



Systematic Review

Primary Latarjet procedure versus Latarjet in the setting of previously failed Bankart repair: a systematic review



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ABSTRACT

Objectives: The purpose of this study is to systematically review the comparative studies in the literature to compare the outcomes of the Latarjet procedure in the setting of a previously failed Bankart repair versus those undergoing the Latarjet procedure as a primary surgery for anterior shoulder instability.

Methods: A systematic search in Pubmed, EMBASE, and The Cochrane Library databases was carried out according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines. Cohort studies comparing outcomes in the Latarjet procedure as a primary surgery versus the Latarjet procedure in the setting of a previously failed Bankart repair were included.

Results: Ten studies with 1913 patients were included. There was a significantly lower rate of recurrent instability in those with a Latarjet procedure as a primary surgery (4.8% vs 12.1%, $p = 0.007$). There was also a significantly lower rate of complications with the Latarjet procedure as a primary surgery (6.2% vs 10.2%, $p = 0.03$). Furthermore, there was a significant difference in the rate of revision surgery in favour of the Latarjet procedure as a primary surgery (4.8% vs 10.9%, $p = 0.02$). However, there were similar rates of redislocations (2.8% vs 3.4%, $p = 0.82$) and return to play (67.7% vs 78.5%, $p = 0.30$) between the two cohorts.

Conclusion: This study found that the Latarjet procedure as a revision procedure for a previously failed Bankart repair resulted in higher rates of complications, recurrent instability, and revisions than the Latarjet procedure performed as a primary procedure.

Level of evidence: Level III, Systematic Review & Meta-Analysis of Level III studies.

What is already known:

- Murphy et al. found in their systematic review at a minimum of 10 year follow-up that there was a 31% rate of recurrent instability following arthroscopic Bankart repair
- More recently, the Latarjet procedure has gained popularity as the primary treatment for anterior shoulder but there are concerns of its utility as a primary operation due to high complication rates
- To date, there is mixed evidence how failed prior Bankart repairs affect outcomes of those undergoing Latarjet procedure

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What are the new findings:

- The most important finding in this study was that the Latarjet procedure as a primary procedure for anterior shoulder instability resulted in lower rates of recurrent instability complications and revisions than the Latarjet procedure performed in the setting of a previously failed Bankart repair.
- There was no overall difference in redislocation rate when excluding subluxations
- There was no significant difference in the rate of return to play, but this was only evaluated in 3 studies and needs further investigation.
- These findings indicate that an arthroscopic Bankart repair has negative effects on a future Latarjet procedure and should give caution to performing this in high-risk populations as a primary procedure where there is a high risk of failure.

Introduction

Anterior shoulder instability is a common pathology with an incidence rate of 0.12 injuries per 1000 athlete exposures [1,2]. The highest incidence is reported among young athletes and those involved in collision sports or the military [3–6]. Operative treatment has been proven to be superior to non-operative treatment in the management of anterior shoulder instability [7]. Although there is consensus regarding the importance of surgery in the setting of recurrent instability for improving function, return to activity or sports, and maximizing long-term outcomes, there is little agreement regarding the optimal surgical treatment [8–10].

Arthroscopic Bankart repair is one of the most common treatment methods; however, it has been associated with a high rate of recurrence, ranging from 20 to 40% [5]. Murphy et al. found in their systematic review at a minimum of 10 year follow-up that there was a 31% rate of recurrent instability following arthroscopic Bankart repair [5]. Another surgical option is the Latarjet procedure where the coracoid is transferred to the anterior glenoid with the conjoint tendon, with a similar systematic review by Hurley et al. finding a recurrence rate of 8.5% at greater than 10 year follow-up [11,12]. This procedure is used to primarily in high-risk patients for post-operative recurrent instability, such as those with significant glenohumeral bone loss or prior failed Bankart repair [9]. More recently, it has gained popularity as the primary treatment for anterior shoulder but there are concerns of its utility as a primary operation due to high complication rates [13–15]. To date, there is mixed evidence how failed prior Bankart repairs affect outcomes of those undergoing Latarjet procedure [16–18].

The purpose of this study was to compare outcomes of the Latarjet procedure in the setting of a previously failed Bankart repair versus those undergoing the Latarjet procedure as a primary surgery for anterior shoulder instability. Our hypothesis was that those treated with the Latarjet procedure in the setting of previously failed Bankart repair would have higher complication rates and lower rates of return to play, recurrence and revision rates when compared to those who had a Latarjet procedure as a primary surgery.

2. Methods

2.1. Search strategy and study selection

Two different, independent reviewers searched in adherence with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines and then analysed the search results. In the event of

disagreement, a senior author would intervene. The following were search terms that were used in The Cochrane Library, EMBASE, and Pubmed from their inception to January 2023 (Latarjet), with an updated search conducted in August 2023. Both the abstract and the title were reviewed for all identified studies, followed by a thorough review of each full text. Furthermore, references included in the studies identified were reviewed for additional studies that met the inclusion criteria.

2.2. Eligibility criteria

Inclusion criteria were as follows: (1) Cohort studies comparing primary Latarjet versus Latarjet secondary to failed Bankart repair, (2) published in a peer-reviewed journal, (3) published in English or full translation freely available, and (4) full text of studies available. All other studies were excluded.

2.3. Data extraction

Two independent reviewers collected all relevant information using a predetermined data sheet on Microsoft Excel. In the instance where required information was not offered in the text, authors were contacted via email. Level of evidence (LOE) was assessed using the criteria from the Oxford–Centre for Evidence-Based Medicine. Methodological quality of the evidence (MQOE) was assessed using the Newcastle–Ottawa scale, which is a 9 point scale where studies 7–9, 5–6, and 0–3 points were identified as very good, good, satisfactory, and unsatisfactory, respectively.

2.4. Outcomes analysed and statistics

Statistical analysis was performed using Review Manager ((Revman) [Macintosh]. Version 5.3. Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2014.) Heterogeneity between studies was quantified using the I^2 statistic. Random-effects models were employed. Results were expressed as risk ratio (RR) for dichotomous outcomes and mean difference for continuous outcomes, with a 95% confidence interval (95% CI). A p-value of <0.05 was considered to be statistically significant.

3. Results

3.1. Literature search

The initial literature search resulted in 3,172 total studies. Once duplicates were removed, 2,093 studies were assessed for eligibility and full texts were reviewed. Ten studies with 1,913 unique patients were included in this review (Fig. 1).

3.2. Study characteristics and patient demographics

There were 10 studies (all LOE III), with 1,155 patients treated with a primary Latarjet procedure and 758 with a Latarjet procedure following a failed Bankart repair [14,16,18–25]. The mean MQOE was 7 (6–8). Two of the studies were utilized from the same patient cohort, but only unique outcomes were used. Overall, 88.8% of the patients were male with an average of 27 years old and a mean follow-up of 48.4 months. The study characteristics and patient demographics are detailed in Table 1.

3.3. Clinical outcomes

3.3.1. Recurrent instability

Recurrent instability was reported in 5 studies, with 523 patients treated with a primary Latarjet procedure and 387 with a revision Latarjet procedure secondary to a failed Bankart repair. Overall, 4.8% of

patients treated with a primary Latarjet procedure and 12.1% of patients treated with a revision Latarjet procedure secondary to a failed Bankart repair had recurrent instability. There was a statistically significant difference in favour of primary Latarjet procedure (RR; 0.50, 95% CI, 0.30 to 0.82, $I^2 = 0\%$, $p = 0.007$) (Fig. 2).

3.3.2. Redislocations

Redislocation was reported in 7 studies, with 566 patients treated with a primary Latarjet procedure and 470 with a revision Latarjet procedure secondary to a failed Bankart repair. Overall, 2.8% of patients treated with a primary Latarjet procedure and 3.4% of patients treated with a revision Latarjet procedure secondary to a failed Bankart repair experienced a redislocation. There was no statistically significant difference (RR; 1.12, 95% CI, 0.42 to 3.00, $I^2 = 25\%$, $p = 0.82$) (Fig. 3).

3.3.3. Complications

Complications were reported in 9 studies, with 1155 patients treated with a primary Latarjet procedure and 758 with a revision Latarjet procedure secondary to a failed Bankart repair. Overall, 6.2% of patients treated with a primary Latarjet procedure and 10.2% of patients treated with a revision Latarjet procedure secondary to a failed Bankart repair had complications. There was a statistically significant difference in favour of primary Latarjet procedure (RR; 0.71, 95% CI, 0.52 to 0.98, $I^2 = 0\%$, $p = 0.03$) (Fig. 4).

3.3.4. Revision surgery

Revision surgery was reported in 7 studies, with 566 patients treated with a primary Latarjet procedure and 470 with a revision Latarjet procedure secondary to a failed Bankart repair. Overall, 4.8% of patients treated with a primary Latarjet procedure and 10.9% of patients treated with a revision Latarjet procedure secondary to a failed Bankart repair

Table 1
Study characteristics and patient demographics.

Author	LOE	MQOE	N	M/F	Mean age (yrs)	Follow-up (mo.)
Alfaraidy et al., 2022	III	6	96	83/13	26.7	7.2
Alkaduhimi et al., 2023	III	6	532	438/94	29.9	NR
Davey et al., 2021	III	7	97	200/0	22.7	39.8
Ernat et al., 2022	III	7	125	98/27	28.1	44.4
Flinkkila et al., 2019	III	7	99	78/21	32.5	45.16
Hurley et al., 2021	III	8	72	52/20	30	34.8
Rodkey et al., 2021	III	8	234	226/8	NR	60
Rossi et al., 2018	III	7	100	92/8	26.6	58
Scanlon et al., 2020	III	7	441	430/11	23	NR
Yapp et al., 2019	III	6	156	140/16	26.3	67.2

LOE, Level of Evidence, Methodological quality of Evidence; N, number; M/F, male/female ratio; yrs, years; mo, months.

underwent a revision surgery. There was a statistically significant difference in favour of primary Latarjet procedure (RR; 0.55, 95% CI, 0.34 to 0.90, $I^2 = 3\%$, $p = 0.02$) (Fig. 5).

3.3.5. Return to play

Return to play was reported in 3 studies, with 216 patients treated with a primary Latarjet procedure and 124 with a revision Latarjet procedure secondary to a failed Bankart repair. Overall, 78.5% of patients

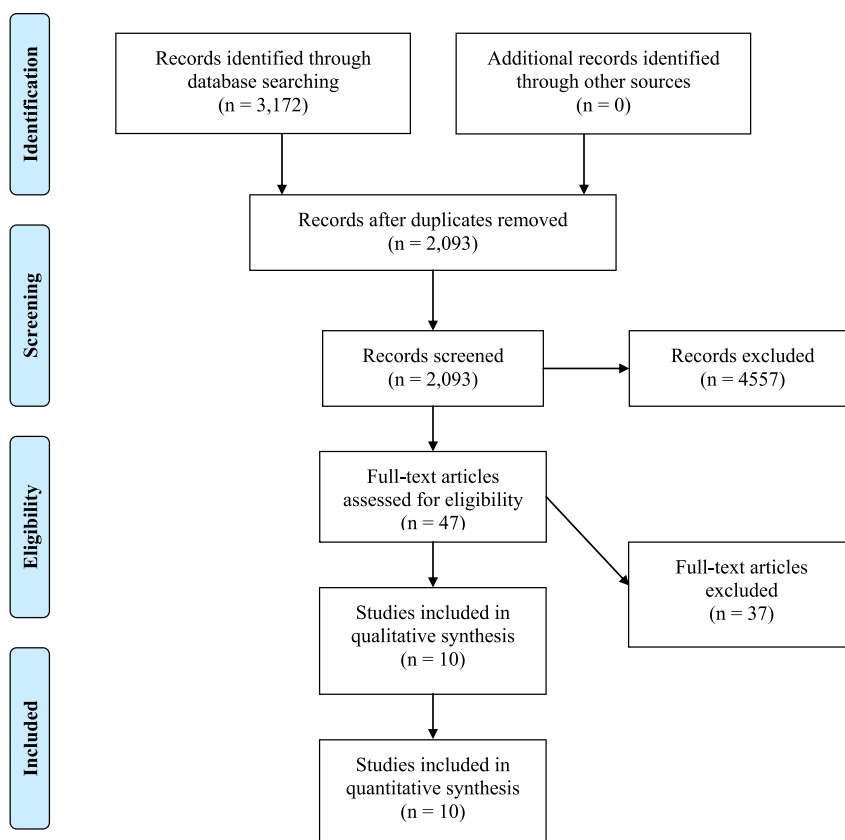


Fig. 1. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analysis.

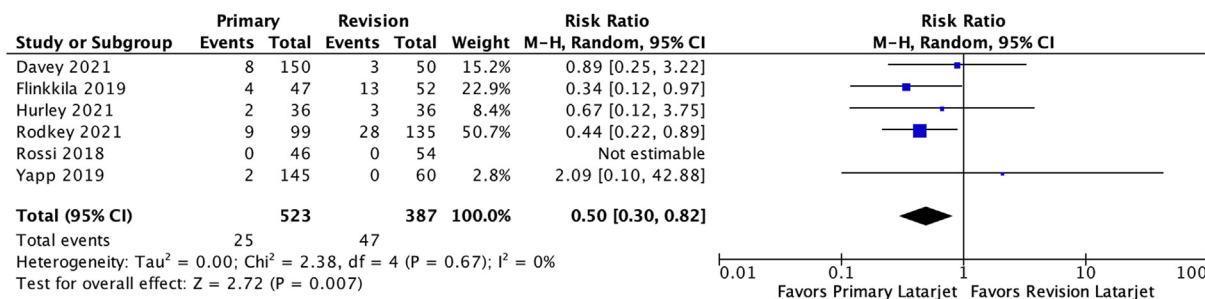


Fig. 2. Forest plot of recurrent instability.

treated with a primary Latarjet procedure and 67.7% of patients treated with a revision Latarjet procedure secondary to a failed Bankart repair returned to play. There was no statistically significant difference (RR; 0.52, 95% CI, 0.15 to 1.79, I² = 71%, p = 0.30) (Fig. 6).

4. Discussion

The most important finding in this study was that the Latarjet procedure as a primary procedure for anterior shoulder instability resulted in lower rates of recurrent instability complications and revisions than the Latarjet procedure performed in the setting of a previously failed Bankart repair. However, there was no overall difference in redislocation rate when excluding subluxations. Furthermore, there was no significant difference in the rate of return to play, but this was only evaluated in 3 studies and needs further investigation. These findings indicate that an arthroscopic Bankart repair has negative effects on a future Latarjet procedure and should give caution to performing this in high-risk populations as a primary procedure where there is a high risk of failure.

Historically, the Latarjet procedure has been more commonly utilized in Europe, although, recent American Board of Orthopaedic Surgeons (ABOS) board data have shown the Latarjet is increasing in popularity amongst surgeons in United States [26]. The indications for the Latarjet procedure include those with risk factors for recurrent post-operative instability, younger patients, collision sport athletes, the presence of Hill-Sachs or glenoid bone-loss, previous history of ipsilateral traumatic dislocation, and underlying ligamentous laxity [9]. Despite the differences in practice between the United States and Europe, prior consensus statements on anterior shoulder instability showed a high degree of agreement on when and how it should be performed [9].

In the setting of a previously failed Bankart repair, the Latarjet procedure was shown in the current to result in a higher recurrence rate. While the mechanisms behind this may warrant further investigation, it is hypothesized to be due to the possibility of inferior graft position in the setting of altered anatomy, the setting of scar tissue, and a damaged

subscapularis tendon, all make for a more technically challenging operation. Furthermore, recurrent instability can lead to increased glenohumeral bone loss and cartilage damage, which may negatively affect outcomes [27]. Rodkey et al. [16] found that primary Latarjet was found to have lower rates of recurrence than Latarjet as a salvage procedure (9.1% vs. 20.7%). However, in contrast, Davey et al. [18] showed no difference in the rate of recurrence between those who underwent it as a primary or revision procedure. This was primarily due to a difference in subluxations as there was no difference in redislocation rates when these data were parsed out.

High complication rates are one of the biggest concerns when performing a Latarjet procedure, as the systematic review by Greisser et al. [13] determined that the complication rate of a Latarjet procedure was approximately 30%. A more recent systematic review by Hurley et al. [15] found this rate to be closer to 6%. Furthermore, in a high-volume centre where they performed close to a 100 Latarjet procedures a year, Scanlon et al. [14] found the complication rate to be 4%. These more recent studies reporting lower complication rates warrant updated discussion in the role of a Latarjet procedure as a primary treatment option for anterior shoulder instability, when considering the recent discovery of how a previously failed Bankart repair can negatively outcome the Latarjet procedure's outcomes when used as a secondary option. Moreover, Scanlon et al. [16] noted that the use of tranexamic acid, Hohmann positioning at the time of graft placement, and solid screws, in contrast to cannulated screws, can improve the complication profile of the Latarjet procedure.

In the athletic population, return to play is an outcome that has critical importance and has been shown to correlate with satisfaction with surgery. Ali et al. [17] found in their systematic review that return to play in the setting of open Latarjet procedure as a revision for failed prior stabilization surgery was 95.1%. Although, other studies such as those by Davey et al. [18] have found this value to be much lower with only 64% returning to play post-operatively, which was significantly lower than in those with a primary Latarjet procedure. It is important to note the limited amount of data with 3 only studies comparing return to

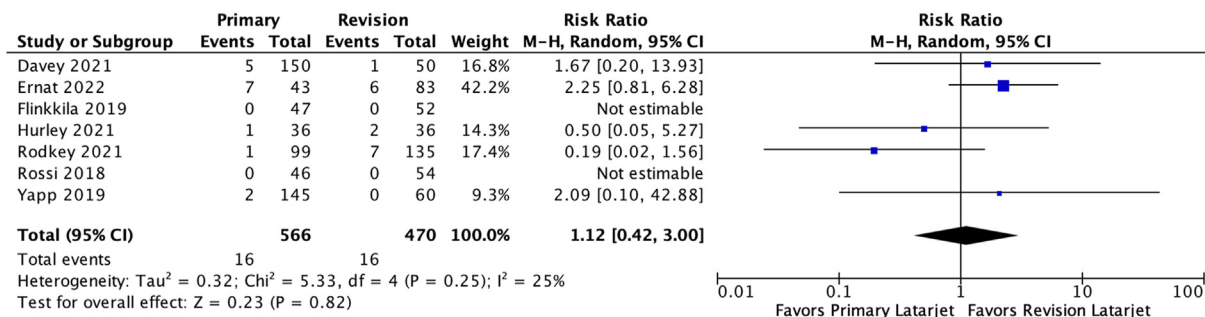


Fig. 3. Forest plot of redislocations.

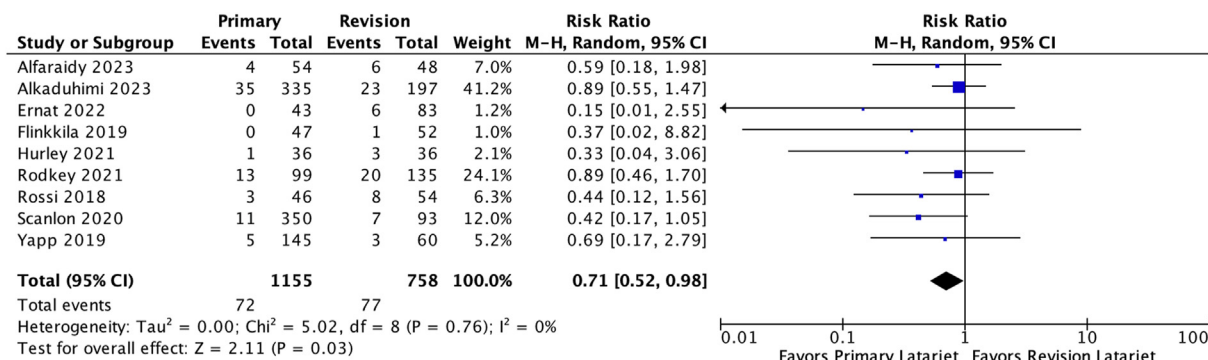


Fig. 4. Forest plot of complications.

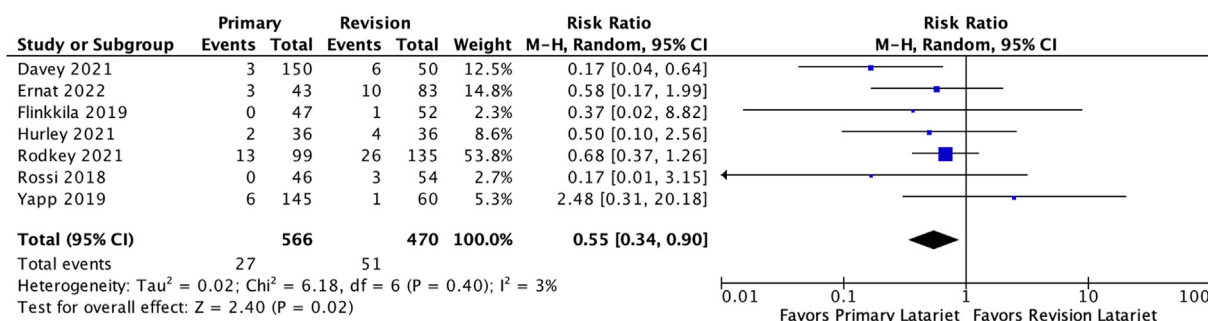


Fig. 5. Forest plot of revision surgery.

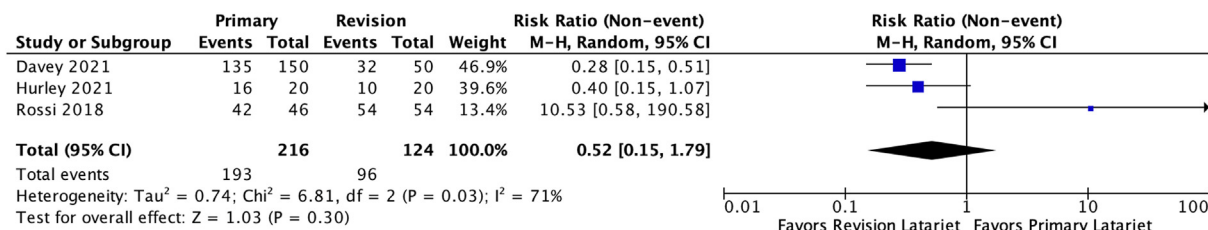


Fig. 6. Forest plot of return to play.

play in this systematic review, but it is worth considering that return to play following revision surgery could be multifactorial and be in part due to psychological factors. In their analysis of patients who failed to return to play post-Latarjet procedure, Hurley et al. [28] found through multiple logistic regression that thoughts of having to go through surgery and rehabilitation again was significantly associated with lower Return to play (RTP). Future studies should explore how the Latarjet procedure in the setting of a previously failed Bankart repair versus those undergoing the Latarjet procedure as a primary surgery for anterior should instability affects return to play.

Further research is still required on the outcomes of the Latarjet procedure as revision surgery. First, the impact of failure after arthroscopic Bankart repair on arthritis is understudied. Murphy et al. [5] found a 59.4% rate of arthritis following arthroscopic Bankart repair at 10-year follow-up, which they felt was due to the high rate of recurrent instability. In contrast, Hurley et al. [12] found at 10-year follow-up, the rate of arthritis was 38.2%, which correlated with a lower rate of recurrent instability. Additionally, it is important to study how to treat patients in the setting of a failed Latarjet procedure, and what the optimal

procedure in this setting. Hurley et al. [29] performed a systematic review of procedures following a failed Latarjet procedure and found multiple procedures were utilized but none were shown to be superior.

4.1. Limitations

This study has several limitations and potential biases, including the limitations of the included studies themselves, as this is a systematic review. First, with all of the included studies being retrospective in nature, the lack of prospective studies is a weakness. Additionally, the lack of return to play data is a limitation, as only three studies included this as their outcomes. Furthermore, there was moderate heterogeneity in some of the outcomes measured. Lastly, the lack of radiological outcomes and patient reported outcomes is a limitation.

5. Conclusion

The Latarjet procedure as a revision procedure for a previously failed Bankart repair resulted in higher rates of complications, recurrent

instability, and revisions than the Latarjet procedure performed as a primary procedure.

Conflict of interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests. Jonathan Dickens reports a relationship with American Academy of Orthopaedic Surgeons that includes: board membership. Jonathan Dickens reports a relationship with American Journal of Sports Medicine that includes: board membership. Jonathan Dickens reports a relationship with American Orthopaedic Society for Sports Medicine that includes: board membership. Jonathan Dickens reports a relationship with Arthroscopy Association of North America that includes board membership. Jonathan Dickens reports a relationship with Society of Military Orthopaedic Surgeons that includes: board membership. Christopher Klifto reports a relationship with Acumed LLC that includes: consulting or advisory. Christopher Klifto reports a relationship with GE Healthcare that includes: consulting or advisory. Christopher Klifto reports a relationship with Johnson and Johnson that includes: equity or stocks. Christopher Klifto reports a relationship with Merck that includes: equity or stocks. Christopher Klifto reports a relationship with Pfizer that includes: equity or stocks. Christopher Klifto reports a relationship with Restore3d that includes: consulting or advisory. Christopher Klifto reports a relationship with Smith and Nephew Inc that includes: consulting or advisory. Brian Lau reports a relationship with American Orthopaedic Society for Sports Medicine that includes: board membership. Brian Lau reports a relationship with Arthrex Inc that includes: consulting or advisory. Brian Lau reports a relationship with Arthroscopy Association of North America that includes: board membership. Brian Lau reports a relationship with Depuy that includes: consulting or advisory. Brian Lau reports a relationship with Wright Medical Technology, Inc. that includes: consulting or advisory. Eoghan Hurley reports a relationship with Arthroscopy that includes: board membership. Eoghan Hurley reports a relationship with European Society for Surgery of the Shoulder and Elbow that includes: board membership. Eoghan Hurley reports a relationship with Journal of Shoulder and Elbow Surgery that includes: board membership.

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