Technical Note

Open Latarjet Procedure for Recurrent Anterior Shoulder Instability with Glenoid Bone Loss: Technical Considerations

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Abstract: Shoulder instability is a common pathology treated in acute and chronic settings, often in young, active patients. Surgical options vary depending on patient factors, injury severity, degree of bone loss, and surgeon preference. In cases of significant bone loss, bony augmentation procedures are recommended to minimize the risk of recurrent instability. This Technical Note describes the authors' preferred surgical technique for the open Latarjet procedure for treatment of shoulder instability.

The glenohumeral joint is prone to instability as the result of its high degree of mobility and limited bony constraints.[1] Anterior shoulder dislocations represent more than 90% of all dislocations, often occurring in young, contact athletes, and military personnel.[2,3] Although arthroscopic Bankart repair is more effective than conservative treatment for patients who experience a first-time dislocation,[4] recurrence remains high (21%-67%) in patients with poor labral tissue or significant bone loss.[5,6]

In this subset of patients, bone block augmentation techniques such as the Latarjet procedure are preferred.[7,8] Described by Dr. Michel Latarjet in 1954, coracoid transposition with the conjoint tendon reduces recurrent instability rates when performed as a primary or revision surgery.[9] Modifications of this technique have been introduced since its inception, including an arthroscopic technique[10] and the congruent-arc Latarjet.[11,12] In this Technical Note, we describe the senior author's preferred technique for the open Latarjet procedure, as shown in Video 1.

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Surgical Technique

Indications

Patients indicated for Latarjet include patients with recurrent anterior shoulder instability with (1) unsuccessful previous arthroscopic stabilization, (2) poor quality anterior/anteroinferior labral tissue, (3) anterior glenoid bone loss >13.5%, or (4) an off-track Hill Sachs lesion.

Patient Positioning and Preparation

After general and regional anesthesia with a single-shot interscalene block for postoperative pain control, the patient is placed in the beach-chair position with an arm holder (SPIDER2 Limb Positioner; Smith & Nephew, Andover, MA). Standard prophylactic antibiotics are administered and the patient is prepped and draped in sterile fashion.

Diagnostic Arthroscopy

A diagnostic arthroscopy is always performed, because the authors have found that in approximately one third of cases there is some intra-articular pathology that must be addressed.[13] A standard arthroscopic posterior viewing portal is established approximately 2 cm medial and 2 cm inferior to the posterolateral corner of the acromion. A standard 30° arthroscope is introduced, and an anterosuperior working portal with a low-profile 5.5-mm diameter cannula (Arthrex,

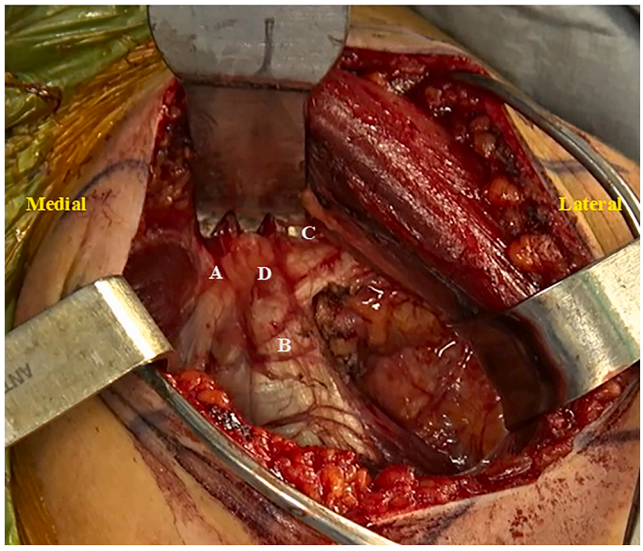

Fig 1. As visualized in a left shoulder with the patient in a beach-chair position, dissection is carried down to the deltopectoral interval with the cephalic vein mobilized and retracted medially. The deltopectoral interval is opened and the following structures can be identified: intraoperative exposure of the pectoralis minor (A), conjoint tendon (B), coracoacromial ligament (C), and coracoid (D).

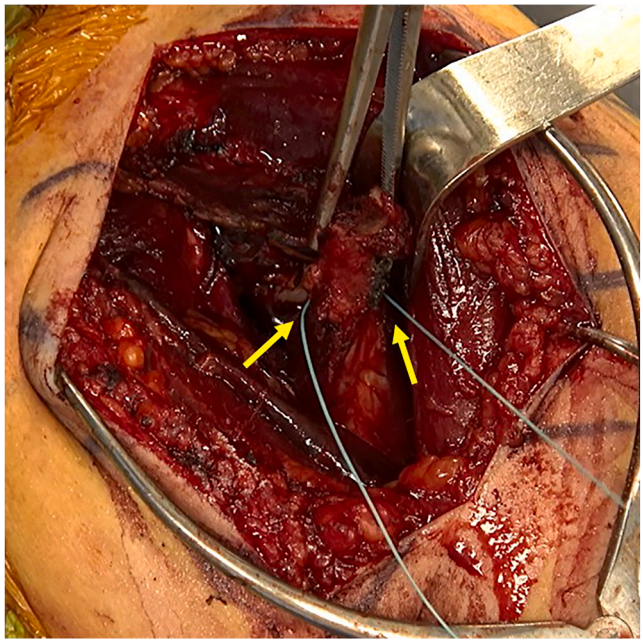

Fig 2. A No. 2 ETHIBOND (Ethicon, Raritan, NJ) countertraction suture placed at the conjoint, bone-tendon interface to be used during later screw placement. This is a left shoulder with the patient in the beach-chair position.

Naples, FL) is established through the rotator interval. Documentation of concomitant injuries, the degree of glenoid and humeral bone loss, quality of the anterior capsulolabral tissue, and status of the articular cartilage is performed. An anterior load and shift may be performed during diagnostic arthroscopy to document dynamic examination. Once the diagnostic arthroscopy is completed, the arthroscope is removed, and excess fluid is evacuated from the shoulder.

Procedure

A deltopectoral approach is used for exposure. If possible, the patient's previous incisions are used. The authors' preferred incision begins at the center of the coracoid and extends distally toward the humeral shaft, just lateral to the axillary crease, so that this incision may be used for any future open shoulder procedures (including arthroplasty). Alternatively, a more vertical incision in line with the axillary crease may be used per the surgeon's preference. Full-thickness medial and lateral skin flaps are raised and the fascial plane between the deltoid and the pectoralis major is identified. The cephalic vein is mobilized and retracted medially to avoid injury during lateral retraction of the deltoid. The deltopectoral interval is opened and retractors are placed beneath the deltoid and pectoralis major to aid in visualization. A 3-prong anterior glenoid retractor is placed on the superior aspect of the coracoid and forward flexion of the arm helps to relax the deltoid. The conjoint tendon and its attachment to the coracoid are identified (Fig 1). The arm is placed into internal rotation and the pectoralis minor tendon is fully released from the coracoid using electrocautery. The arm is then placed into abduction and external rotation, and the coracoacromial ligament is released from the acromion using curved Mayo scissors, leaving a 15-mm stump attached to the coracoid. Electrocautery is used to release the coracohumeral ligament laterally at its bony insertion on the coracoid. A key elevator is used to elevate the periosteum from the superior, inferior, and medial aspects of the coracoid. A Cobra retractor is placed laterally, and a 2-prong retractor is placed medially to protect the neurovascular structures. A 90° oscillating saw is then used to perform the osteotomy from superomedial to inferolateral at the base of the coracoid and then finished with a curved half-inch osteotome. In general, the authors' goal coracoid graft length is 20 to 25 mm. Preoperative cross-sectional imaging should be scrutinized to ensure the patient's coracoid is of adequate length. The medial and lateral aspects of the graft are held with a large Kocher and the inferior surface of the coracoid is leveled and partially decorticated with an oscillating saw to create a flat surface. A key technical point is to avoid pulling excessive tension on the conjoint tendon during graft preparation, as this may cause a neuropraxia, particularly to the musculocutaneous nerve. The coracoid graft is then prepared with two 3.5-mm drill holes approximately 10 mm apart oriented in the sagittal plane to facilitate coracoid placement in the

Fig 3. Sterile sponge placement within the subscapularis and capsule interval. The dashed line represents the planned capsulotomy. This is visualized in a left shoulder with the patient in the beach-chair position.

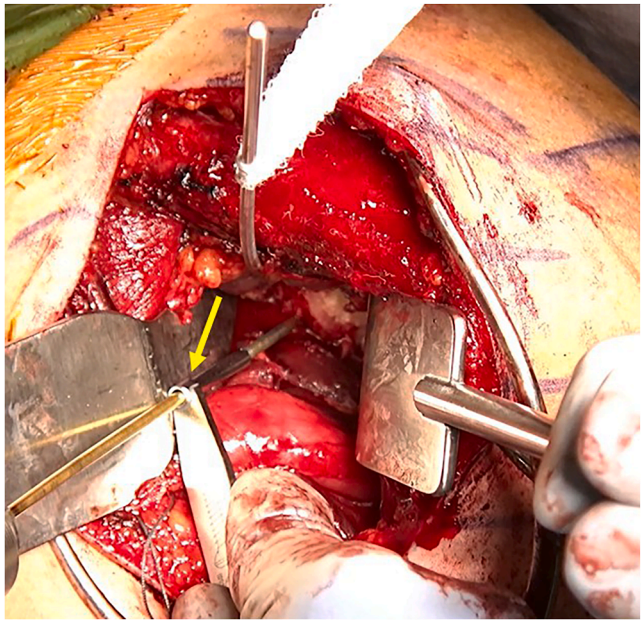

Fig 4. A 2.7-mm drill guide can be used to create additional leverage for desired screw trajectory as seen in a left shoulder with the patient in the beach-chair position.

class or lying position, ensuring there is adequate bone distally and proximally to both drill holes. The bone-tendon interface is tagged with a No. 2 ETHIBOND (Ethicon, Raritan, NJ) suture that will be used as countertraction during later screw placement (Fig 2).

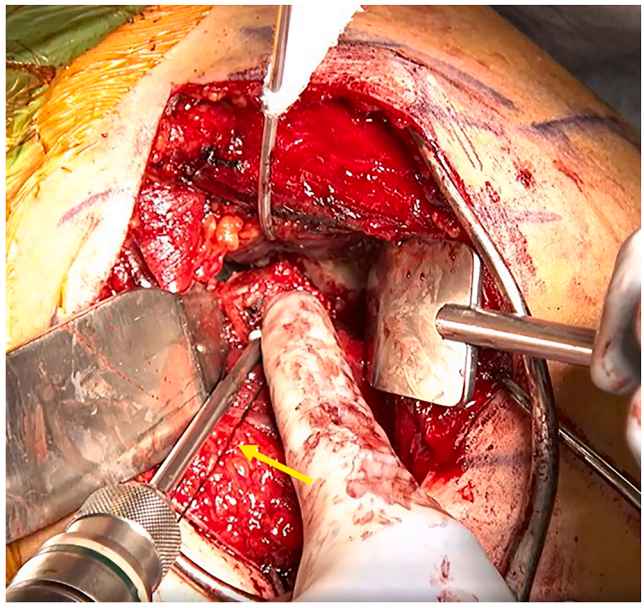

Fig 5. The countertraction stitch is used to hold counter tension on the graft while the inferior screw is placed and the graft is carefully rotated to sit flush with the anterior glenoid. The patient is in the beach-chair position, and this view is seen in the left shoulder.

The glenoid exposure is accomplished through a subscapularis split at the midpoint of the subscapularis muscle. The interval between the subscapularis and the capsule is then developed bluntly. A sterile sponge is placed within the subscapularis and capsule interval, dissecting the capsule free from the overlying muscle (Fig 3). The capsule is split longitudinally in line with the subscapularis split, exposing the glenoid. A thin, long-handled Fukuda retractor is then placed into the glenohumeral joint to retract the humeral head posteriorly and a triangular capsulectomy is performed at the planned position of the coracoid graft. A 7/64ths Steinmann pin is placed into the superomedial aspect of the anterior glenoid neck to retract the upper border of the subscapularis. A 3-prong retractor is then placed medially to expose the anterior glenoid neck which is decorticated with a 5.5-mm arthroscopic burr in preparation for coracoid transfer. The sponge is then removed. The inferior screw hole is drilled freehand on the glenoid side using a long 2.5-mm drill, with the trajectory being parallel to the glenoid surface. The use of a 2.7-mm drill guide allows for additional leverage to obtain the desired trajectory (Fig 4). The glenoid starting point is one half the width of the coracoid, with the coracoid flush on the glenoid face. A key technical point is to relax retraction on the Fukuda laterally and increase retraction on the 3-prong retractor medially to

Table 1. Advantages and Disadvantages of the Open Latarjet

Advantages	Disadvantages
Decreased surgical time and learning curve compared with all-arthroscopic Latarjet technique	Scar from deltopectoral approach incision
Solid, fully threaded screws placed in lag by technique fashion allows for rigid fixation of the coracoid graft	Open Latarjet is more invasive than arthroscopic Latarjet

Table 2. Pearls and Pitfalls of the Open Latarjet

Pearls	Pitfalls
Diagnostic arthroscopy should be performed in every case to identify glenohumeral pathology that potentially was missed by advanced imaging	Inadequate medial exposure can compromise appropriate screw trajectory
Countertraction suture placed at the bone-tendon junction aids in inferior screw placement and preventing malrotation of the coracoid graft	Excessive tension on the conjoint tendon during graft preparation can result in neuropraxia
Placement of sponge within the capsule inferior to the glenoid aids in exposure and protection of the axillary nerve	

allow for the appropriate screw trajectory. Tunnel depth is measured, and this length is combined with the thickness of the coracoid to calculate appropriate screw length. A 3.5-mm solid, fully threaded cortical stainless-steel screw (Synthes, West Chester, PA) is first placed through the inferior hole of the coracoid, to the anterior glenoid, in a lag-by-technique fashion. Counter tension is held on the graft using the previously placed traction stitch. As the screw is provisionally tightened, the graft should be carefully rotated until it is perfectly flush with the anterior glenoid (Fig 5). The screw heads must be away from the humeral head and there should be no overhang. A 2.5-mm drill is then used to drill the superior screw hole through the superior hole of the coracoid graft, aimed parallel to the inferior screw. The superior screw is measured and placed in standard fashion, sequentially tightening the screws to ensure adequate fixation. Ensure the graft is flush with the articular surface by visual inspection and manual palpation.

The capsule and subscapularis are closed together laterally using No. 2 ETHIBOND sutures in figure-of-eight fashion with the arm in 30° of external rotation, abduction and forward elevation. The authors' preferred technique does not include placement of anchors into the glenoid for capsular fixation due to concerns regarding compromising graft fixation or graft healing. However, in cases of excessive inferior translation, a 2-layer repair can be performed, where the capsule can be imbricated first with a Neer type T-plasty before secondary closure of the subscapularis. The deltopectoral interval is closed with a running No. 0 VICRYL suture. The remainder of the incision is closed in standard layered fashion.

Postoperative Protocol

The patient is placed in a shoulder immobilizer with an abduction pillow for 3 weeks postoperatively. Patients are made non–weight-bearing immediately and begin physical therapy on postoperative day 1. Passive forward flexion, abduction, adduction, and internal rotation as tolerated are allowed for the first 2 to 3 weeks after surgery, with external rotation limited to 0 to 30° and no resisted elbow flexion for 2 weeks. At 3 weeks postoperatively, patients begin active range of motion as tolerated, with no additional restrictions on external rotation. Strengthening begins at 5 to 6 weeks postoperatively, and a progressive return to play program is initiated at 10 to 12 weeks postoperatively, with a goal of return to all sporting activities, including full contact, at 4 months postoperatively.

Discussion

Glenohumeral instability is a challenging pathology with many treatment options available, ranging from soft-tissue repair to bone-block procedures. Previous studies demonstrate a lower recurrence rate for patients who undergo Latarjet compared with open or arthroscopic repairs in general and athletic populations.[14] In a systematic review of long-term outcomes by Hurley et al., the rate of good/excellent outcomes was 86.1% and the overall rate of return to sports was 84.9% and shorter return to sport timing by 0.40 months compared with arthroscopic Bankart repair.[14,15]

The deltopectoral approach and open nature of this procedure provide good exposure to the glenohumeral joint but limits access to all areas of the joint. Magnetic resonance imaging and computed tomography can show additional pathology contributing to instability, but studies have shown that identifying some of these injuries, such as a pan-labral tear, is challenging with advanced imaging.[16] In their series, Ernat et al.[13] reported that findings on diagnostic arthroscopy altered the surgical plan in 19% of cases. Therefore, it is recommended to perform a diagnostic arthroscopy before all Latarjet procedures to address pathologies not seen on preoperative imaging or during the surgical exposure.

The technique described has several advantages (Table 1). Solid, fully threaded screws are strongly preferred over cannulated screws to ensure rigid fixation of the coracoid graft to the glenoid, with less risk of hardware complication. To aid with inferior screw placement, a countertraction suture is placed at the bone-tendon junction, which helps prevent malrotation of the graft (Table 2). In addition, placement of a sponge within the capsule, inferior to the glenoid, helps with exposure and protection of the axillary nerve. Disadvantages include the scar from the deltopectoral approach incision, although use of the authors' preferred incision lateral to the axillary crease allows for use of the same incision for future open shoulder procedures. Despite various modifications to the technique over the years, the open Latarjet via a deltopectoral approach has been recognized as a reliable option to address complex glenohumeral instability.

Disclosures

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