1 month, 3 months and 6 months post-op respectively and this reduction in pain was found to be highly significant ($p = 0.001$).

The American Shoulder and Elbow Surgeons (ASES) Shoulder Score which is both a physician-rated and patient-rated scoring system showed a highly significant improvement at post-op follow ups as determined using repeated measures Anova. The mean pre-op ASES score was 48.01 (+/-6.00). The post-op scores at 1 month, 3 months and 6 months were 68.48 (+/-7.78), 81.06 (+/-4.17), and 90.26 (+/- 3.93) respectively.

Ballal MM¹⁶ reported significant improvement in the Quick DASH score with good improvement in patient satisfaction and ROM, with postop scores at 1 month, 3 months and 6 months being 29.8 (+/-7), 18.1 (+/-6.3), and 10.5 (+/-5.9) respectively. The mean pre-op Quick DASH score was 42.2 (+/-8.6). In the present study the Quick DASH score also showed highly significant improvement in patient satisfaction and ROM as determined using repeated

measures Anova, with postop scores at 1 month, 3 months and 6 months being 33.27 (+/-7.18), 19.38 (+/-5.27), and 11.01 (+/-4.25) respectively. The mean pre-op Quick DASH score was 46.82 (+/-8.22)

Many patients have decreased external rotation after the Latarjet procedure. Hoveliuss et al.⁷ found a mean loss of 7.4° of external rotation in adduction and 8° in abduction. Young and Walch¹² did not find any significant loss of external rotation in their patient population. Banas et al¹⁰ and Carol et al¹³ reported 9° and 12° mean reduction in external rotation respectively. Our study, when compared with the above studies, showed consistent findings, with 10° limitation of ER1 and 12° limitation of ER2.

Shah et al.¹⁴ had reported a 6% infection rate in their study, all of which resolved with thorough lavage and debridement. However, in the present study, patients did not have any immediate complications like infection, hematoma, intraoperative graft fracture, graft malposition, malunion, non-union, hardware complications like screw breakage and neurovascular injury.

Banas et al.¹⁰ found an 82% union rate in long-term follow-up of the Latarjet procedure; however, 14% of patients had a fibrous union, and many patients had pain either from the hardware or the fibrous union itself. They found that 14% of patients required reoperation, 10% for screw removal and 4% for stabilization.

The follow up of patients for 6 month duration may not be adequate to identify long term complications like resorption of coracoid graft and glenohumeral arthritis.

5. Conclusion

The present study was conducted to evaluate the functional outcome of Latarjet procedure for recurrent anterior shoulder instability. The conclusions drawn from this study are enumerated as follows

- In our study, all patients showed a statistically significant improvement in functional outcome at 6 months follow up period as evidenced by the baseline and follow up values of ROWE score. Mean ROWE score improved from 27.75 preoperatively to 88.6 postoperatively at 6 months follow up, which was statistically significant. 18 patients reported excellent outcome while 7 patients had good outcome on ROWE scoring. At final follow up none of the patients had any recurrence, subluxation or apprehension.
- The present study demonstrated that, Latarjet surgery is a very effective and safe procedure with reduced complications, presenting very satisfactory functional results in the treatment of recurrent anterior glenohumeral instability.

The follow up of patients for 6 months duration may not be adequate to identify long term complications like resorption of coracoid graft and glenohumeral arthritis.

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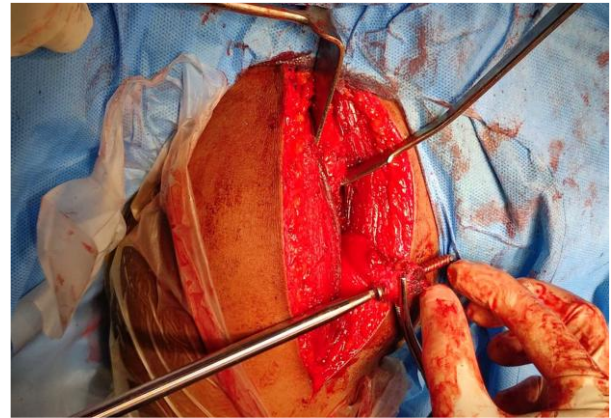
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Intraop image showing CC screw fixed to Coracoid



Intraop image post successful Latarjet Procedure