

# Arthroscopic Latarjet Stabilization of the Shoulder With Capsulolabral Repair

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**Abstract:** The arthroscopic Latarjet procedure is an evolving treatment for anterior shoulder instability in patients with significant glenoid bone loss, or failed soft-tissue repair. The original description of the arthroscopic Latarjet procedure includes resection of the anterior capsule to simplify passage of the transferred coracoid through the subscapularis split. We describe a technical modification of the arthroscopic Latarjet procedure that includes repair of the anterior capsule at the conclusion of the operation.

**Key Words:** shoulder, instability, Latarjet, Bankart, arthroscopic

(*Tech Should Elb Surg* 2015;16: 85–88)

Arthroscopic stabilization of the shoulder has gained popularity despite initial disappointing results.<sup>1</sup> The success rates for arthroscopic repair techniques have significantly improved, primarily due to improved implant design and increased understanding of underlying pathology.<sup>2</sup> However, despite these improvements, arthroscopic repair appears to be unsatisfactory in patients with significant glenoid bone loss or a large engaging Hill-Sachs lesion.<sup>2</sup> Patients with these lesions, or patients who have had a previous Bankart repair with subsequent failure, may be successfully treated with a Latarjet procedure performed open or arthroscopically.

The Latarjet procedure first described in 1954 involves transfer of the coracoid with its attached conjoint tendon to the anteroinferior glenoid rim through a split in the subscapularis tendon.<sup>3</sup> This procedure stabilizes the shoulder in several ways. The increased bony surface of the glenoid prevents engagement of large Hill-Sachs lesions. Glenoid bone loss beyond 20% has been shown to be intrinsically unstable, and the transferred coracoid bone block addresses these bone defects. The transferred coracobrachialis provides improved capsular support, and the sling effect of coracobrachialis on the inferior subscapularis tendon provides significant stabilizing effects in the position of perceived risk at 90 degrees of abduction and external rotation.<sup>4</sup>

Originally the Latarjet procedure was described using an open technique, and a capsular repair to the coracoacromial ligament which is left attached to the coracoid.<sup>5</sup> Since then, the Latarjet procedure has been performed arthroscopically with favorable results.<sup>6</sup> However, the technical challenge of performing the procedure arthroscopically has meant that an anterior capsulectomy and labral resection is routinely used to

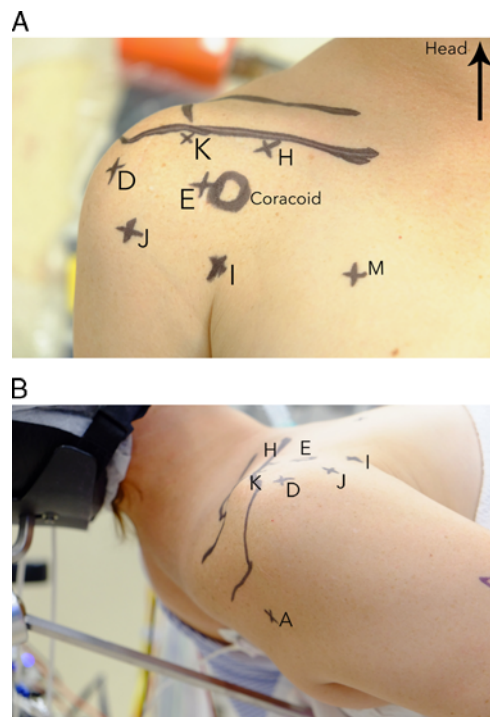
facilitate exposure of the anterior face of the glenoid and simplify the subscapularis split.<sup>7</sup>

We present a modification of the technique described by Lafosse et al,<sup>8</sup> which includes a repair of the anteroinferior capsule to the native glenoid over the transferred coracoid, placing the graft in an extra-articular position. It has previously been proposed that adding a capsular reconstruction in addition to transfer of the coracoid further adds to stability of the glenohumeral joint.<sup>5</sup>

## SURGICAL TECHNIQUE

Before operation all patients undergo an examination under anesthesia (EUA). If the instability is purely anterior or anteroinferior, then an arthroscopic Latarjet is performed. We are reluctant to perform a Latarjet procedure in a patient in whom there is evidence of multidirectional instability on EUA, as we are concerned that the Latarjet procedure will not adequately address coexisting inferior or posterior instability.

The technique used for the arthroscopic Latarjet is a modification of the technique pioneered by Lafosse et al<sup>8</sup> in 2007, using the arthroscopic Latarjet instrumentation by DePuy Mitek. The portals used for this arthroscopic technique are shown in Figure 1. They are the same as those originally



**FIGURE 1.** A and B, Arthroscopy portals used for the Latarjet procedure. full color online

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The authors declare no conflict of interest.

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described by Lafosse, with an extra K portal just anterior to the acromioclavicular joint to aid dissection and subsequent manipulation of the anterior capsule.

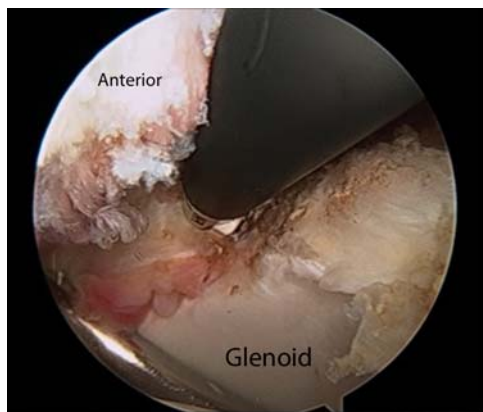
### Capsulectomy and Subscapularis Exposure

The glenohumeral joint is assessed using the standard posterior viewing portal (A) and an anterior working portal (E) placed at the coracoid. The capsulolabral complex is split radially along the superior border of the subscapularis with an electrocautery device. The radial split in the capsule and labrum is the key to the subsequent dissection as it allows reflection of the anterior capsule and labrum inferior to the split.

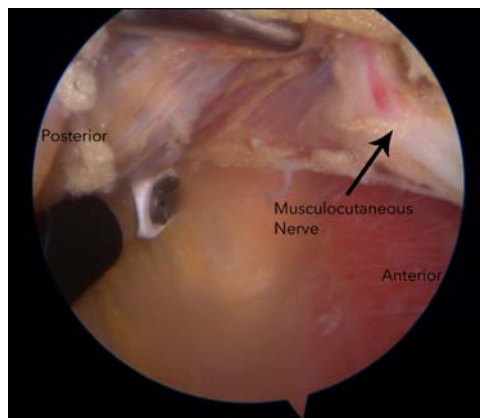
The inferior portion of the capsule is progressively mobilized off the subscapularis and the anterior glenoid with electrocautery. The subscapularis may need to be pushed forward to create space to improve access, and this is done with gentle forward pressure on the subscapularis with a switching stick inserted through the posterior A portal. As the capsule is mobilized from the anterior glenoid neck medially (Fig. 2), the arthroscope is moved to an anterior viewing portal (D). The inferior capsular flap is folded inferiorly and laterally using a grasper inserted through the K portal, further aiding the extension of the split medially. The K portal is located with a needle placed from outside in and is usually positioned immediately anterior and lateral to the acromioclavicular joint.

Care needs to be paid to the dissection of the capsule from the subscapularis muscle to ensure that the preparation is adequate. If the capsular dissection from the subscapularis is not extensive enough, 2 issues occur. First, it becomes difficult to create the subscapularis split and hinders subsequent bone transfer. Second, if the extent of the dissection is not adequate, the prepared capsule and labrum can be amputated as the deep preparation of the split in the subscapularis is performed with electrocautery.

Once the capsular preparation has been performed, the inferior capsular flap is held retracted in the inferior recess using the switching stick inserted from posterior. This switching stick can be advanced into the subscapularis, if necessary, to hold it and the prepared capsule and labrum out of the way in the inferior recess. Retraction of this prepared tissue into the inferior recess is necessary to allow access to the anterior glenoid rim for burring.



**FIGURE 2.** The capsule is mobilized from the anterior glenoid neck medially as a flap, this is then pushed inferiorly using a grasper through the K portal to allow passage of the coracoid through the subscapularis split.



**FIGURE 3.** The musculocutaneous nerve is identified entering the medial aspect of the conjoint tendon; it is important to ensure that the musculocutaneous and axillary nerves are free before transfer of the coracoid.

### Coracoid Soft-Tissue Preparation

While viewing through the D and E portals and working through the J and I portals, the coracoid is exposed in a 360-degree manner using the chondrotome and electrocautery. The coracoacromial ligament is released from its coracoid insertion and the pectoralis minor tendon is released from the medial side of the coracoid. During this part of the operation, the musculocutaneous nerve is identified entering the medial aspect of the conjoint tendon (Fig. 3). Anesthesia without the use of muscle relaxant assists this stage of the operation, as the biceps will contract as the electrocautery approaches the nerve. Once located, the musculocutaneous nerve is exposed and all tissue between it and the coracoid are divided. This clearance ensures that there are no fascial bands that could compress the nerve when the coracoid is transferred to the glenoid. The axillary nerve is similarly visualized and tissue around it is cleared with the chondrotome to allow easy visualization at the time of bone transfer.

The conjoint tendon retractor is now inserted through the M portal and used to retract the conjoint tendon medially. The posterior switching stick is now repositioned at the level of the inferior glenoid, and passed through the subscapularis at the level of the proposed split.

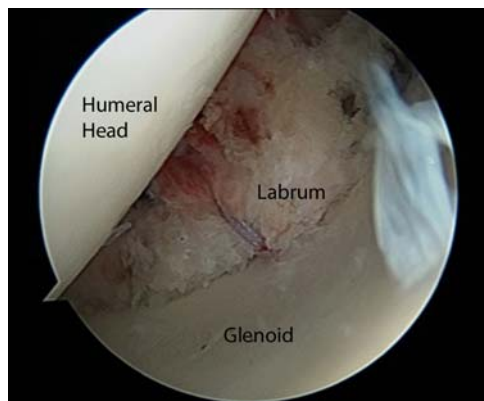
### Subscapularis Split

Electrocautery is used to create the subscapularis split on its anterior surface using the previously inserted switching stick as a guide. As the senior author's confidence and familiarity with this procedure has increased, much of this split is performed by blunt dissection using the conjoint tendon retractor. Care is taken at all times to preserve and protect both the musculocutaneous and axillary nerves.

### Harvesting the Graft

Using 2 spinal needles, the points for insertion of the top hats on the coracoid are identified. A skin incision is created and the drill guide inserted to rest on the superior coracoid.

Two wires are inserted through the drill guide and passed through the coracoid. The coracoid is then drilled, and tapped. The 2 long guidewires from the Latarjet set are inserted into each hole and the 2 top hats are run over these guidewires. The top hats are screwed into the coracoid, and then a short-sleeved 4.5 mm burr is used to decorticate the coracoid base



**FIGURE 4.** After the coracoid is secured to the anterior glenoid, the capsulolabral complex is pulled over it to rest on the glenoid. An anchor is then inserted at this point to allow repair of the labrum. It is important to avoid excessive tension on this repair.

circumferentially. Finally, a curved osteotome is used to complete the osteotomy. The coracoid positioning device is inserted through the M portal and secured to the graft. Once secure, the graft is contoured using a burr.

### Coracoid Transfer and Fixation

The coracoid is passed horizontally through the split in subscapularis, rotated 90 degrees, and placed in position on the glenoid rim. Care is taken to ensure that there is no soft tissue interposed beneath the graft.

Once the coracoid is adequately contoured and seated, 2 guidewires are inserted through the holding cannula, through the graft, through the glenoid, and out of the skin at the posterior aspect of the shoulder. The coracoid is then drilled secured to the glenoid using 2 cannulated screws.

### Capsular Repair

A grasper is inserted through a superior K portal and used to lift the capsular flap superiorly. Two Gryphon anchors (DePuy, Warsaw, IN) are inserted en face to the glenoid and sutures are passed through the labrum and capsule using a spectrum suture passer (Conmed, Utica, NY). The superior anchor is situated at the level of the capsular split. It is possible to repair the labrum so that labrum at the level of the split is approximated (Fig. 4). All sutures are tied with Weston knots. The capsule is highly mobile and care needs to be taken to not overtighten the labral repair with an overenthusiastic capsular shift.

Final assessment of the joint is performed. The portals are closed and dressings applied. All patients are dressed with a Cold Pad (DonJoy, Vista, CA) and shoulder abduction sling (Ultrasling, DonJoy) for 6 weeks postoperatively.

**TABLE 1. Outcomes**

Outcome	Mean $\pm$ SD	
	Preoperative	> 6 mo
VAS normal activities	28.5 $\pm$ 24.7	17.9 $\pm$ 23.5
WOSI	1142.8 $\pm$ 386.0	721.7 $\pm$ 297.5
ASES	68.3 $\pm$ 21.0	81.5 $\pm$ 18.5

ASES indicates American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form; VAS, Visual Analogue Score; WOSI, Western Ontario Instability Index.

### RESULTS

This procedure has been performed on 15 patients between January 2011 and August 2014. Mean age at surgery was 27.3 years (15 to 45 y), and 100% of patients were male. Clinical outcome data on 13 consecutive patients reviewed at >6 months postsurgery have been recorded. There has been no loss to follow-up. A summary of preoperative and postoperative outcome measures is shown in Table 1.

Pain intensity during normal activities improved by mean difference 10.5 out of a total of 100 measured on a visual analogue scale. Function improved by 13.2 using the patient-rated score from the American Shoulder and Elbow Surgeons evaluation. Global improvement was measured using the Western Ontario Shoulder Instability Index by 421.1. All patients reported that their shoulder instability had resolved following the procedure. One patient reported severe neural-type pain following the procedure, and on repeat arthroscopy the next day it was felt that the capsular repair was too tight. Release of the inferior-most anchor was performed arthroscopically with complete resolution of the pain immediately postoperatively. Presumably, the labral repair had been too tight and resulted in traction on the axillary nerve. Since then, the authors have been very conscious to not overtighten the labral repair.

### DISCUSSION

Similar to the reports by Lafosse, the learning curve is steep. The procedure initially taking on 3 hours to perform, but can now be performed reliably in 1 hour 30 minutes, including the labral repair. The actual capsular repair is technically straightforward once the bone transfer has been completed.

We perform capsular repair in all patients undergoing an arthroscopic Latarjet.

The patients have been enrolled consecutively. There are 3 patients who have been excluded from the series after initial consent was obtained. All 3 were excluded due to amputation of the prepared capsule and labral tissue rendering the tissue unsuitable for repair. All of these amputations of the capsular flap occurred as the deep dissection of the subscapularis split was completed with electrocautery and could have been avoided with a more extensive initial dissection of the capsular tissue inferiorly and laterally. Care is now taken to perform an extensive mobilization of the tissue for repair and ensure wide separation of the capsule well clear of the region where the subscapularis split will be made.

We feel it is worth preserving the anteroinferior capsule and repairing it to place the bone block in an extra-articular position, and further reinforce the anterior stabilization of the glenohumeral joint. We also believe that preservation of the capsule allows tightening of the inferior capsule at the time of labral repair if there is additional inferior. We therefore recommend that reconstruction of the anterior capsule and labrum should be considered when performing the arthroscopic Latarjet procedure.

### ACKNOWLEDGMENT

The authors would like to acknowledge the support of Carly Rankin, Bhavana Jha, and Susan Peters (research assistants) at the Brisbane Hand and Upper Limb Research Institute for data collection, data entry, and assistance with manuscript preparation.

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