



# Clinical and radiographic outcomes of open Latarjet procedure in patients aged 40 years or older

Peter Domos, MD, FRCS<sup>a,\*</sup>, Enricomaria Lunini, MD<sup>b</sup>, Francesco Ascione, MD<sup>c</sup>, Nicola Serra, PhD<sup>d</sup>, Michael J. Bercik, MD<sup>e</sup>, Lionel Neyton, MD<sup>f</sup>, Arnaud Godeneche, MD<sup>f</sup>, Gilles Walch, MD<sup>f</sup>

<sup>a</sup>Royal Free London NHS Foundation Trust, Barnet and Chase Farm Hospitals, London, UK

<sup>b</sup>Orthopaedic Unit, Hospital of Guastalla, Reggio Emilia, Italy

<sup>c</sup>Department of Shoulder Surgery, Campolongo Hospital, Salerno, Italy

<sup>d</sup>Department of Pediatrics, University Federico II of Naples, Naples, Italy

<sup>e</sup>Lancaster Orthopedic Group, Lancaster, PA, USA

<sup>f</sup>Centre Orthopédique Santy, Hôpital Privé Jean Mermoz Ramsay GDS, Lyon, France

**Background:** The Latarjet procedure is often used to treat shoulder instability in younger patients. Little is reported on the outcomes of this procedure in older ( $\geq 40$  years) populations. The purpose of this study was to evaluate the clinical and radiographic outcomes of patients aged 40 years or older with recurrent anterior shoulder instability who underwent open Latarjet stabilization.

**Methods:** A total of 168 patients aged 40 years or older were treated surgically for recurrent anterior shoulder instability with an open Latarjet procedure between 1988 and 2014. Bankart lesions or antero-inferior glenoid fractures were confirmed preoperatively with a computed tomography arthrogram. Outcomes were assessed with preoperative and postoperative physical examinations, clinical outcome scoring, and radiographic examinations.

**Results:** Ninety-nine patients with complete data were available with a mean follow-up period of 13 years (range, 3–23 years). At the time of final follow-up, 94% of patients did not have recurrence of instability. Of the patients, 90% were satisfied or very satisfied with their outcomes and 54% returned to their preinjury level of activity. The overall complication rate was 21% (the most common complications being subjective apprehension [9%] and recurrent instability [6%]), with 9% of patients requiring reoperation. A full-thickness rotator cuff requiring repair was identified in 22% of patients.

**Conclusions:** The Latarjet procedure is an effective treatment option for older patients (aged  $\geq 40$  years) with recurrent anterior shoulder instability in the setting of an antero-inferior capsulolabral and/or bony injury.

The Institutional Review Board of the Ethical Committee of Hôpital Privé Jean Mermoz and Centre Orthopédique Santy read the study project and deemed that it did not infringe on French ethical rules and the privacy of the patients. This committee approved this retrospective study.

\*Reprint requests: Peter Domos, MD, FRCS, Royal Free London NHS Foundation Trust, Barnet Hospital, Wellhouse Lane, Barnet, London, EN5 3DJ, UK.

E-mail address: [peter.domos@googlemail.com](mailto:peter.domos@googlemail.com) (P. Domos).

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In patients older than 40 years, the pathology and risk of recurrence of anterior glenohumeral dislocations differ from those in the younger population. Whereas the incidence of recurrence is significantly higher in younger patients,<sup>19,41</sup> the reported rate may be as low as 10% after age 40 years.<sup>25</sup> This is postulated to occur because in older patients, the degenerative and, consequently, weaker posterior cuff ruptures before the stronger anteroinferior labrum and capsule.<sup>25</sup> Because the anterior static restraints are typically preserved, surgical treatment for instability in older patients has typically focused on repairing the torn rotator cuff.

The Latarjet procedure is an established treatment option for anteroinferior shoulder instability, and several long-term follow-up studies have already substantiated both its efficacy and its lasting benefits. However, most of these studies involved younger patients.<sup>1,20</sup> There is little in the reported literature on the long-term outcomes of Latarjet procedures performed in an older (ie, age  $\geq$  40 years) population.<sup>18,28</sup> The purpose of this study was to determine and evaluate the clinical and radiographic outcomes of patients aged 40 years or older with recurrent anterior shoulder instability who underwent open Latarjet stabilization with a minimum of 2 years' follow-up. We hypothesized that the Latarjet procedure would provide a low rate of recurrent instability with acceptable radiographic results in the long term (mean follow-up, 13 years) in this patient population.

## Materials and methods

### Study design

The inclusion criteria for this study were (1) symptomatic, recurrent traumatic anterior shoulder instability treated with open Latarjet stabilization; (2) minimum age of 40 years at the time of surgery; (3) minimum follow-up period of at least 2 years; and (4) complete preoperative and postoperative clinical outcome scores and radiographic data. The exclusion criteria were (1) previous failed instability surgery, (2) irreparable rotator cuff tear, (3) accompanying fracture of the humerus (tuberosity), (4) neurologic deficit in the ipsilateral arm, and (5) incomplete functional outcome and radiographic data.

### Surgical technique and rehabilitation protocol

Three experienced shoulder surgeons performed all procedures at the same shoulder center using the same previously well-described operative technique.<sup>44</sup> The indication for Latarjet stabilization was

symptomatic, recurrent traumatic anterior instability with either soft-tissue Bankart lesions or any glenoid bony lesions (bony Bankart lesion or glenoid erosion) as detected with a computed tomography arthrogram. When the surgeons identified full-thickness rotator cuff tears, they performed an open repair with suture anchors via a separate anterolateral deltoid split and acromioplasty.

Postoperatively, all patients were placed in a sling for 2 weeks. Three days after surgery, active-assisted forward flexion and external rotation were allowed as tolerated. The sling was removed 2 weeks after surgery, and self-mobilization was continued. Four weeks after surgery, patients were allowed to resume conditioning of the lower extremities. Eight weeks after surgery, shoulder strengthening began. Return to sporting activities, including contact sports, was allowed once clinical and radiographic evaluation confirmed satisfactory healing of the coracoid graft, usually at 3 months after surgery.

### Clinical and radiographic evaluation

Preoperatively, we recorded basic demographic information, the activity level, and the number of preoperative dislocations. All patients also underwent a physical examination in which range of motion (ROM), shoulder stability, and rotator cuff function were examined. Postoperatively, patients returned for follow-up at 6 weeks, 3 months, and 6 months after surgery. At a minimum of 2 years after surgery (mean, 13 years; range, 3-23 years), we attempted to contact all patients to undergo assessment clinically and radiographically by independent clinicians, who were not involved in the surgical and postoperative treatments. For patients in the local area or those willing to travel to our institution, a detailed physical and radiographic examination was performed in person. For those who lived far from our institution (<10% of patients), a detailed questionnaire was sent and a request was provided to obtain radiographs. The questionnaire included self-assessment of (1) ROM,<sup>7</sup> as well as strength, using clear, reproducible instructions (text and photographs); (2) stability; (3) activity; (4) satisfaction; (5) Subjective Shoulder Value<sup>14</sup>; and (6) visual analog scale score for pain. This questionnaire was used to calculate the postoperative Rowe score,<sup>36</sup> Constant-Murley score (CMS)<sup>10</sup> with adjusted CMS, and Walch-Duplay score (WDS).<sup>42</sup>

For all patients, we used the same radiographic protocol preoperatively and postoperatively. This included true anteroposterior views of the glenohumeral joint taken in neutral, internal, and external rotation to determine the degree of glenohumeral arthritis. Comparative glenoid profile views<sup>12</sup> were taken to assess anterior bone loss and fracture of the glenoid preoperatively, as well as to assess for both bony union and the position of the coracoid graft postoperatively. Radiographs were obtained before surgery, immediately after surgery, at 3 months postoperatively, and at the time of final follow-up. The position of the coracoid graft was assessed on the immediate postoperative films. A flush position

**Table I** Comparison of preoperative and postoperative range of motion

	Anterior elevation, °	External rotation in adduction, °	Internal rotation, spinal level
Preoperatively	168	59	T8
Postoperatively (3 mo)	158	32	T11
Final follow-up	164	56	T10
<i>P</i> value	.186	.494	.0064

was defined as having the lateral aspect of the graft within 1 mm of the glenoid surface. Medial overhang and lateral overhang were consequently defined as the lateral aspect of the graft being positioned more than 1 mm medial and more than 1 mm lateral to the glenoid surface, respectively.

Osteoarthritis (OA) was graded as stage 1, 2, 3, or 4 according to the Samilson and Prieto classification<sup>38</sup> as modified by Buscayret et al.<sup>5</sup> On the basis of this staging, we recorded preoperative arthritis, progression of arthritis in patients with arthritis before surgery, and postoperative development of arthritis in patients without arthritis preoperatively.

## Statistical analysis

Statistical analysis used the MATLAB statistical toolbox (version 2008; The MathWorks, Natick, MA, USA). Categorical variables are presented as numbers and percentages, whereas continuous data are expressed as mean  $\pm$  standard deviation. The  $\chi^2$  test with Yates continuity correction or the Fisher exact test was performed to compare the differences between 2 percentages or proportions for unpaired data, and the McNemar exact test was used for paired data. A multiple-comparison  $\chi^2$  test was performed to compare the differences among multiple percentages or proportions. The Wilcoxon test was performed to compare 2 paired groups. The analysis-of-variance test for repeated measures was used in multiple comparisons among means when the same parameter had been measured under different conditions in the same subjects. In addition, to compare 2 means of continuous variables preoperatively and postoperatively, we used the paired Student *t* test. The test on the Pearson linear correlation coefficient, *R*, was performed with the Student *t* test. *P* < .05 was considered statistically significant.

We also performed a subgroup analysis comparing patients older than 46 years (group B) with those 46 years-old or younger (group A). This number was selected as it represented the average age of all patients. Differences in clinical and radiographic outcomes, as well as complications, were explored in this subgroup analysis.

## Results

A total of 168 patients underwent an open Latarjet procedure at age 40 years or older between 1988 and 2014. Of these patients, 32 were lost to follow-up and another 37 had incomplete data, so 99 patients ultimately met all inclusion and exclusion criteria. The mean age of the cohort at the

**Table II** Radiographic assessment of OA

	Preoperative, %	Postoperative, %
No OA	70	24
Stage 1	27	35
Stage 2	3	28
Stage 3	0	7
Stage 4	0	6

OA, osteoarthritis; 0, no cases.

time of surgery was 46 years (range, 40-67 years), and the mean age at injury was 34 years. There were 60 men and 39 women. The mechanism of injury was sport related in 50% of cases, a simple fall in 30%, and a high-energy injury (a fall off a bike or horse or a road traffic accident) in 20%. The mean time between the initial injury and the surgical procedure was 13 years (range, 0.5-44 years), and the average number of preoperative dislocations was 7 (range, 2-20). Preoperative imaging confirmed Bankart lesions in 58% of cases and glenoid bony lesions in 42%. The operation involved the right arm in 70% of cases, and the dominant arm was involved in 80%. The mean follow-up time was 13 years (range, 3-23 years).

A torn rotator cuff (supraspinatus and/or infraspinatus) was also diagnosed in 22% of patients preoperatively, and those patients underwent open rotator cuff repair (with 1 or 2 anchors) at the time of the Latarjet procedure. Twenty-five percent of patients described preoperative symptoms of pain and/or stiffness or weakness.

## Clinical and radiographic outcomes

Mean postoperative ROM recovered nearly to the preoperative level, but a significant decrease in internal rotation (IR) was noted compared with preoperative values (Table I). Of the patients, 90% were satisfied or very satisfied with the operation, and 90% participated in regular sporting activities, with 58% returning to their preoperative level of sport. The clinical scores showed good outcomes, with a visual analog scale score for pain of 1.2 (range, 0-8), WDS of 83 (range, 66-100), Rowe score of 87 (range, 72-100), CMS of 75 (range, 60-91) with adjusted CMS of 89, and Subjective Shoulder Value of 87% (range, 72%-100%).

Thirty percent of patients had findings of OA on preoperative radiographs, and 76% of cases had postoperative findings of OA on radiographs (Table II). OA developed in 46% of patients, whereas patients' pre-existing OA progressed in 50%. Most positive postoperative findings were stage 1 or 2. Stage 3 or 4 OA developed in 13% of patients (mostly in group B), and this showed some association with the following: longer follow-up time (>15 years), high-energy injury or sport as the mechanism of injury, higher number of preoperative instability episodes, preoperative

**Table III** Summary of clinical and radiographic complications

Complication	Rate, %	Intervention
Clinical		
Apprehension	9	Intervention not required
Recurrence (all redislocations)	6	4 underwent Eden-Hybinette procedure at mean of 3.5 yr (range, 1.5-5.5 yr) 1 underwent reverse TSA for irreparable cuff tear at 8 mo 1 underwent arthroscopic posterior labral repair for secondary instability at 7 yr
Hematoma	2	1 underwent hematoma evacuation at 3 wk
Transient nerve injury (2 × MCN, axillary)	3	Intervention not required
Frozen shoulder	2	1 underwent capsular release at 2 yr
Superficial infection	1	Intervention not required
Radiographic		
Bone block fracture	4	Intervention not required
Nonunion	5	Intervention not required
Transient inferior subluxation	2	Intervention not required
Static anterior subluxation	1	Intervention not required
Avascular necrosis	1	Reverse TSA for static anterior subluxation at 6.5 yr

TSA, total shoulder arthroplasty; MCN, musculocutaneous.



**Figure 1** Recurrent dislocation after initial Latarjet procedure (A, B), which was successfully revised with Eden-Hybinette surgery (C).

glenoid bony lesion, other preoperative symptoms, and malpositioned graft. There was no gender difference, and 30% of these patients had no pre-existing OA preoperatively.

### Complication and reoperation rates

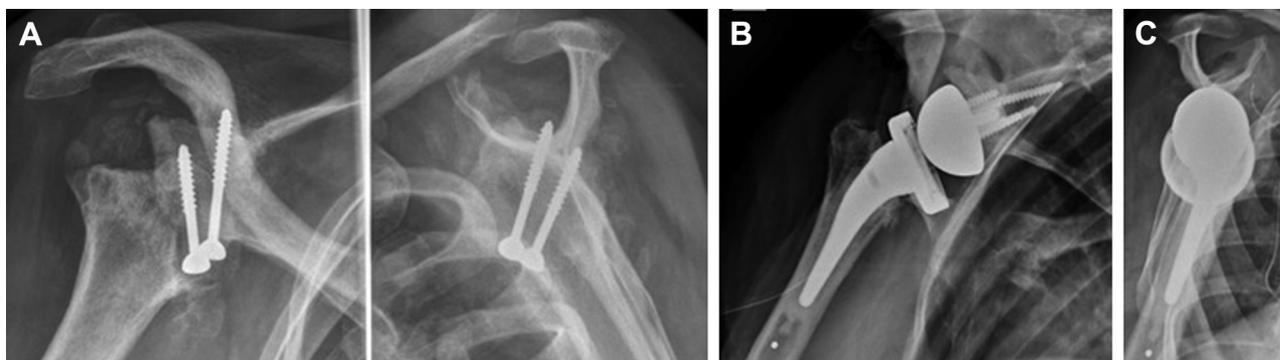
The overall clinical complication rate was 21% (Table III), and the overall reoperation rate was 9%. We found positive subjective apprehension in 9% of patients and recurrence of instability in 6%. The cases of recurrent instability involved traumatic anterior redislocations at an average of 3.5 years (range, 0.5-5.5 years) after surgery. In these cases, there was an association with higher numbers of preoperative instability episodes and preoperative glenoid bony lesions but not with any bone block problems. In most patients, there was a single episode of instability associated with persistent pain, apprehension, and loss of function, but 2 patients did complain of recurrent dislocations. Only 1 patient required open reduction as the initial treatment, and 4 patients underwent an Eden-Hybinette procedure (Fig. 1). These patients had satisfactory and good outcomes with

50% returning to sport at the same level without recurrence of instability or severe arthritic changes. One patient required another surgical procedure to remove symptomatic screws 2 years after the revision operation. In another patient with hyperlaxity, secondary posterior instability developed and an arthroscopic labral repair was performed 7 years after the initial Latarjet procedure with poor final clinical outcomes.

The other clinical complications included hematoma (2%), transient nerve injury to the musculocutaneous or axillary nerve (3%, all recovered within 1 year), frozen shoulder (2%), and superficial infection (1%). One patient underwent hematoma evacuation and another patient underwent capsular release at 2 years because of persistent frozen shoulder.

Twenty percent of patients complained of some degree of pain and/or stiffness postoperatively. This correlated with preoperative symptoms or a combined Latarjet procedure with rotator cuff repair.

Four percent of patients had ruptures of the long head of the biceps, and in 10%, secondary rotator cuff tears



**Figure 2** Static anterior subluxation with avascular necrosis of humeral head (A) due to failed combined Latarjet procedure with rotator cuff repair, which was treated with reverse total shoulder arthroplasty (B, C).

developed at an average of 4 years (range, 2-6.5 years) after the Latarjet operation without open cuff repair. There was an association between a higher number of preoperative instability episodes and postoperative rotator cuff tears. Most of these patients were in group B; had supraspinatus and/or infraspinatus involvement with pain, weakness, and reduced sport activities; and were successfully treated conservatively. Massive rotator cuff tears were diagnosed in 2 patients, and 1 required reoperation at 8 months after surgery with a reverse shoulder arthroplasty because of associated recurrent instability.

Early (ie, within 3 months) complications identified on radiographic evaluation (Table III) included graft nonunion (5%) and bone block fracture (4%), but none required further intervention. There was no gender difference, and these graft complications had no significant clinical relevance.

One patient had static anterior subluxation, and 2 patients received diagnoses of transient inferior subluxations. All were treated conservatively. In another patient, avascular necrosis developed owing to failed rotator cuff repair and static anterior subluxation. This was revised successfully with a reverse shoulder arthroplasty 6.5 years after the combined Latarjet and open cuff repair procedure (Fig. 2).

### Statistical analysis

All significant statistical correlations are summarized in Table IV. Pre-existing preoperative arthritis and postoperative graft complications (graft fracture or nonunion) had no significant correlations.

The subgroup analysis revealed several statistically significant differences (Table V). The older group had more pain; higher stages of OA; decreased ROM with less elevation and IR (preoperatively and postoperatively); and lower WDS, CMS, and Rowe scores. There were also lower but not statistically significant differences in the adjusted CMS, Subjective Shoulder Value, and satisfaction in group B. The prevalence of recurrence of instability, reoperation rates, and overall complication rates were not

significantly different between groups A and B. All the nerve injuries were in group A, but the 2 postoperative hematomas and the majority of radiographic complications (graft fracture, nonunion, and static subluxation) were found in group B.

### Discussion

Recurrent dislocations have a reported occurrence of 0% to 33% in patients whose first episode occurred after age 40 years.<sup>2,16,29,37</sup> Many authors have suggested that recurrent instability in this older population occurs due to the “posterior mechanism,” in which rotator cuff rupture is the primary etiology, as opposed to injury to the anteroinferior labrum and capsule<sup>11,25</sup>; in the older patient with pre-existing degenerative weakening of the rotator cuff, the posterior structures fail rather than the anterior structures.<sup>11</sup> Given the lack of anterior labral and capsular injury, rotator cuff repair alone in these patients can be an appropriate treatment for instability.<sup>11,25,29</sup>

Although the cuff is often weaker and may rupture first in patients of more advanced age, this does not always hold true. For example, Araghi et al<sup>2</sup> reported on a series of 11 patients older than 40 years treated surgically with an open stabilization for recurrent instability, and 9 showed no cuff tear. All patients in this series reported successful outcomes, and no episodes of recurrent instability occurred at a mean of 5.6 years’ follow-up. Similarly, Maier et al<sup>23</sup> compared 23 patients older than 40 years with 49 younger patients who had sustained a dislocation and found only an 8.7% rate of cuff tears in the older cohort. They argued that there is no role for cuff repair in treating instability in these patients, and they also found that arthroscopic Bankart repair is less reliable with lower clinical scores (even the adjusted CMS) and satisfaction than for younger patients. Walch et al<sup>43</sup> reported their experience of 24 cases of recurrent instability in patients older than 40 years with rotator cuff tears and upward migration of the humeral head highly suggestive of massive

**Table IV** Significant statistical correlations

	<i>P</i> value
Increasing age	
Higher preoperative OA grade	.0063
Higher final OA grade	.0090
Lower No. of preoperative instability episodes	.0232
Worse satisfaction	.0042
Less final AE	<.0001
Lower CMS	.0074
Less postoperative sport activity	.0016
Higher reoperation rate	.0043
Preoperative symptoms	
Worse satisfaction	<.0001
Worse final IR	.0495
Higher complication rate	<.0001
Latarjet with RC repair	
Better satisfaction	<.0001
Higher complication rate	.0003
Complications	
Increased No. of preoperative instability episodes	.0008
Hyperlaxity	.0313
Preoperative RC tear and repair	.0492

OA, osteoarthritis; AE, anterior elevation; CMS, Constant-Murley score; IR, internal rotation; RC, rotator cuff.

rotator cuff tears. In their series, the treatment of instability without cuff repair achieved satisfactory results in 85% of patients with the Trillat procedure. Clearly, a portion of recurrent dislocations in older populations occur secondary to an anteroinferior defect as opposed to the posterior mechanism.

Moroder et al<sup>28</sup> recently published a study on 25 patients (mean age, 62 years) with an average of 9 years' follow-up who underwent open Latarjet or Bristow surgery for anterior glenoid bone defects with or without irreparable but functionally compensated rotator cuff tears. They reported an overall 76% satisfaction rate, but bone graft-related and hardware-related complications led to frequent revisions (32%), especially with pre-existing cuff tear arthropathy. Our study showed higher satisfaction (90%) and lower complication (21%) and reoperation (9%) rates, probably because of our selection criteria and the more homogeneous group of patients without irreparable cuff tears. Moroder et al also concluded that their high rate of graft- and hardware-related complications might be due to the age-related decrease in bone density of the coracoid process,<sup>3</sup> although we did not report an increased number of this complication in our study.

Hart et al<sup>18</sup> published a case series of 11 elderly patients (mean age, 65 years) at a minimum follow-up of 4 years in whom they performed a modified Latarjet procedure, and they reported that it can successfully restore shoulder

stability without significant complications. Our results also demonstrate that the open Latarjet procedure provides reliable long-term clinical results in patients aged 40 years or older with recurrent traumatic anterior shoulder instability caused by Bankart lesions or glenoid fractures. In our long-term study, 94% of patients did not have recurrence of their instability, and the vast majority were satisfied or very satisfied. Over half of the patients could return to their preinjury level of activity. Moreover, ROM generally returned to preoperative levels with the exception of active IR, which was significantly reduced. The decrease in active IR was probably due to the reduced healing capacity, strength, and elasticity of the subscapularis muscle. This could also explain the cause of the static anterior and transient inferior subluxations.

This study showed high overall complication (21%) and reoperation (9%) rates. These numbers are greater than some reported in the literature<sup>26,34,39</sup> but comparable to those in other review articles for patients with younger mean ages.<sup>15,17,22</sup> Most reported complications were minor, however, and were related to some pain and stiffness (20%) that did not require reoperation. Although the rate of the radiographic complications of graft fracture or nonunion (9%) was comparable to systematic reviews,<sup>6,15</sup> most were found in our older cohort (age > 46 years) and had no clinical relevance. Other authors have previously reported on the long-term results of the Latarjet procedure. For example, Singer et al<sup>40</sup> reported on 14 Latarjet procedures with a mean follow-up period of 20.5 years and demonstrated an excellent or good Rowe score in 93% despite a 71% rate of glenohumeral arthritis in the involved shoulders. Allain et al<sup>1</sup> reported on 58 Latarjet procedures with a mean follow-up period of 14.3 years. They reported good or excellent results in 88% according to the Rowe score. These studies included younger populations of patients. Our study demonstrates similarly good results but, to our knowledge, represents the longest follow-up of patients who underwent the Latarjet procedure after the age of 40 years.

The rate of postoperative arthritis after treatment of glenohumeral instability has ranged from 35% to 71% at long-term follow-up.<sup>1,8,9,13,20,24,30-33,35,45,46</sup> Reported risk factors for arthritis have included age at initial dislocation and at the time of surgery, number of preoperative dislocations, excessive anterior tissue tightening or subscapularis tenotomy, intra-articular hardware, lateral overhang of the bone block in the case of the Latarjet procedure, and longer follow-up.<sup>1,4,5,9,13,20,24,30-33,35,45,46</sup> Our rate of postoperative development of arthritis (46%) was lower than the rates in the aforementioned Latarjet reports (49%-71%). Notably, we identified only a few cases that progressed to stage 3 or 4 (13%) but 50% of pre-existing arthritis progressed, which is comparable to previous reports in patients with a younger mean age.<sup>21,27</sup> We believe that several components of our surgical technique may have a substantial influence on the long-term development of arthritis.

**Table V** Statistical subgroup analysis between groups A and B

	Group A (age < 46 yr)	Group B (age > 46 yr)	P value
No. of patients	51	48	
Mean age at surgery, yr	42	53	
Mean age at injury, yr	28	41	
Mean follow-up, yr	13	13.5	
Preoperative rotator cuff tear with repair, %	19	25	.217
Secondary rotator cuff tear, %	4	16	.181
Preoperative symptoms, %	20	30	.382
Preoperative active elevation, °	167	161	.576
Final active elevation, °	177	160	.0005
Preoperative internal rotation	T7	T8	.0001
Final internal rotation	T8	T10	.0007
Preoperative external rotation, °	58	59	.843
Final external rotation, °	57	55	.584
Sport activity (same level), %	63	51	.198
VAS score (pain)	0.8	1.6	.0473
CMS	79	72	.03
Rowe score	90	84	.01
Walch-Duplay score	87	78	.0232
SSV, %	89	85	.176
Adjusted CMS	91	88	.336
Satisfaction, %	95	85	.08
Reoperation rate, %	6	12	.309
Recurrence, %	4	8	.427
Positive apprehension, %	10	8	.093
Postoperative pain, %	16	25	.586
Postoperative stiffness, %	25	21	.689
Frozen shoulder, %	0	4	.232
Graft fracture, %	2	8	.196
Graft nonunion, %	0	5	.181
Preoperative grade 0 (no OA), %	75	65	.392
Postoperative grade 0 (no OA), %	27	22	.685
Postoperative grade 3-4 OA, %	2	12	.211

VAS, visual analog scale; CMS, Constant-Murley score; SSV, Subjective Shoulder Value; OA, osteoarthritis.

Specifically, we used a horizontal subscapularis-splitting technique that does not require reattachment of the tendon. A tenotomy of the subscapularis muscle risks arthritis in the long term as a result of changes in glenohumeral joint contact forces caused by external rotation deficits that may subsequently occur after tendon healing. In addition, lateral overhang of the coracoid graft is a well-known risk factor for postoperative arthritis.<sup>1,20</sup> In our study, the coracoid graft was positioned laterally in only 10% of cases, which is lower than in other reports.<sup>1</sup> The rate of development of OA in our cohort would be expected to be higher than in other Latarjet studies given the older average age of our patients and longer follow-up time.

Our further analysis suggested worse outcomes for patients aged over 46 years and/or patients with preoperative symptoms, as well as in cases in which the Latarjet procedure was combined with rotator cuff repair. An explanation for this finding is that the older group had more pain,

higher stages of OA, decreased ROM, and more secondary rotator cuff problems postoperatively, which resulted in lower overall functional scores. Although the rotator cuff repair patients were also older and mostly men, as they reported severe preoperative symptoms of pain, weakness, and loss of function (involving more commonly the dominant shoulder), they experienced significant improvement after the surgical procedure, which led to better overall satisfaction.

There are several weaknesses to our study. First, as a retrospective study, it has all the weaknesses inherent to that design including the number of patients lost to follow-up and number of self-assessed patients (<10%). In addition, no postoperative computed tomography assessment was performed. Finally, there is a wide range in terms of the follow-up time, and perhaps the results would be worse with longer follow-up of some of the more recently treated patients. The strengths of the study are the long mean

follow-up period, the large number of patients, and the preoperative and postoperative collection of both clinical and radiographic data.

## Conclusion

We accept our hypothesis that the Latarjet procedure provides a low rate of recurrent instability with acceptable radiographic results in the long term for patients aged 40 years or older with anteroinferior capsulolabral or bony injuries. Despite the potential risk of graft failure owing to poorer bone quality in this population, we did not report an increased number of this complication. The overall complication rate is relatively high, however, for this technically demanding procedure.

## Disclaimer

The authors, their immediate families, and any research foundations with which they are affiliated have not received any financial payments or other benefits from any commercial entity related to the subject of this article.

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