

# Results of Arthroscopic Bankart Repair in Recreational Athletes and Laborers

## A Retrospective Study With 5 to 14 Years of Follow-up

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**Background:** Arthroscopic Bankart repair is the most common procedure for anterior shoulder instability management. However, the long-term efficacy of the procedure is questionable, and the results are different among different populations. Few studies have focused on specific populations, such as recreational athletes and laborers.

**Hypothesis:** Good to excellent long-term results, with a low recurrence rate, can be achieved using arthroscopic Bankart repair in recreational athletes and laborers suffering from anterior shoulder instability.

**Study Design:** Case series; Level of evidence, 4.

**Methods:** A specific group of laborers and recreational athletes were included in this study. A total of 52 patients (52 shoulders) with anterior-inferior traumatic shoulder instability underwent arthroscopic Bankart repair and met our strict criteria for study inclusion. The recurrence rate was recorded. Patients were evaluated at a minimum follow-up of 5 years using the American Shoulder and Elbow Surgeons (ASES) score, the Rowe score, the Constant score, and a visual analog scale (VAS) for pain. A radiological evaluation for arthritis was also performed according to the Samilson-Prieto classification.

**Results:** The mean follow-up was 105.4 months (range, 65-164 months). Our overall recurrence rate was 11.5% (6/52 patients). All patients were able to return to their previous job status with minimum limitations, and 76.7% of our study population reported returning to their preinjury sporting activities. Postoperatively, all scores were improved, with statistically significant increases from preoperative values ( $P < .001$ ). At the last radiographic follow-up, 9 patients (18.8%) had mild arthritis, while 2 patients (4.2%) had moderate arthritis.

**Conclusion:** Arthroscopic soft tissue Bankart repair may provide good to excellent long-term clinical results with an acceptable recurrence rate in medium-demand patients (recreational athletes and laborers).

**Keywords:** arthroscopic Bankart repair; soft tissue procedure; recreational athletes; laborers; long-term results

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Although an anterior shoulder dislocation is a quite common cause of shoulder trauma, with a relatively high incidence, controversy exists regarding which type of operative treatment should be the standard of care.<sup>19,28,29</sup> According to the literature, arthroscopic Bankart repair provides good results in terms of shoulder stability as well as a return-to-sports rate similar to open repair.<sup>13,17</sup> However, arthroscopic anterior stabilization is currently the preferred means of treatment for anterior glenohumeral dislocations in the absence of bone loss.<sup>21,22,26</sup>

Over the past 2 decades, arthroscopic reconstruction with the use of anchors has been reported to have good clinical results with a low rate of complications.<sup>12,30</sup> Short-term outcomes have demonstrated favorable results with a low recurrence rate and no significant limitations in shoulder use.<sup>6,12,21,22</sup> However, few studies in the literature

have evaluated the long-term results of arthroscopic Bankart repair, despite the fact that anterior dislocations are very common among the population.<sup>1,4,10,13,25</sup> According to these studies, a recurrence of instability could occur even 5 years after the index procedure, and therefore, studies with a long-term follow-up (>5 years) are needed to establish the effectiveness of arthroscopic Bankart repair. Indeed, studies with a long-term follow-up have reported that the failure rate increased with time and could be 18% to 30%.<sup>1,4,10,31</sup> Because of these high failure rates, some authors do not recommend arthroscopic Bankart repair anymore, and they suggest bony procedures (such as the Latarjet procedure) to manage traumatic anterior shoulder instability because of the lower failure rate after these procedures, despite an increase of glenohumeral arthritis at long-term follow-up and a higher incidence of serious complications.<sup>2,3,23,38</sup>

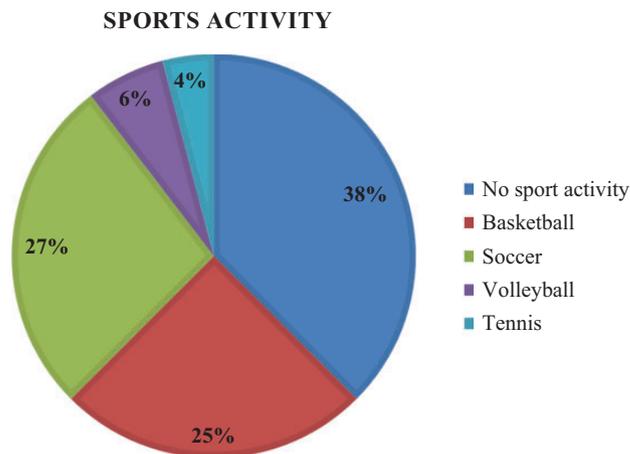
We believe that to determine the effectiveness of arthroscopic Bankart repair, in addition to a long-term follow-up, we should also differentiate between high-demand (contact athletes) and medium-demand (recreational athletes or heavy laborers) or low-demand patient populations because risk factors differ between these groups. In other words, instead of blaming the procedure, patient selection (right procedure for a specific patient) could be the key factor to reduce the recurrence rate after arthroscopic Bankart repair.

Therefore, the purpose of this study was to evaluate long-term clinical and radiological outcomes in a specific group of patients (recreational athletes and laborers) who underwent arthroscopic Bankart repair using suture anchors. Our hypothesis was that good to excellent long-term results in terms of stability and return to work and recreational activity, similar to open Bankart repair, could be achieved using arthroscopic Bankart repair.

## METHODS

This single-institution retrospective study included patients who underwent surgery between April 2003 and May 2012. In particular, 52 patients (52 shoulders) suffering from anterior-inferior instability of their shoulder underwent arthroscopic Bankart repair in our department. The study was conducted in a tertiary care university hospital after approval from an institutional ethics committee. The same senior surgeon (M.E.H.) operated on all patients. Inclusion criteria were a primary diagnosis of symptomatic anterior-inferior shoulder instability after at least 2 episodes of a shoulder dislocation, with arthroscopic Bankart repair as the preferred treatment. Only patients who were available for a minimum follow-up of 5 years were included. Exclusion criteria were multidirectional instability, hyperlaxity, bony defects (based on computed tomography or magnetic resonance imaging) more than 15% from the glenoid side, rotator cuff tears, humeral avulsion of the glenohumeral ligament lesions, neurological disorders involving the shoulder joint, and previous failed Bankart repair.

There were no professional athletes among these patients. All of them were either laborers or recreational



**Figure 1.** Reported sports activity (N = 48 patients).

**TABLE 1**  
Patient Demographic Data (N = 48)<sup>a</sup>

| Variable                   | Value        |
|----------------------------|--------------|
| Age, mean (range), y       | 24.8 (16-48) |
| Male sex                   | 42 (87.5)    |
| Dominant shoulder affected | 38 (79.2)    |
| Heavy physical workload    | 28 (58.3)    |
| Average physical workload  | 20 (41.7)    |
| Recreational athlete       | 30 (62.5)    |

<sup>a</sup>Data are shown as n (%) unless otherwise indicated.

athletes. More specifically, all of them reported the use of their arms in their work. A total of 4 patients were not available for the final clinical and radiographic evaluation, and they were contacted only by telephone. The data from these 4 patients was only included in the overall recurrence rate.

More than half of the 48 evaluated patients (n = 28; 58.3%) reported a heavy physical workload (manual laborers, construction workers, military personnel), while the rest (41.7%) had occupations with medium average work required (electricians, plumbers). In terms of sports activity, 62.5% (30/48) of our patients reported weekly recreational sports activity (once or twice per week) at an amateur level. In particular, 15 declared participation in overhead sports activities (12 basketball, 3 volleyball), 13 in soccer, and 2 in tennis (Figure 1).

Patient demographics, surgical variables, and postoperative complications were recorded. Demographic data included age, sex, and dominant shoulder affected (Table 1). Surgical variables, such as the number of anchors used, were obtained. Postoperative complications were defined as hematoma, infection, and neurological injury, as well as other instances of dislocations after arthroscopic repair. Patients were assessed at follow-up with the American Shoulder and Elbow Surgeons (ASES) score, Rowe score, and Constant score. Additionally, a 10-point visual analog scale (VAS) for pain was used.

## Surgical Technique

All patients underwent the procedure in a lateral decubitus position with a traction system. A standard posterior portal and an anterior-superior portal were used for Bankart repair and capsular shift. A 30° arthroscope was introduced in the posterior portal so as to fully explore the joint and confirm the Bankart lesion, the capsulolabral complex was mobilized, and thorough debridement of the glenoid anterior rim was performed. The anterior capsule was shifted, and the first anchor was placed at the 5-o'clock position. At least 2 more anchors were used (4- and 3-o'clock positions). Additional anchors were placed if needed. Absorbable single-loaded suture anchors (Bio-Ancor; Linvatec) with No. 2 nonabsorbable sutures were used in all cases. The anchors were placed on the cartilaginous margin of the glenoid, creating a "bumper effect." A Nicky arthroscopic sliding knot was used to secure the anchor sutures. No remplissage procedure was performed in any patient at that time. Overall, 31 patients (59.6%) underwent arthroscopic Bankart repair, and 21 patients (40.4%) underwent combined Bankart and superior labral from anterior to posterior (SLAP) repair.

## Rehabilitation Protocol

All patients were discharged the next day after surgery. Postoperatively, the operated arm was placed in a sling in internal rotation for 3 weeks. During this period, patients were allowed to flex and extend the elbow and wrist and maintain axillary hygiene. For the next 3 weeks, patients were free to perform active anterior elevation movements and at 6 weeks postoperatively were free to perform active full range of motion. Rotator cuff-strengthening exercises were allowed 6 weeks after the procedure and full participation in sports or recreational activities 6 months later based on the functional recovery of each patient individually. Full participation in work was allowed 4 months after surgery.

## Evaluation Methods

All patients were evaluated at 3 weeks, 6 weeks, 6 months, and annually thereafter. At least 5 years after the index procedure, the patients were contacted for clinical evaluation by 2 independent observers (G.A.K. and K.B.) to assess shoulder stability and evaluate range of motion. Recurrence or failure was defined as a redislocation or subluxation episode. Patients were assessed using the aforementioned measures (Constant score, Rowe score, ASES score, VAS). Furthermore, the patients were queried during their final follow-up for their activity level, including return to work and return to sports. At their last follow-up visit, the patients were asked to undergo true anterior-posterior and lateral radiography of their shoulder to evaluate possible arthritic changes according to the Samilson-Prieto classification.<sup>28</sup>

## Statistical Analysis

Descriptive statistics were applied, and a nonpaired *t* test was used for a comparison between preoperative and postoperative scores. Significance was set at  $P \leq .05$ .

## RESULTS

In total, 52 patients (52 shoulders) who underwent surgery for anterior-inferior instability of their shoulder were included in our study. Ultimately, 48 of these patients (92.3%) were available for the final follow-up. Despite our efforts, the remaining 4 patients (4 shoulders) were not able to visit our outpatient clinic for the final assessment because of personal reasons, and therefore, they were excluded from evaluation tests and radiographic examinations. However, during telephone contact, they all declared no incidence of recurrent instability, and therefore, they were included in our final recurrence rate. All patients had documented traumatic, recurrent anterior dislocations of the shoulder before surgery, with a mean number of reported dislocations of 7.4 (range, 3-18). The sex distribution was in favor of men (87.5%), and the mean age at the time of surgery was 24.8 years (Table 1).

In the majority of the patients, we used 3 anchors (25/48; 52.1%), while 4 anchors were applied in 13 cases (27.1%), 5 anchors in 8 cases (16.7%), and 6 anchors in 2 cases (4.2%). More than 4 anchors were used in patients with a type 5 SLAP lesion (combined Bankart and type 2 SLAP lesion). No incidence of postoperative hematomas, infections, or neurological damage occurred.

The mean follow-up was 105.4 months (range, 65-164 months). At the final follow-up, 6 of the 52 patients (11.5%) experienced recurrent instability: 5 had another dislocation, and 1 experienced a subluxation. Interestingly, 4 of them redislocated their shoulder more than 3 years after the index procedure. All of the 6 patients had postoperative instability due to trauma, suffering from an unexpected fall, or during work or sports participation. Moreover, 3 of them with a dislocation requested further treatment, and all 3 subsequently underwent the Latarjet procedure. The other 3 had only 1 instance of a dislocation and felt satisfied with their arm, without requesting further treatment. These 3 patients reported a slight modification of their daily arm use, without restriction in their jobs.

All the remaining patients returned to their previous job status. Of the 30 patients who reported previous recreational sports activity, 23 (76.7%) were able to return to their preoperative level. In terms of functional outcomes, the mean outcome scores were as follows: ASES score, 94.93 (range, 63-100); Rowe score, 94.41 (range, 40-100); and Constant score, 96.04 (range, 62-100). The VAS score was 0.56 (range, 0-5) (Table 2). Preoperative scores recorded included the Rowe score (mean, 28.7 [range, 16-43]) and Constant score (mean, 42.4 [range, 28-50]). According to statistical analysis, these scores were statistically significantly improved in comparison with preoperatively ( $P < .001$ ).

The evaluation of arthritis progression in patients in comparison with their preoperative status revealed that 9

TABLE 2  
Clinical Results at Last Follow-up<sup>a</sup>

| Variable                                       | Value           |
|--|-----------------|
| Follow-up time, mo                             | 105.41 (65-164) |
| Recurrent instability, n (%) <sup>b</sup>      | 6 (11.5)        |
| Returned to work, n (%)                        | 48/48 (100.0)   |
| Returned to recreational sport activity, n (%) | 23/30 (76.7)    |
| VAS score                                      | 0.56 (0-5)      |
| ASES score                                     | 94.93 (63-100)  |
| Rowe score                                     | 94.41 (40-100)  |
| Constant score                                 | 96.04 (62-100)  |

<sup>a</sup>Data are shown as mean (range) unless otherwise indicated. ASES, American Shoulder and Elbow Surgeons; VAS, visual analog scale.

<sup>b</sup>N = 52 patients.

patients (18.8%) had mild arthritis (stage 1) while 2 patients (4.2%) had moderate arthritis (stage 2) at the last radiographic follow-up according to the Samilson-Prieto classification (Figure 2). No arthritic lesions were found in these patients before surgery. However, shoulder function in these patients according to the Constant and ASES scores was good or excellent.

## DISCUSSION

The recurrence rate in our series was 11.5% at a mean follow-up of nearly 9 years. Return to previous job status and recreational activity were also assessed in our study. All patients managed to return to their previous job status, despite the fact that all of them had heavy or more than average physical work. Another interesting finding in our

study was the return of our patients to the preinjury level of recreational sports activities. There were 30 patients who reported participation in various sports activities before their injury, and the majority of them (76.7%) continued their recreational activity postoperatively. Accordingly, all evaluated scores were significantly higher when compared with preoperatively.

Our recurrence rate of 11.5% is in accordance with the published literature and may be even relatively low in comparison with the reported rates.<sup>1,4,10,32,33</sup> Our belief is that this is an acceptable recurrence rate at long-term follow-up. Aboalata et al<sup>1</sup> reported a redislocation rate of 18% in a larger but more heterogeneous group of patients. They also reported a high satisfaction rate (92%), but their series consisted of both professional and nonprofessional athletes, and different types of fixation devices were used. In another study by Castagna et al,<sup>4</sup> the failure rate was slightly larger (16%) than ours. However, their results included atraumatic recurrence, contrary to our patients, who had an episode of trauma resulting in another dislocation after surgery. On the other hand, their study population included athletes, with one-third reporting to be at a competitive level.

Flinkkilä et al,<sup>10</sup> in a large series of 186 shoulders, demonstrated a high recurrence rate (30%) at a median 12-year follow-up. This large recurrence rate is probably because their study focused on young adults, younger than 20 years, which has been found to be a predisposing risk factor.<sup>20,24,34,35</sup> They also included patients with bony lesions. We strictly excluded patients with glenoid defects more than 15% because they are considered contraindications for arthroscopic soft tissue repair.<sup>8</sup> In a retrospective comparative study by Zimmermann et al,<sup>38</sup> the rate of recurrence and subluxations was 28.4%, a much higher rate than ours. This may have been the result of a mixed population

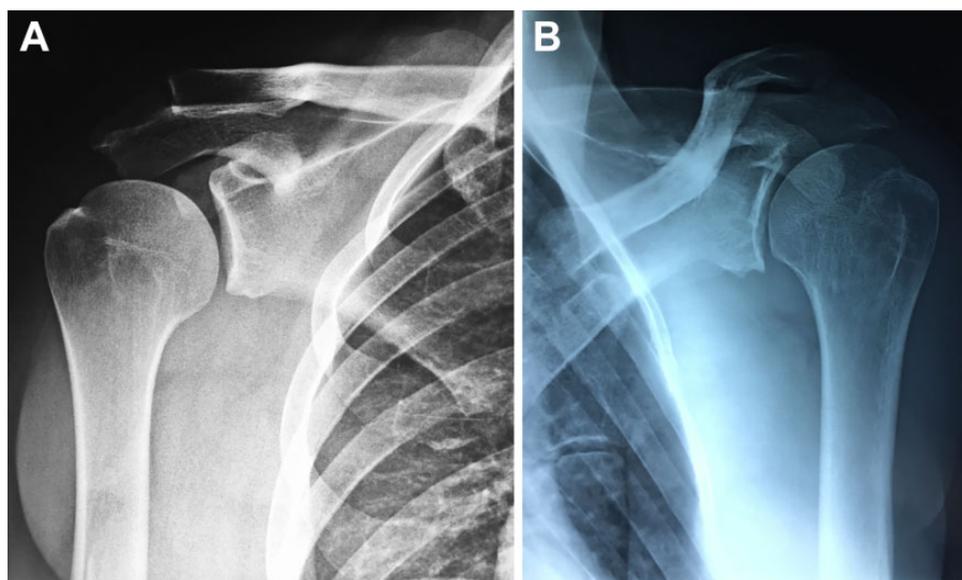


Figure 2. (A) Radiographic follow-up of a 35-year-old patient with no signs of arthritis 8 years after Bankart repair. (B) Radiographic follow-up of a 31-year-old patient with mild arthritis 10 years after Bankart repair.

(athletes, nonathletes, laborers) and their slightly longer follow-up, as they indicated in their study that there was a remarkable increase in redislocations and the reoperation rate with the passage of years. Of note, most patients with recurrent anterior instability are contact athletes or military personnel, and our population represents only a proportion of the surgical procedures performed for anterior instability. Therefore, our results with this low recurrence rate cannot be extrapolated to a population of contact athletes (rugby, football, etc).

Our results indicate that arthroscopic Bankart repair is an acceptable treatment for patients with shoulder instability who are recreational athletes and laborers. The primary aim of shoulder stabilization surgery is to prevent the recurrence of anterior dislocations or subluxations. Nevertheless, a recurrence of instability is not the only complication after a procedure for anterior shoulder instability. Postoperative shoulder arthritis is usually present with the Latarjet procedure, with a rate of 20% to 60%.<sup>2,14,23</sup> A recent systematic review reported a high rate of 38.2% of arthritic changes in patients with the Latarjet procedure, with 35% of the total population having residual pain postoperatively.<sup>15</sup> On the contrary, we found in our study a lower rate of degenerative changes in comparison with most published series for shoulder instability managed with the Latarjet procedure.<sup>2,14,23</sup> This long-term sequence/complication should be taken into account (in addition to the recurrence rate) in the selection of a shoulder stabilization procedure.

Osteolysis of the coracoid graft was found in 59.5% of patients treated with the Latarjet procedure in a computed tomography analysis study by Di Giacomo et al.<sup>7</sup> Although it seems to be just a radiological finding with little or no clinical significance in terms of the recurrence of instability or functional outcomes, osteolysis may result in implant problems (screw prominence). Another complication of the Latarjet procedure is pseudarthrosis of the coracoid process, which can occur in 1.5% to 9% of cases.<sup>11,23</sup> Both of these complications do not exist with arthroscopic soft tissue procedures. Last but not least, a transient nerve injury is more prevalent after bony procedures according to a systematic review by Williams et al,<sup>36</sup> with predominance of the musculocutaneous nerve. In our cohort, none of the patients reported any kind of neurological impairment.

The arthroscopic Latarjet procedure is an emerging surgical technique for Bankart repair. Excellent results after this procedure have been demonstrated in the literature.<sup>9,37</sup> However, complications not present with arthroscopic Bankart repair do exist and are reported for this type of procedure. Athwal et al<sup>3</sup> highlighted a 7% rate of intraoperative fractures of the coracoid graft, while single-screw fixation was performed in 6% of the cases, which is a negative prognostic factor for failure at long-term follow-up. Finally, we should bear in mind that the arthroscopic Latarjet procedure is a demanding nonanatomic procedure with a high learning curve and is not easily performed by a majority of orthopaedic surgeons.<sup>9,16</sup>

In terms of the surgical technique, the use of at least 3 suture anchors is associated with a lower risk of recurrence.<sup>18,27,32</sup> Previous studies using fewer anchors have

reported quite high rates of recurrence.<sup>5</sup> Our surgical technique includes the use of at least 3 suture anchors. This may be one of the reasons for our low rate of redislocations.

Our study is not without limitations. It is a retrospective study, the sample size was probably not large enough, and no control group was available to compare clinical and radiological scores. However, despite the retrospective nature of the study, only 4 of 52 patients (7.7%) were unavailable for the final follow-up. The main strengths of the study are that our study population was homogeneous in terms of occupations and athletic activities, and the follow-up was quite long. In addition, all patients had the same abnormality, were treated by the same surgeon with the same surgical procedure, and followed the same rehabilitation protocol.

## CONCLUSION

Based on our results, we believe that arthroscopic Bankart repair can provide good to excellent long-term clinical results with an acceptable recurrence rate in medium-demand patients (recreational athletes and laborers). Our recurrence rate of 11.5% at a mean of 105.4 months of follow-up shows that when an arthroscopic soft tissue procedure is performed correctly with proper positioning of at least 3 anchors, good to excellent results can be achieved.

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