

The Open Capsular Shift-Latarjet Procedure for Recurrent Anterior Shoulder Instability

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Background: Capsular management is having an increasingly important place during the open Latarjet procedure especially in preventing postoperative glenohumeral arthritis. The open capsular shift-Latarjet procedure consists of the classic Latarjet procedure associated with a glenoid T-based capsular shift to treat patients with high risk of recurrent anterior shoulder instability.

Indications: Patients presenting with humeral and/or glenoid bone loss, patients practicing professional activities or sports at risk of recurrence and without any previous capsular surgery, or major capsular deficiency.

Technique Description: After a classic deltopectoral approach and the osteotomy of the coracoid process, a horizontal split of the subscapularis is performed. Then a glenoid T-based capsulotomy is performed, and 2 passing wire suture threads are passed through the inferior flap of the capsule to prepare the capsular shift. A first, soft, all-sutured anchor is inserted at the inferior part of the glenoid medially to the articular surface. The coracoid graft is then positioned with a first inferior cancellous screw to be flush with the articular surface and fixed using a second cancellous screw. A second anchor is placed laterally and superiorly to the coracoid at the anterior scapular neck. The capsular shift is performed using a passing wire technique to suture the capsular flap to both anchors and to ensure the extraarticular positioning of the coracoid.

Results: Bouju et al found a low rate of recurrence with no revision surgeries and a significative lower incidence of osteoarthritis (8.6%) at 10-year follow-up compared with the current literature when suturing the capsule to the coracoid process. Itoigawa et al concluded that suturing the capsule on the coracoid may increase the risk of osteoarthritis due to a direct contact between the humeral head and the transferred coracoid, thus we suggest attaching the capsule over the glenoid.

Discussion/Conclusion: With appropriate patient selection, this technique is safe and reliable to treat patients with anterior instability without any specific risk related to the surgery. The association of the capsular repair is an appropriate solution to better restore the anatomy and to prevent the long-term risk of glenohumeral arthritis.

Keywords: shoulder instability; capsular shift; operative technique; Latarjet procedure; glenohumeral arthritis

VIDEO TRANSCRIPT

In this video we will be presenting the open capsular shift Latarjet procedure for patients with recurrent anterior shoulder instability.

There are no relevant disclosures to be mentioned.

We will be reviewing the following items: the background of the Latarjet procedure; the indications and

contraindications of our technique; the patient's history, physical examination, and imaging; an illustration of the capsular suture; the preoperative planning and positioning; the surgical technique; the postoperative management; some operative technical tips and pearls; and the complications of the Latarjet and the procedure outcomes.

As we all know, recurrent anterior shoulder instability is the most common joint dislocation. In a meta-analysis study, An et al have found that the Latarjet procedure has a lower rate of recurrence, revision, dislocation, and a higher range of motion than from the Bankart repair, but on the other hand, the Latarjet procedure has a slightly higher complication rate.

The Latarjet procedure was first described by Michel Latarjet in 1954, which consists of transpositioning the coracoid process over the front of the glenoid. The indications rely on Instability Severity Index Score (ISIS) score, the glenoid track concept, bony defect, and of course the surgical experience and education. The biomechanics behind the reliability of this technique were explained by Patte and Debeyre when they introduced the “triple locking concept” consisting of

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increasing the glenoid surface, the dynamic sling of the conjoint tendon, and the capsular repair.

Neer and Foster were the first to describe a juxta humeral T-based capsulotomy and repair but then Altchek et al introduced the T-capsulotomy on the glenoid side, used for the treatment of multidirectional shoulder instability.

In an article published in 2014, Luc Favard found a lower rate of osteoarthritis with a modified Latarjet-Patte procedure by suturing the capsule and attaching it to the coracoid process. But, there are some limitations to this technique. These include a risk of having a non-union or a bone-block resorption due to the strains on the graft caused by the tension forces of the capsule. That is why we suggested suturing the capsule over the glenoid in order to decrease these tensions while having an extra-articular graft and lower osteoarthritis rate.

Compared with the simple Latarjet procedure, unique contraindications for the open capsular shift Latarjet procedure are the presence of a previous capsular surgery like a Bankart repair or a capsular insufficiency due to chronic shoulder instability. Thus, all patients presenting a functional capsule are candidates to this technique.

Our patient is a 25-year-old nonsmoker man, who plays handball as an amateur, right-handed with no past medical or surgical history. He suffered from a first left shoulder dislocation 18 months ago that resulted from a trauma. Since then, he reported having 3 subluxations. On the physical examination, he had a positive anterior apprehension and relocation tests, and negative abduction and posterior drawer tests, as well as a negative posterior apprehension test.

These are the preoperative images showing a major Hill-Sachs lesion. An arthro-computed tomography (CT) scan was performed to better evaluate a cartilage depression and a capsular labral complex tear that were found in our patient. In the following illustrations we will explain the T-capsulotomy with a vertical incision on the glenoid side and its capsulorrhaphy using 2 soft all-suture anchors.

After the T-capsulotomy, 2 sutures of different colors are passed through the inferior part of the capsule. One is superficial and more lateral, and the other is medial and deep. In blue you can see the suture of a 1.7-mm soft all-suture anchor inserted just inferior to the bony graft and then a distal screw inserted on the graft.

Then we insert the second screw on the proximal side of the graft and another 1.7-mm soft all-suture anchor just superior to it. After that, a capsulorrhaphy is performed by suturing the lateral capsular part to the glenoid using the superior anchor.

This is a picture of the pre-operative positioning showing a female patient in the supine position. The whole upper limb will be included in the surgical field. The patient's head is maintained in a head positioner device, and general anesthesia is administered after a pre-operative anesthetic interscalene block.

We begin by a standard deltopectoral approach with the patient in the supine position. After identifying the cephalic vein, a Gelpi retractor (GerMedUSA; Garden City Park, NY) is used to separate the 2 limits of the deltopectoral groove and a Hohmann retractor (GerMedUSA;

Garden City Park, NY) is put above the coracoid process. Using a bovie cautery, the coracoacromial ligament is released from the lateral side of the coracoid with the arm at external rotation. Then a release of the pectoralis minor is performed with the arm maintained in internal rotation, and a partial medial osteotomy is performed.

Then the Hohmann retractor is replaced by a curved osteotome with which we perform the osteotomy of the coracoid process. The coracoid is released from its adherent tissue using the bovie cautery taking care not to injure the conjoint tendon, then its cut section is well coagulated to decrease bleeding into the surgical site. The deep surface of the coracoid is decorticated using an oscillating saw, then two 2.9-mm holes are drilled and separated 11-mm from one another.

An external rotation is performed, and the subscapularis muscle is well exposed and cut horizontally within its fibers at the junction of its middle and distal third. Metzenbaum scissors are used to separate the upper and the lower part of the subscapularis. Then a "blunt" capsulotomy is performed using a No. 11 scalpel blade all the way to its glenoid attachment.

A first suture is then passed through the capsule using a No. 1 vicryl suture and capsular detachment from the glenoid is continued using the pull of the suture. Using a different color, another suture is passed through the capsule and then a humeral head retractor is used for a better glenoid exposure. The anterior and inferior part of the glenoid is decorticated with a curved osteotome and a periosteal raspator while protecting the axillary nerve with a Hohmann retractor.

A distal prehole is marked using a bone reamer approximately 5-mm from the articular surface. Then the bone reamer is put at the superior part and used as a retractor. A 1.7-mm soft all-suture anchor is inserted on the inferior part of the glenoid. A 2.5-mm hole on the glenoid is drilled, then we fix the coracoid process on the glenoid using two 3.5-mm screws starting with the distal one and adjusting the lateral border of the coracoid, so it is flush with the articular surface. The second 2.5-mm glenoid hole is drilled and a 3.5-mm screw is inserted. Another 1.7-mm soft all-suture anchor is inserted on the superior part.

Now the arm is put at 30° of external rotation and abduction. Then we use the superficial capsular suture as a passing wire to pass the anchor suture through the capsule. Then we do several half hitch knots and slide them to close then the capsule. We do the same on the inferior part by passing the second capsular suture through the capsule with a different color passing wire. You can see how the capsule is closed and the graft is extra-articular to glenohumeral joint.

Some pearls to remember during this procedure:

- Limit the release of the conjoint tendon soft tissue to prevent complete devascularization of the graft and bone block resorption
- Inferior and medial partial osteotomy at the knee of the coracoid process is key in order to prevent any risk of scapular fracture
- Using a bovie cautery, cauterize the cut section of the osteotomy to decrease bleeding into the surgical site

- Use 2 relay sutures with 2 different colors while passing the capsule to easily differentiate the medial suture from the lateral one
- Always begin by suturing its lateral part for a better capsular tensioning
- The length of the coracoid process should be 20 to 25 mm
- Use cannulated screws for an easier fixation
- Give the screws a divergent direction

Some of the perioperative complications include the following:

- Cross the tunnels of the coracoid bone-block fixation screws with the glenoid anchors used for capsulorrhaphy
- Risk of entanglement and misrecognition of the threads
- Misplacement of the fixation screws causing bone block fracture
- Miscalculation of the screw's length causing impingement with the infraspinatus muscle; this can be avoided by using a depth gauge

These are the 3-months postoperative images showing the well-positioned graft over the anterior and inferior part over the glenoid.

Postoperative management for this type of surgery includes a shoulder immobilization for only 2 weeks with an immediate self-rehabilitation. A return to non-contact sports such as running and cycling in 6 weeks. Contact sports training is begun 3 months postoperatively and return to competition 6 months after the procedure.

Complications of this procedure are compared with those of the simple Latarjet technique. These include recurrence (1%–3%), neurological complications, hematoma, infection, stiffness and loss of external rotation, bone-block non-union/fracture/resorption, osteoarthritis, and irritation due to implants.

Concerning the outcomes of the Latarjet procedure, Schmid et al found that 88% of patients reported excellent or good results.

In our experience, this procedure has no added limitation of range of motion compared with the simple Bankart procedure with a loss of a maximum of 20 degrees of external rotation. In a study performed by Itoigawa et al, they found that suturing the capsule on the coracoid may increase the risk of osteoarthritis, and this is why we

suggest attaching the capsule over the glenoid. We believe that suturing the capsule to the coracoid process may increase the risk of bone-block resorption and graft non-union. And we also think that suturing the capsule to the coraco-acromial ligament will not give the graft an extra-articular position, which is the main purpose of our technique in order to decrease the risk of postoperative arthritis.

These are our references.

Thank you for watching.

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