

# Arthroscopic Bankart Repair Versus Open Latarjet for First-Time Dislocators in Athletes

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**Background:** In athletes with a first-time shoulder dislocation, arthroscopic Bankart repair (ABR) and the open Latarjet procedure (OL) are the most commonly utilized surgical procedures to restore stability and allow them to return to play (RTP).

**Purpose:** To compare the outcomes of ABR and OL in athletes with a first-time shoulder dislocation.

**Study Design:** Cohort study; Level of evidence, 3.

**Methods:** We performed a retrospective review of patients with first-time shoulder dislocation who underwent primary ABR and OL and had a minimum 24-month follow-up. Indications for OL over ABR in this population were those considered at high risk for recurrence, including patients with glenohumeral bone loss. Patients who underwent ABR were pair-matched in a 2:1 ratio with patients who underwent OL by age, sex, sport, and level of preoperative play. The rate, level, and timing of RTP, as well as the Shoulder Instability–Return to Sport after Injury (SIRSI) score were evaluated. Additionally, we compared recurrence, visual analog scale pain score, Subjective Shoulder Value, Rowe score, satisfaction, and whether patients would undergo the surgery again.

**Results:** Overall, 80 athletes who underwent ABR and 40 who underwent OL were included, with a mean follow-up of 50.3 months. There was no significant difference between ABR and OL in rate of RTP, return to preinjury level, time to return, or recurrent dislocation rate. There were also no differences between ABR and OL in patient-reported outcome scores or patient satisfaction. When collision athletes were compared between ABR and OL, there were no differences in RTP, SIRSI score, or redislocation rate.

**Conclusion:** ABR and OL resulted in excellent clinical outcomes, with high rates of RTP and low recurrence rates. Additionally, there were no differences between the procedures in athletes participating in collision sports.

**Keywords:** shoulder; instability; Bankart repair; Latarjet; athlete; return to play

Anterior shoulder instability is a common shoulder issue affecting 1% to 2% of the general population,<sup>19,42</sup> with rates of 8 to 17 dislocations per 100,000 person-years.<sup>25,32,37</sup> The incidence of anterior shoulder instability is highest among collision athletes, with rates as high as 15%.<sup>23,30</sup> Athletes with anterior shoulder instability are primarily concerned with their ability to return to play (RTP) after injury, and this

has been shown to affect decision-making about treatment more so than other factors, such as shoulder stability.<sup>41</sup>

It has been established that nonoperative management for first-time dislocations results in lower rates of RTP, with higher rates of recurrent instability.<sup>19</sup> Therefore, operative management may be indicated in this population to allow for successful RTP. In athletes with a first-time shoulder dislocation, arthroscopic Bankart repair (ABR) and the open Latarjet procedure (OL) are the most commonly utilized procedures to restore stability and allow for RTP.<sup>9,21,28</sup> However, it is still unclear how ABR and OL compare in athletic populations and whether there is a difference in rate or timing of RTP. Furthermore, it is unclear how functional outcomes in athletes differ after ABR versus OL.

The purpose of this study was to compare the outcomes of ABR and OL in athletes with a first-time shoulder dislocation. In a companion study, these outcomes were evaluated in athletes with recurrent instability.<sup>16</sup> Our hypothesis was that athletes undergoing ABR and OL for a first-time shoulder dislocation would have a similar rate of RTP and time to RTP when compared with ABR.

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Ethical approval for this study was obtained from the Sports Surgery Clinic (SAREB02/12/18HM/NF).

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## METHODS

### Patient Selection

In this institutional review board–approved study, all patients who underwent ABR or OL by a single surgeon between July 2012 and March 2018 were retrospectively identified. We analyzed the operative notes of all patients who underwent ABR or OL, including those playing sports preoperatively. The indications for OL over ABR in this population were those considered at high risk for recurrence, including glenohumeral bone loss. The final decision for which surgery to perform was made in consideration of these risk factors and patient preference. The inclusion criteria for this study were first-time anterior shoulder dislocation and preoperative sport playing. The exclusion criteria were recurrent preoperative instability of the ipsilateral shoulder, previous shoulder surgery, a HAGL lesion (humeral avulsion of the glenohumeral ligament), and nonathletes. Patient matching between ABR and OL based on patient characteristics (age, sex, sport, level of preoperative play, and follow-up length) was performed to generate 2 comparable groups. As there were more ABRs performed for primary instability, these were matched 2:1 to OL.

### Surgical Technique

Both procedures were performed in the beach-chair position under general anesthesia. An examination under anesthesia was performed perioperatively on both shoulders to evaluate range of motion and joint laxity. Arthroscopic examination was performed through a standard posterior portal, including evaluation of the capsuloligamentous complex, while the glenoid and humerus were checked for osteochondral or osseous defects. A dynamic examination was performed to evaluate instability, laxity, and engagement of any osseous defects while moving the shoulder through its full range of motion. A probe was then used to assess the stability of the labrum and biceps anchor.

In the case of an ABR, the labrum was then mobilized and the glenoid bone freshened. The capsulolabral tissues were fixed to the glenoid rim with suture anchors approximately up to the 11- or 1-o'clock position. At least 3 knotted suture anchors were used in all cases. All arthroscopic knots were positioned away from the joint to avoid glenohumeral irritation. No patients underwent remplissage.

In the case of an OL, after arthroscopic examination, a 4 cm–long skin incision was placed in extension of the axillary fold, starting approximately 2 to 3 finger breadths distal to the tip of the coracoid. The coracoacromial ligament laterally and the pectoralis minor insertion medially were then released off the coracoid. An osteotomy of the coracoid at the junction between its body and base was then performed with a 90° angled saw while aiming to harvest a minimum 20 mm–long graft. The coracoid base donor site was coagulated and sealed with bone wax. A high-speed bur was used to prepare the undersurface of the coracoid, and the first 2.5-mm drill hole was placed central to and 5 mm proximal from the coracoid tip. A horizontal subscapularis

split was performed at the junction between its middle and lower third to expose the capsule, which was then also split horizontally. An inferior 2.5-mm drill hole was then placed 5 mm superior to the inferior margin of the capsular defect. The coracoid graft was fixed in the classic position to the glenoid with 2 standard 3.5-mm partially threaded cancellous screws. The medial surface of the graft was then contoured to be flush with the glenoid surface using a high-speed bur. Capsular closure was then performed with 2 or 3 nonabsorbable stitches.

### Rehabilitation Protocol

The rehabilitation protocol was the same for all patients. Postoperatively, the shoulder was placed in a sling for 3 weeks, allowing nonresisted activities of daily living without excessive elevation or external rotation. Patients immediately began physical therapy, which increased in intensity over the next 9 weeks. Return to contact in training was allowed after 12 weeks, while return to full contact and competition usually would follow within the next 3 months. In clearing an athlete to RTP, strength, range of motion, and pain were considered alongside time. In the case of OL, radiological healing was evaluated via radiographs at 12 weeks postoperatively.

### Clinical Outcomes

Participants provided postoperative patient-reported outcomes via telephone survey. The rate, level, and timing of RTP, and the Shoulder Instability–Return to Sport after Injury (SIRSI) score were evaluated. A SIRSI of >56 is considered a passing score for being psychologically ready to RTP.<sup>14</sup> To assess apprehension, patients were asked if they had subjective instability at extreme range of motion. Additionally, patients were asked for recurrence data, visual analog scale pain score, Subjective Shoulder Value, Rowe score, satisfaction, and whether they would undergo the surgery again. Furthermore, sport-specific outcomes were analyzed in collision athletes.

### Statistical Analysis

Statistical analysis was carried out using SPSS Version 22 (IBM Corp). A power calculation was performed for rate and timing of RTP and SIRSI score, with an alpha of 0.05 and a power of 0.8, and it revealed that 78 patients were required for the study to be adequately powered. For all continuous and categorical variables, descriptive statistics were calculated. Continuous variables were reported as weighted mean and estimated standard deviation, whereas categorical variables were reported as frequencies with percentages. Categorical variables were analyzed using the Fisher exact test or chi-square test. The independent or paired *t* test was performed to compare for normally distributed variables, and the nonparametric Mann-Whitney *U* test or Wilcoxon signed-rank test was used for continuous variables. *P* < .05 was considered to be statistically significant.

TABLE 1  
Patient Characteristics Between Study Groups<sup>a</sup>

	ABR (n = 80)	OL (n = 40)	P Value
Age, y	26.7 ± 8	26.4 ± 9	.853
Male sex	76 (95)	38 (95)	≥.999
Collision sport	60 (75)	30 (75)	≥.999
Percentage glenoid bone loss	1.7 ± 4.2	13.1 ± 7.8	<.001
Off-track Hill-Sachs lesion, %	5	45	<.001

<sup>a</sup>Data are reported as mean ± SD or No. (%) unless otherwise indicated. Bold P values indicate statistically significant difference between groups (P < .05). ABR, arthroscopic Bankart repair; OL, open Latarjet procedure.

TABLE 2  
Return to Play<sup>a</sup>

	ABR	OL	P Value
Return to play	65 (81.3)	32 (80)	≥.999
Same/higher level	53 (66.3)	25 (62.5)	.690
Timing, mo	6.4 ± 2.7	5.9 ± 2.5	.382
SIRSI			
Score	67.1 ± 24.3	70.2 ± 21.6	.496
Pass	55 (68.8)	29 (72.5)	.833

<sup>a</sup>Data are reported as mean ± SD or No. (%). ABR, arthroscopic Bankart repair; OL, open Latarjet procedure; SIRSI, Shoulder Instability-Return to Sport after Injury.

## RESULTS

### Patient Characteristics

Overall 487 ABRs and 297 OLs were performed in our institution during this period. After analysis, 80 athletes treated with ABR were matched with 40 treated with OL at a mean follow-up of 50.7 months (range, 24-84 months). Proportional numbers of athletes were matched perfectly for each sport and sex. The groups demonstrated no significant differences in characteristic variables, except for glenoid bone loss and off-track Hill-Sachs lesions, which were higher in those treated with OL. Minimal glenoid bone loss was identified in ABR cases (1.7%) as compared with OL (13.1%), with some OL cases requiring excision of a bony Bankart lesion. Collision sport was represented in 75% of both cohorts and was predominantly composed of rugby union and Gaelic football athletes. A comparison of patient characteristics between the OL and ABR groups is shown in Table 1.

### Return to Play

There was no significant difference in the mean time of RTP between the ABR group and the OL group (6.4 ± 2.7 vs 5.9 ± 2.5 months; P = .382). Similarly, there was no significant difference in the rate of RTP or return at the same/higher level and no difference in SIRSI score or rate of passing SIRSI score. A comparison of RTP between the

TABLE 3  
Patient-Reported Outcomes<sup>a</sup>

	ABR	OL	P Value
VAS score	2.4 ± 2.2	1.9 ± 1.8	.216
Subjective Shoulder Value	84.8 ± 17.4	85.3 ± 12	.871
Rowe score	80.1 ± 19	87.6 ± 13.1	.456
Satisfied	68 (85)	36 (90)	.574
Would undergo surgery again	71 (88.8)	34 (85)	.569

<sup>a</sup>Data are reported as No. (%) or mean ± SD. ABR, arthroscopic Bankart repair; OL, open Latarjet procedure; VAS, visual analog scale.

TABLE 4  
Recurrent Instability<sup>a</sup>

	ABR	OL	P Value
Total recurrence	7 (8.8)	1 (2.5)	.266
Redislocation	5 (6.3)	0 (0)	.171
Subluxation	2 (2.5)	1 (2.5)	≥.999
Apprehension	29 (36.3)	11 (27.5)	.413

<sup>a</sup>Data are reported as No. (%). ABR, arthroscopic Bankart repair; OL, open Latarjet procedure.

ABR and OL groups is illustrated in Table 2. Among patients in the ABR group who did not RTP, the reasons for not returning included shoulder injury in 10 (66.7%), lifestyle reasons in 4 (26.7%), and other injuries in 1 (6.7%). Among patients in the OL group who did not RTP, the reasons for not returning included shoulder injury in 4 (50%) and lifestyle reasons in 4 (50%).

### Patient-Reported Outcomes

At final follow-up, there was no difference between the groups on any of the patient-reported outcome scores. A comparison of patient-reported outcomes between the ABR and OL groups is presented in Table 3.

### Recurrent Instability

Overall 7 (8.8%) patients in the ABR group and 1 (2.5%) in the OL group experienced recurrent instability (P = .266). Despite a difference in redislocation rate, with 5 patients in the ABR group and 0 patients in the OL group, this did not reach statistical significance (P = .171). There were no other intraoperative or immediate postoperative complications in our series. Recurrence between the ABR and OL groups is compared in Table 4.

### Outcomes in Collision Athletes

Regarding collision athletes, there was no significant difference in the mean time of RTP between the ABR and OL groups (6.5 ± 2.8 vs 5.9 ± 2.3 months; P = .356). As in the

TABLE 5  
Outcomes in Collision Athletes<sup>a</sup>

	ABR (n = 60)	OL (n = 30)	P Value
Return to play			
Overall	51 (85)	25 (83.3)	≥.999
Same/higher level	43 (71.6)	20 (66.7)	.634
Timing, mo	6.5 ± 2.8	5.9 ± 2.3	.356
SIRSI			
Score	70.6 ± 24	69.3 ± 20.1	.816
Pass	45 (75)	22 (73.3)	≥.999
Total recurrence	4 (6.7)	0 (0)	.297
Redislocation	3 (5)	0 (0)	.548
Subluxation	1 (1.7)	0 (0)	≥.999
Apprehension	21 (35)	9 (30)	.813

<sup>a</sup>Data are reported as mean ± SD or No. (%). ABR, arthroscopic Bankart repair; OL, open Latarjet procedure; SIRSI, Shoulder Instability-Return to Sport after Injury.

overall comparison, no significant differences occurred between collision athletes who underwent ABR and OL in terms of RTP outcomes or recurrence rates. A comparison of outcomes in collision athletes between the ABR and OL groups is shown in Table 5.

## DISCUSSION

The most important finding from this study was that both ABR and OL resulted in high rates of RTP, with a similar time to RTP and similar SIRSI scores. There was no difference in any outcome measure between the procedures in athletes, with excellent clinical outcomes and low recurrence rates. Additionally, no differences were found between the procedures in collision athletes.

ABR is the most commonly performed procedure for shoulder instability globally, particularly in cases of soft tissue injury absent of glenoid bone loss.<sup>13</sup> Although Murphy et al<sup>30</sup> reported satisfactory functional results at 10-year follow-up, a high rate of recurrence occurs after soft tissue repair alone, with rates of 30% to 40% reported in studies. The Latarjet procedure is a more invasive alternative treatment, favored primarily in Europe, involving transferring part of the coracoid process and the attached conjoint tendon to the anterior aspect of the glenoid rim to restore stability. The Latarjet procedure has been shown to result in lower recurrence rates; however, serious complications have been described, such as nonunion, hardware problems, and neurovascular injuries.<sup>2,10,15,17,22</sup> While traditionally performed in open fashion, the Latarjet procedure is increasingly being performed arthroscopically, with limited albeit promising evidence to support this approach and scant outcome data in athletes looking to RTP.<sup>7,11,18,26,33</sup>

RTP has been shown to be athletes' primary concern when undergoing shoulder stabilization, with operative management resulting in higher rates of RTP than nonoperative management.<sup>19,41</sup> Our findings are in line with overall RTP rates in the literature. Memon et al<sup>28</sup> found in a systematic review that 88% of patients were able to

RTP after ABR, whereas Hurley et al<sup>21</sup> found in their systematic review that 85% of patients were able to RTP after the Latarjet procedure. However, the overall pooled rate is slightly higher with the OL than ABR in the literature (83.5% vs 70.3%).<sup>5,6,35</sup> Similarly, we established that there was no difference in time of RTP, whereas given the literature we expected OL to result in a faster RTP, as the time taken for bone healing may be shorter than that for soft tissue healing. In their systematic reviews, Hurley et al noted that RTP after OL took approximately 5 months, and Memon et al indicated a mean RTP time of approximately 8 months after ABR.

Our study evaluated athletes for their psychological readiness to return to sport using the SIRSI score. No significant difference occurred between groups for overall score or pass rate. This indicates that the procedures are equally efficacious in restoring patients' confidence in their shoulders after operative management. The SIRSI is an adaptation of the Anterior Cruciate Ligament-Return to Sport after Injury Scale (ACL-RSI), with several studies demonstrating a higher score in those who are able to successfully RTP.<sup>1,3,24,29</sup> Additionally, psychological recovery has been shown to be independent of a patient's physical recovery, as the ACL-RSI score does not correlate with athletes' strength and power measures.<sup>31</sup> However, a higher ACL-RSI score has been shown to be predictive of further injury.<sup>27</sup> Furthermore, the groups demonstrated no differences with any patient-reported outcome, including pain. Pain is important to consider in this population and in clearing athletes to RTP, as it may limit their ability to RTP, particularly among the collision athlete population, where it may limit their ability to perform.<sup>20</sup>

There was a high rate of RTP among collision athletes. Studies have evaluated the outcomes of OL in collision athletes and revealed high rates of RTP with low recurrence rates.<sup>21</sup> However, while studies have shown a high rate of return with ABR in collision athletes, there is a concern over the high rate of recurrent instability in this cohort.<sup>28,38</sup> Nonetheless, with both procedures we found a low recurrence rate in collision athletes, which highlights the importance of appropriate patient selection and counseling. Our study demonstrated similar high rates of RTP, time to RTP, and SIRSI scores between the procedures in this population, indicating that both may be effective in allowing collision athletes to RTP.

The ABR and OL groups were matched for preoperative characteristics, although we did not control for bone loss. Thus, while there was no significant difference in recurrence rates, it should be noted that this was not the primary purpose of this study, and our study was not designed to assess this, as it was not appropriately powered to do so. Glenoid bone loss<sup>4,8,34,43</sup> and off-track Hill-Sachs lesions<sup>4,12,36,39,40</sup> are considered the biggest risk factors for recurrent instability, and these are the key determining factors in the decision to utilize ABR or OL. As the indications for the procedures differed owing to OL being offered to athletes at high risk for recurrence, including those with glenohumeral bone loss, the lack of statistical significance should be tempered, as it has been well established in the literature that OL results in a lower rate of recurrence.

## Limitations

As this study was retrospective, it has numerous limitations inherent to such design. While all patients were matched for sex, sport, and level of sport, there was a slight albeit nonstatistically significant difference in age, but this was also matched as closely as possible. Furthermore, this study reported the findings of a single-surgeon cohort with short- to midterm follow-up, which may limit generalizability. Additionally, subsequent clinical examination was not possible, because follow-up was conducted through telephone survey. Thus, it was difficult to assess apprehension, minor range of motion loss, and other subtle clinical findings. We also cannot comment on potential long-term complications, such as pain and arthritic changes. Patients were not randomized, and those with greater bone loss were placed in the OL group. Therefore, given the differences in indications between the procedures, the study was not sufficiently powered to find significant differences in recurrence rate, and post hoc analysis revealed that 228 patients would be needed to determine a significant difference.

## CONCLUSION

In the current study, ABR and OL resulted in excellent clinical outcomes, with high rates of RTP and low recurrence rates. Additionally, there were no differences in outcomes between the procedures in collision athletes.

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