

Arthroscopic Bankart Repair Versus Conservative Management for First-Time Traumatic Anterior Shoulder Instability: A Systematic Review and Meta-analysis



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Purpose: To perform a meta-analysis of the current evidence in the literature comparing arthroscopic Bankart repair versus conservative management for first-time anterior shoulder dislocation. **Methods:** A literature search of the MEDLINE, Embase, and Cochrane Library databases was performed based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) guidelines. Prospective studies comparing arthroscopic Bankart repair versus conservative management as treatment for first-time anterior shoulder dislocation were included. Recurrence, further treatment, and return to play were compared, with all statistical analysis performed using Review Manager, version 5.3. $P < .05$ was considered statistically significant. **Results:** Ten prospective studies with 569 patients were included. Arthroscopic Bankart repair resulted in a lower rate of total recurrent instability (9.7% vs 46.7%, $I^2 = 0$, $P < .0001$) and further surgical treatment for anterior shoulder instability (5.9% vs 46.7%, $I^2 = 0$, $P < .0001$). Additionally, arthroscopic Bankart repair resulted in a higher rate of return to play (92.8% vs 80.8%, $I^2 = 0$, $P = .002$). **Conclusions:** Arthroscopic Bankart repair resulted in a 7-fold lower recurrence rate and a higher rate of return to play than conservative management. Thus, arthroscopic Bankart repair may be advisable to perform routinely in patients with first-time dislocation who participate in sports. **Level of Evidence:** Level II, systematic review of Level I and II studies.

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Anterior shoulder instability is a common clinical problem, with a reported incidence ranging from 8 to 25 per 100,000 person-years in the general population, with higher rates seen in athletic populations.¹⁻³ Traditionally, patients with a first-time dislocation have been managed conservatively; however, recurrence rates of up to 100% have been reported.⁴⁻⁶ With

recurrent instability, there may be an increased incidence of additional intra-articular pathologies that can lead to long-term instability arthropathy.^{7,8} Thus, there is debate as to whether arthroscopic Bankart repair should be routinely performed in patients after first-time anterior shoulder dislocation.⁹

Arthroscopic Bankart repair is the most commonly performed procedure worldwide for anterior shoulder instability, with good outcomes and a low complication rate. Although there are still concerns regarding the recurrence rate in patients with glenoid bone loss, studies have shown low rates of postoperative instability in patients appropriately indicated for arthroscopic Bankart repair.¹⁰ Additionally, arthroscopic Bankart repair allows for a high rate of return to sport, with Memon et al.¹¹ finding that 88% of patients returned to sport postoperatively.

Several systematic reviews have looked at the outcomes of Bankart repair versus conservative management; however, these included a mixture of open and

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arthroscopic techniques, as well as mixed levels of evidence.¹²⁻¹⁶ Multiple new prospective trials have been published, warranting an updated systematic review and meta-analysis. Therefore, the purpose of this study was to perform a meta-analysis of the current evidence in the literature comparing arthroscopic Bankart repair versus conservative management for first-time anterior shoulder dislocation. We hypothesized that arthroscopic Bankart repair would result in superior outcomes with lower rates of recurrent instability and higher rates of return to play.

Methods

Study Selection

Two independent reviewers (E.T.H. and A.K.M.) performed a literature search based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) guidelines and reviewed the search results, with the senior author (E.J.S.) arbitrating on any disagreement.¹⁷ The title and abstract were reviewed for all search results, and potentially eligible studies received a full-text review. Finally, the reference lists of the included studies and literature reviews found in the initial search were manually screened for additional articles meeting the inclusion criteria.

Search Strategy

The following search terms were used in the MEDLINE, Embase, and Cochrane Library databases on September 2019 as the search algorithm: ((Shoulder OR glenohumeral OR anterior shoulder) AND (conservative OR nonoperative OR nonsurgical OR physiotherapy) and (Bankart OR repair OR stabilization OR surgical OR surgery or arthroscopic or arthroscopy) AND (instability OR dislocation)). No time limit was given to publication date.

Eligibility Criteria

The inclusion criteria were as follows: (1) prospective clinical studies comparing arthroscopic Bankart repair and conservative management, including randomized controlled trials and prospective cohort studies; (2) publication in a peer-reviewed journal; (3) publication in English; and (4) studies for which the full text was available. The exclusion criteria were (1) case series, (2) review studies, (3) cadaveric studies, (4) biomechanical studies, and (5) abstract-only publications.

Data Extraction and Analysis

The relevant information regarding the study characteristics, including the study design, level of evidence, methodologic quality of evidence (MQOE), population, outcome measures, and follow-up time points, was collected by 2 blinded reviewers (E.T.H. and A.K.M.) using a predetermined data sheet, with the results

compared. When required information was not available in the text, the study authors were contacted. The MQOE was assessed using the Newcastle-Ottawa scale.¹⁸ On this 9-point scale, studies receiving 7 to 9 points, 5 to 6 points, 4 points, and 0 to 3 points were graded as very good, good, satisfactory, and unsatisfactory, respectively.

Outcomes Measured

The outcomes measured focused on (1) recurrent instability, (2) subsequent surgery for shoulder instability, and (3) return to play.

Statistics

All statistical analysis was performed using Review Manager (RevMan for Macintosh, version 5.3 [2014]; The Nordic Cochrane Centre, The Cochrane Collaboration, Copenhagen, Denmark). Fixed-effects models were used. Results were presented as the risk ratio (RR) for dichotomous outcomes with the 95% confidence interval (CI). Heterogeneity between studies was quantified using the I^2 statistic.¹⁹ An I^2 value of less than 25% was chosen to represent low heterogeneity; greater than 75%, high heterogeneity. $P < .05$ was considered statistically significant.

Results

Literature Search

The initial literature search resulted in 3,217 total studies. After removal of duplicates, the articles were screened for the inclusion and exclusion criteria; 2,120 unique studies were evaluated, and 23 full texts were assessed for eligibility. Ten clinical trials with 569 patients were included in this review.²⁰⁻²⁸ The PRISMA flowchart is shown in [Figure 1](#).

Study Characteristics and Patient Demographic Variables

There were 4 randomized controlled studies (Level I evidence) and 6 prospective cohort studies (Level II evidence). The mean MQOE score of the studies was 8.5. The 10 studies compared 270 patients treated with nonoperative management versus 299 patients treated with arthroscopic Bankart repair.²⁰⁻²⁹ Most of the patients (87.7%) were male patients; the average age was 21.5 years, and the average follow-up time was 66 months. The baseline age, sex, and reported instability measures of patients were similar between the cohorts ($P > .05$). The study characteristics are shown in [Table 1](#).

Clinical Outcomes

Recurrent Instability

Recurrent instability was reported in all 10 studies, with 299 patients in the arthroscopic Bankart repair cohort and 270 patients in the conservative treatment cohort. Overall, 29 patients (9.7%) in the arthroscopic Bankart repair cohort experienced some form of

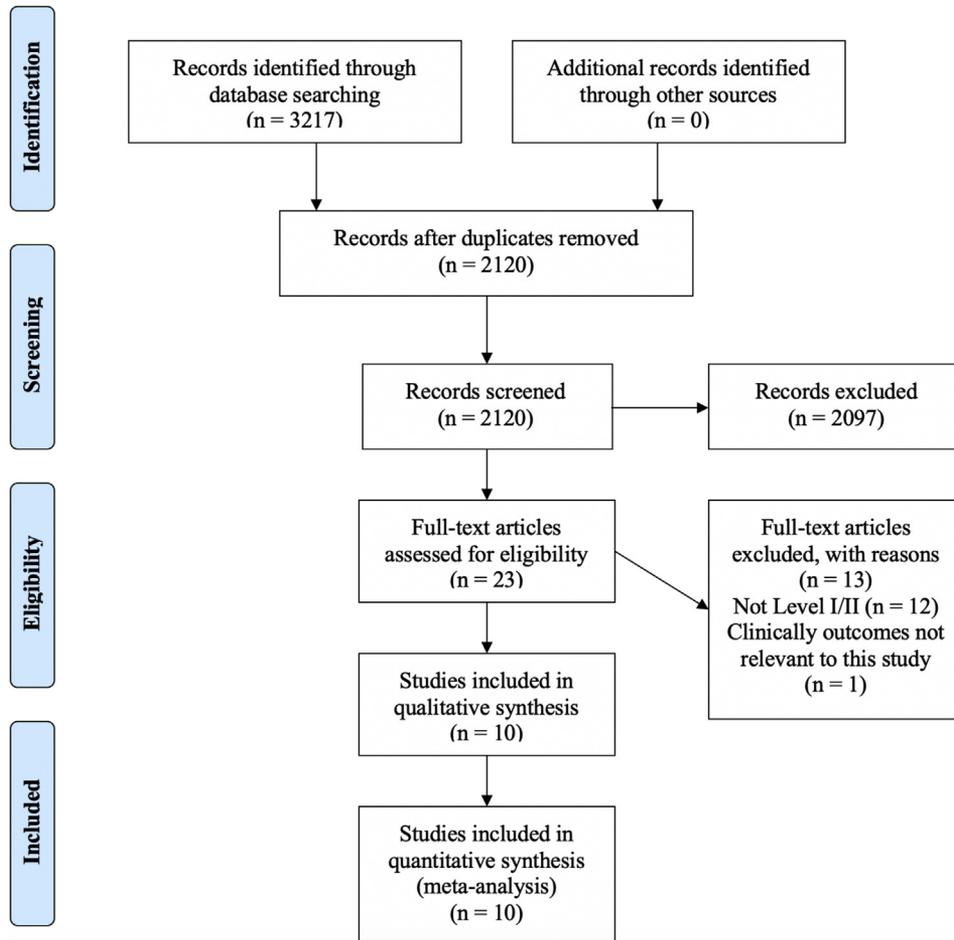


Fig 1. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) study selection flow diagram.

recurrent instability, whereas 182 (67.4%) in the conservative treatment group had recurrent instability. A statistically significant difference was observed in favor of arthroscopic Bankart repair (RR, 0.15; 95% CI, 0.01-0.21; $I^2 = 0\%$; $P < .0001$). The forest plot for recurrent instability is shown in [Figure 2](#).

Subsequent Instability Surgery

Subsequent instability surgery was reported in 6 studies, with 185 patients in the arthroscopic Bankart

repair cohort and 180 in the conservative treatment cohort. Overall, subsequent surgery for shoulder instability was performed in 11 patients (5.9%) in the arthroscopic Bankart repair cohort versus 84 (46.7%) in the conservative treatment group. A statistically significant difference was noted in favor of arthroscopic Bankart repair (RR, 0.13; 95% CI, 0.07-0.24; $I^2 = 0\%$; $P < .0001$). The forest plot for subsequent instability surgical procedures is shown in [Figure 3](#).

Table 1. Study Characteristics

Study	LOE	Study Design	MQOE Score	ABR, n	C, n	Age (Range), yr	M/F	Follow-up, mo
Arciero et al., ²⁰ 1994	II	PCS	8	21	15	20.1 (18-24)	—	26.6
Bottoni et al., ²¹ 2002	I	RCT	8	9	12	22.4 (19-26)	21/0	36.6
De Carli et al., ²² 2019	II	PCS	9	60	70	21.7 (18-28)	121/9	93.8
Dickens et al., ²³ 2017	II	PCS	8	9	7	20.6 (19-23)	36/3	12
Gigis et al., ²⁴ 2014	II	PCS	8	38	27	16.6 (15-18)	21/24	36
Jakobsen et al., ²⁹ 2007	I	RCT	9	37	39	21.5 (15-39)	62/14	120
Kirkley et al., ²⁵ 2005	I	RCT	9	16	15	23 (16-29)	27/4	79
Larrain et al., ²⁶ 2001	II	PCS	9	28	18	21 (17-27)	—	67.4
Robinson et al., ²⁷ 2008	I	RCT	8	45	43	24.8 (19-30)	82/6	24
Shih et al., ²⁸ 2011	II	PCS	9	34	25	22.1 (17-29)	59/0	71.7

ABR, arthroscopic Bankart repair; C, conservative; LOE, level of evidence; M/F, male-female ratio; MQOE, methodologic quality of evidence; PCS, prospective cohort study; RCT, randomized controlled trial.

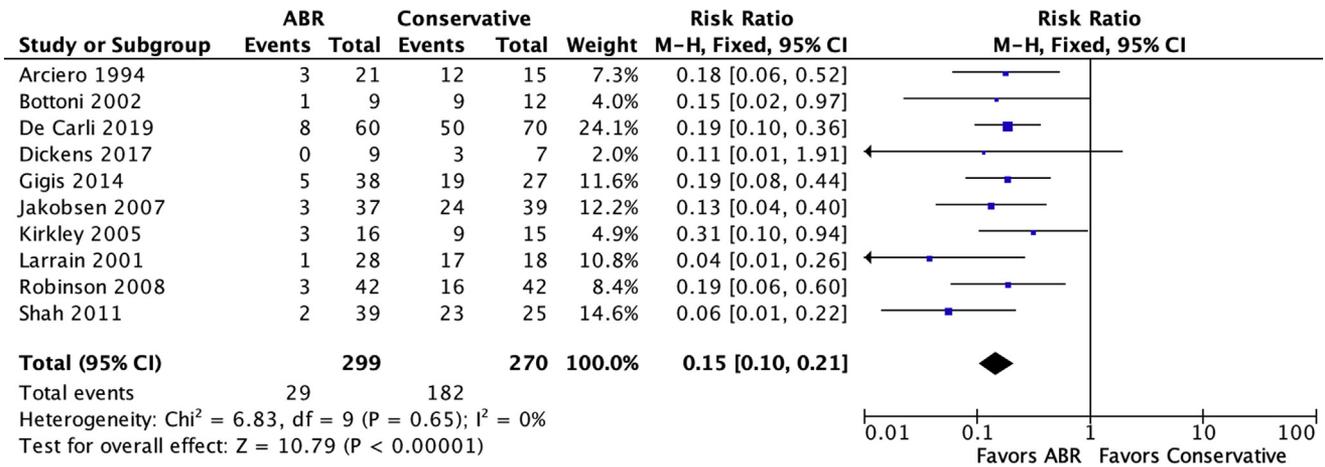


Fig 2. Forest plot of recurrent instability. (ABR, arthroscopic Bankart repair; CI, confidence interval.)

Return to Play

Return to play was reported in 6 studies, with 153 patients in the arthroscopic Bankart repair cohort and 156 in the conservative treatment cohort. Overall, 142 patients (92.8%) in the arthroscopic Bankart repair cohort returned to play, whereas 126 patients (80.8%) in the conservative treatment group returned to play. A statistically significant difference was found in favor of arthroscopic Bankart repair (RR, 0.37; 95% CI, 0.20-0.69; I² = 0%; P < .0001). The forest plot for return to play is shown in Figure 4.

Discussion

The most important finding of this study was that arthroscopic Bankart repair resulted in a 7-fold lower recurrence rate than conservative management as treatment for first-time anterior shoulder dislocation. Additionally, a significantly higher rate of return to play was found after arthroscopic Bankart repair. These findings indicate that arthroscopic Bankart repair may be advisable to perform routinely in patients with first-time dislocation who participate in sports to allow for both return to play and a lower risk of recurrence.

Arthroscopic Bankart repair is the most commonly performed procedure worldwide for anterior shoulder instability.³⁰ However, a small percentage of patients who have undergone this procedure go on to have recurrent instability.^{20,22,24} Thus, clinicians may offer a Latarjet or Remplissage augmentation over an arthroscopic Bankart repair to patients with specific identifiable risk factors. The Instability Severity Index Score stratifies patients based on risk, with age younger than 20 years, participation in competitive sports, contact athletes, hyperlaxity, Hill-Sachs lesions, and glenoid bone loss being considered significant risk factors. We found that, overall, the rate of recurrent instability was 7 times higher in patients who underwent conservative management compared with initial surgical treatment of patients with first-time dislocation. Arthroscopic Bankart repair after recurrent instability has a higher recurrence rate than that after a first-time dislocation, which may suggest that patients should not delay surgical intervention.^{14,31,32} Additionally, further instability events increase the risk of having bone and cartilage injuries, which increase the risk of long-term arthropathy.³² Finally, a low rate of complications was observed with arthroscopic Bankart repair, with our systematic review finding complications other than

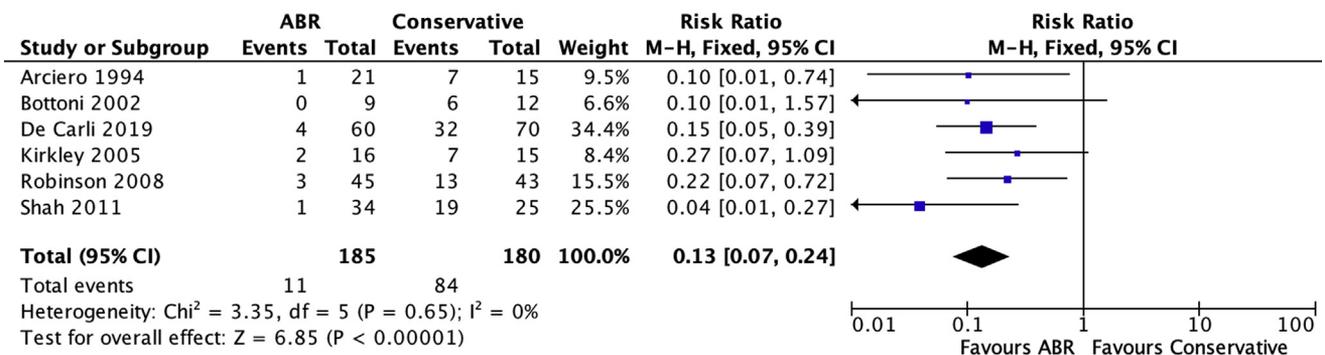


Fig 3. Forest plot of subsequent instability surgical procedures. (ABR, arthroscopic Bankart repair; CI, confidence interval.)

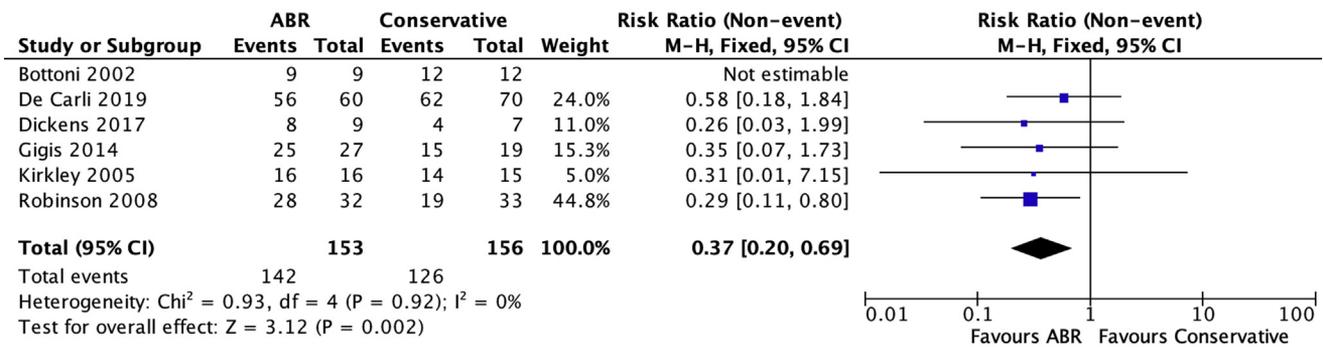


Fig 4. Forest plot of return to play. (ABR, arthroscopic Bankart repair; CI, confidence interval.)

recurrent instability in approximately 1.6% of patients. These complications included posterior subcutaneous suture abscess formation, transient hypesthesia of the median nerve distribution with spontaneous resolution, and adhesive capsulitis.^{20,27}

The results of this systematic review show that a disproportionately high incidence of recurrent instability is seen in patients managed conservatively. These outcomes should be considered unacceptable, especially given that these patients are primarily young athletes. When deciding which patients are candidates for conservative management, it is important to consider their risk factors for recurrence, namely age, participation in sports, and timing within the season. Despite some patients having a high risk of recurrence, it may be acceptable to consider conservative management during the season and proceed with definitive management in the off-season. A variety of questions remain: What is the optimal means of conservative management? How long should a patient remain immobilized? Does immobilizing a patient in external rotation reduce the rate of recurrence? Although further research focusing on the optimization of rehabilitation protocols for conservative management may result in improved outcomes, patients today should be counseled on the high risk of recurrence and the consequences of recurrent instability when deciding on their management strategy.

Regarding a patient's decision on his or her management, Warth et al.³³ found that the ability to return to play is the single most important driving factor, more so than the possibility of recurrent instability. Our study found arthroscopic Bankart repair to result in a higher rate of return to play than conservative management. The potential for intentional crossover was evaluated in the included studies, and we believe that no patients in the included studies fell into this category because none underwent further surgical procedures without instability events. A systematic review by Memon et al.¹¹ found a high rate of return to play, with 81% of patients returning to sport and 66% returning to their preinjury level of activity. De

Carli et al.²² reported lower but similar findings, with 70% of patients returning to sport and 41.4% returning to their preinjury level of activity. Additionally, Larrain et al.²⁶ found that the mean time to return was not significantly different between conservative and operative management: Patients treated conservatively returned at a mean of 4.5 months, and those treated with arthroscopic Bankart repair returned at a mean of 5.3 months. Of note, the protocol of the aforementioned study prevented patients in both groups from returning to play for at least 4 months (to regain normal movement, strength, and function). However, other studies have shown that earlier return is possible with conservative management.

Although the long-term results of shoulder instability management highlight low to moderate rates of recurrent dislocation, the rates of instability arthropathy remain concerning. A systematic review of arthroscopic Bankart repairs with minimum 10-year follow-up found that although 16% of patients had recurrent dislocations, 59.4% had some evidence of instability arthropathy, with 10.5% of cases being rated as moderate to severe.³⁴ A similar systematic review involving the Latarjet procedure found that 3% of patients had recurrent dislocations but 11.7% had moderate to severe instability arthropathy.³⁵ In contrast, Hovelius et al.³⁶ analyzed the outcomes of conservative management in 257 patients with first-time dislocation at 25-year follow-up and found that 26.5% had moderate to severe instability arthropathy, with a slightly lower rate in those who underwent surgical stabilization or had no recurrence. Additionally, Aboalata et al.³⁷ found that the severity of osteoarthritis was correlated with both the number of preoperative dislocation events and the age of the patient at the initial instability event. Although it is still unclear how surgical management influences the natural history of shoulder instability and its progression to radiographic arthritis, De Carli et al.²² found that arthroscopic Bankart repair reduced the progression of arthritis in the short term compared with conservative

management. Thus, the progression of shoulder arthritis does appear to be influenced by the stability of the shoulder.

Limitations

This study has several limitations and potential biases, including the limitations of the included studies themselves. Although all of the included studies were prospective studies, only 4 were randomized, thus potentiating selection bias. Additionally, it was not possible to adjust for age, sex, and type of sport played; however, overall there was no significant difference in these demographic variables between the 2 groups. In one of the included studies, that of Robinson et al.,²⁷ an arthroscopic lavage was performed in the control group. Although this was not a truly conservative therapy and may have affected the heterogeneity of the studies, lavage has not been shown to have a therapeutic benefit and was thus assumed to be similar to conservative management. Given that this was a double-blind randomized trial in which patients were unable to determine whether they underwent Bankart repair, this assumption was believed to be conservative and appropriate. The overall heterogeneity (i.e., statistical measure of differences between studies) was 0% across all outcome measures, which indicated consistency between the results in the studies.

Conclusions

Arthroscopic Bankart repair resulted in a 7-fold lower recurrence rate and a higher rate of return to play than conservative management. Thus, arthroscopic Bankart repair may be advisable to perform routinely in patients with first-time dislocation who participate in sports.

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