OSTEOCONNECT Arthroscopic Guided Latarjet

Bankart technique using DOUBLE ENDOBUTTON◊ Fixation Device for anterior inferior glenohumeral instability

A shoulder technique guide as described by

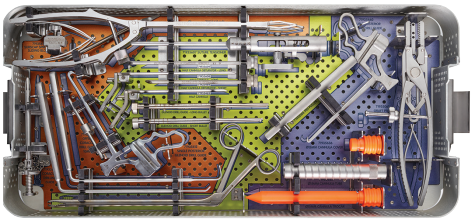
Professor Pascal Boileau, MD

Professor of Orthopaedic Surgery & Chairman

iULS (Institute Universitaire Locomoteur & Sport)

Universite de Nice Sophia-Antipolis
Hôpital Pasteur 2

smith&nephew

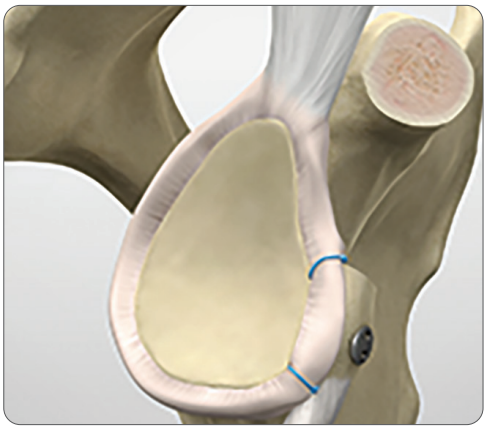


GLENOID BONE LOSS SYSTEMS

Advanced Instability Solutions

Introduction

Coracoid transfer to address anterior shoulder instability, first proposed by Michel Latarjet in 1954[1] and popularized by Walch and Patte[2,3] is increasingly used in cases of glenoid deficiency and in revision anterior stabilization.[4-10] The technique has a three-fold advantage: (1) it allows reconstruction of the glenoid bone loss (static bone effect); (2) it reinforces the weak and stretched inferior glenohumeral ligament by transferring the conjoined tendon closer to the joint and lowering the inferior part of the subscapularis (dynamic sling or seatbelt effect)[1,11,12]; and (3) together with the reattachment of the labrum and capsule, it allows 'triple locking' of the shoulder.[12-14] The procedure yields good results with a low rate of recurrent instability, high rate of return to sports to pre-injury levels, and high rate of patient satisfaction.[2,7,14-20]



For illustrative purposes only. Results may vary.

In an attempt to make the arthroscopic Latarjet procedure safer and to reduce complications associated with the traditional screw fixation, we have developed a novel surgical technique and fixation method involving a guided surgical approach for graft positioning and the use of specific suture buttons for fixation.

In a recent clinical study, we have evaluated the accuracy of graft positioning and healing with computed tomography (CT) assessment in 76 patients followed prospectively.[20] We have demonstrated that:

(1) the use of the guiding technique does allow accurate positioning of the coracoid bone graft,

(2) cortical button fixation is an alternative to screw fixation which allows predictable and reproducible bone union and minimizes complications reported with screw fixation, and

(3) neurological and hardware complications, classically reported with screw fixation, have not been observed with this guided technique and novel fixation method.

This surgical technique was prepared with the guidance of Professor Pascal Boileau, MD and contains a summary of techniques and opinions based upon his training and expertise in the field, along with his knowledge of Smith+Nephew products.

S+N does not provide medical advice and recommends that surgeons exercise their own professional judgement when determining a patient's course of treatment. This surgical technique is presented for informational and educational purposes only. **For more information on the products in this surgical technique, including indications for use, contraindications, effects, precautions and warnings, please consult the products' Instructions for Use (IFU).**

Patient preparation + portal placement

Patient preparation

Under general anesthesia and interscalene block, place the patient in the 'lazy' beach-chair position. Using a movable arm support (SPIDER2 Limb Positioner, Smith+Nephew) place the shoulder in 60° of flexion (to relax the anterior deltoid) and 30° of internal rotation (to increase the space under the coracoid process and relax the axillary nerve). Place the elbow at 90° of flexion (to relax the conjoined tendon). Shoulder abduction is not recommended as it brings the neurovascular structures laterally in front of the scapular neck, putting them at risk. Shoulder extension is also contraindicated as it reduces the anterior subdeltoid space and puts the axillary nerve under tension.

NOTE: In addition to a standard posterior portal for systematic joint inspection, 5 anterior arthroscopic portals are required for this procedure: proximal (north), distal (south), lateral (west), and medial (east) to the coracoid process and used to work mainly extra-articularly. The North-West portal (located to the anterolateral corner of the acromion) is the rotator interval portal used to work inside the joint.

Portal placement

Posterior	P	Located 1cm inferior and medial to the posterior angle of the acromion
North process	N	Located one finger-breadth proximal to the tip of the coracoid
South	S	Located two finger-breadths distal to the tip of the coracoid process in the axillary fold
East	E	Located three finger-breadths medial to the tip of the coracoid process, passing obliquely through the pectoralis major muscle
West	W	Located two finger-breadths lateral to the tip of the coracoid process
North-West	O	Located at the antero-lateral corner of the acromion

A 70° scope is used in preference to a 30° scope throughout the procedure.

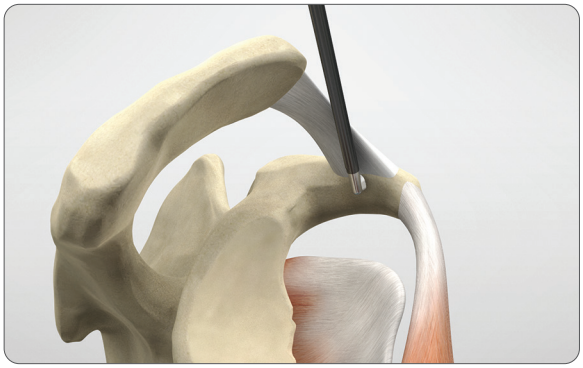


Figure 1a

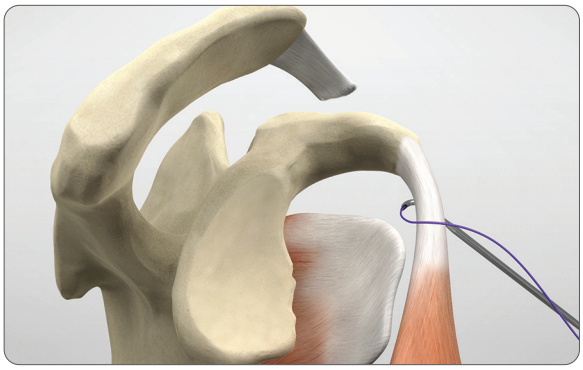


Figure 1b

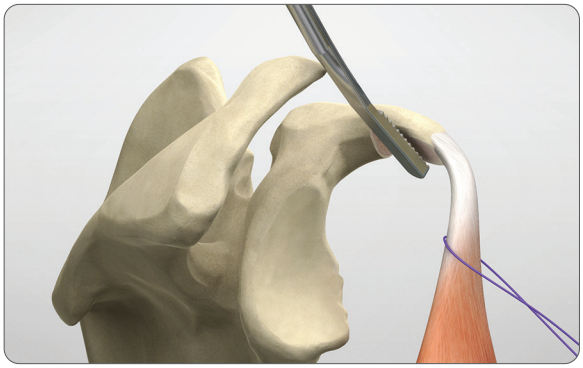


Figure 1c

Coracoid preparation

Coracoid dissection

Start with the 70° arthroscope in the P portal. Locate the O portal with a needle. Use a radio-frequency device to open the rotator interval and identify under-surface of the coracoid process.

Release the coracoacromial ligament from the lateral side of the coracoid and continue the dissection of the subcoracoid space over the coracoid and lateral to the conjoint tendon. Through the N portal, release the pectoralis minor from the medial side. Take care not to completely devascularize the coracoid graft by limiting pectoralis release to no further than 1cm from the tip of the coracoid process (**Figure 1a**).

Through the S portal use an ACCU-PASS◊ suture shuttle (Smith+Nephew) to pass and retrieve a PDS around the conjoined tendon. This will be used to retract the tendon and coracoid distally, after the osteotomy. Clip out of the way using a Kelly forceps (**Figure 1b**).

Coracoid abrasion

Through the O portal, introduce the Reciprocating Rasp and abrade the under surface of the coracoid process to create a flat surface (**Figure 1c**).

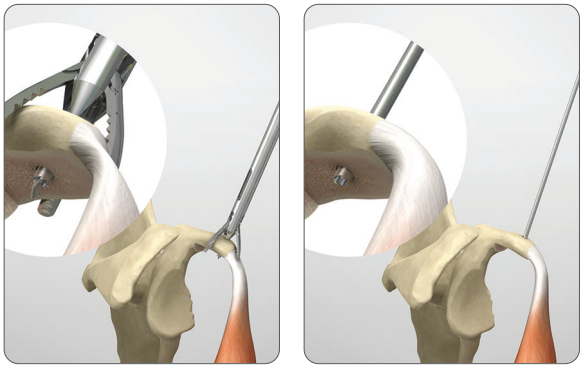


Figure 1d

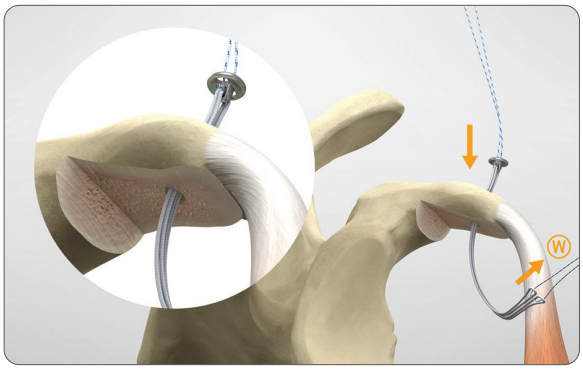


Figure 1e

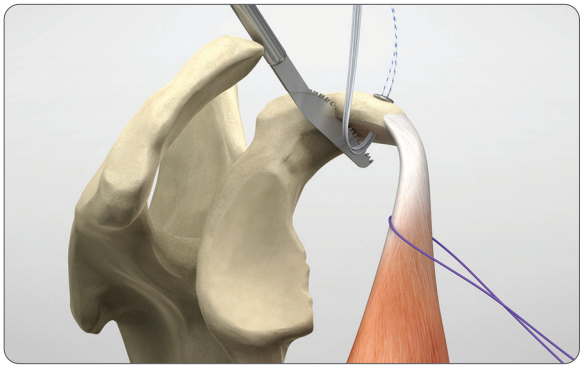


Figure 1f

Coracoid drilling

Introduce the Coracoid Drilling Guide through the N portal and grasp the coracoid perpendicular to its surface ensuring one jaw sits at the tip of the coracoid as shown in Figure 1d.

Advance a 2.8mm drill and sleeve through the coracoid until both exit the prepared surface of the coracoid. Remove the Coracoid Drilling Guide.

Remove the drill (leaving the sleeve in place), and pass a PDS suture through the coracoid (superior to inferior) and retrieve through the W portal. Remove the sleeve using the Pin Puller (**Figure 1d**).

NOTE: You should see the three arms of the drill guide, which means the guide is centered on the coracoid.

NOTE: It is important to drill as far distal on the coracoid (~ 5mm from the tip) as this location sets the position of the ENDOBUTTON◊ Fixation Device in a later step and makes it easier to pass the graft through the subscap split.

Coracoid shuttling

Tie the PDS suture coming from the N portal to the blue/white cobraid attached to the white suture loop of the ENDOBUTTON Fixation Device.

From the W portal, pull the PDS suture to draw the white suture bundle and then the ENDOBUTTON into the hole in the coracoid.

Retrieve the white suture through the N portal and the blue/white cobraid suture on the ENDOBUTTON through the S portal (**Figure 1e**).

Coracoid osteotomy

Through the O portal, use the Reciprocating Saw to osteotomize 15 to 20mm of the coracoid process. Additional soft tissue release may be helpful to fully mobilize the coracoid graft. Temporarily close the N portal with a clamp to avoid losing excess saline (**Figure 1f**).

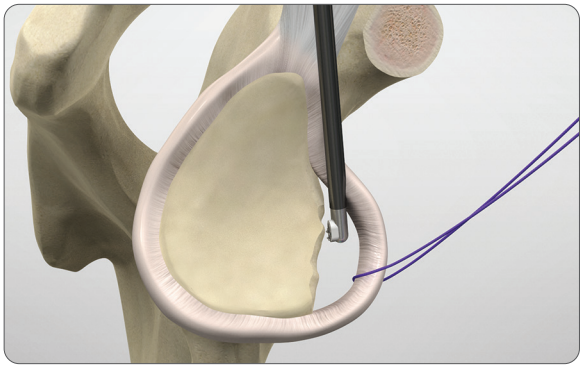


Figure 2a

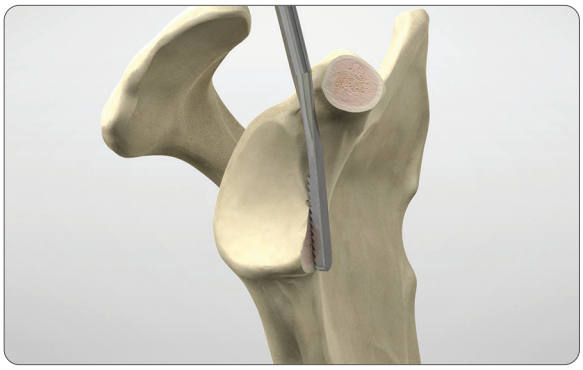


Figure 2b

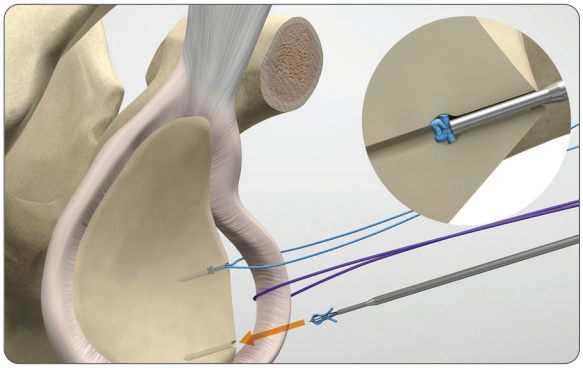


Figure 2c

Glenoid preparation

Labral dissection and elevation

Through the O portal, detach the anterior labrum using a radio-frequency device. Through the W portal, pass a PDS traction suture through the labrum at the 5 o'clock position. Pull this suture medially and clip it to the drape to create a working pouch at the glenoid neck level (**Figure 2a**).

Glenoid neck abrasion

Using the Reciprocating Rasp through the O portal, abrade the glenoid neck between 3 and 6 o'clock to create a cancellous flat surface (**Figure 2b**).

3 o'clock anchor insertion

Through the W portal, drill an anchor hole at 3 o'clock position and insert a SUTUREFIX◊ ULTRA S suture anchor (Smith+Nephew) to be used later for the Bankart repair. Repeat this process for an anchor at the 5 o'clock position (**Figure 2c**).

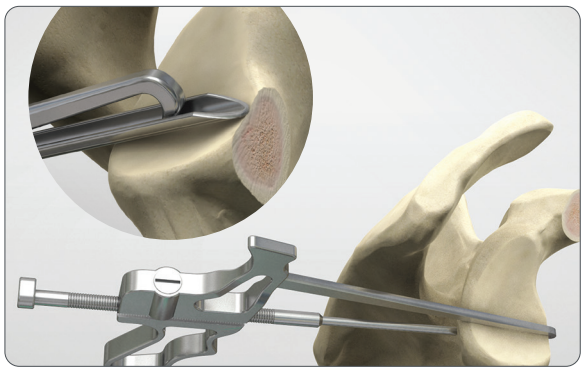


Figure 2d

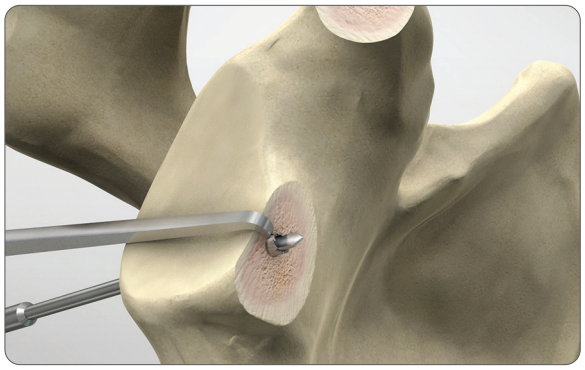


Figure 2e

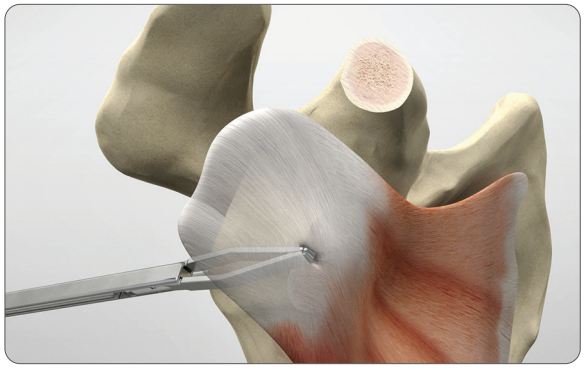


Figure 2f

Glenoid Drill Guide placement

Using a switching stick, move the scope to the O portal to view the glenoid surface and anterior glenoid neck.

Place a switching stick in the P portal and slide the Short Half Cannula down it. Remove the stick and slide the Glenoid Drill Guide down the cannula and then remove the cannula. Place the Glenoid Drill Guide flush to the glenoid at the 5 o'clock position (in a right shoulder), with the tip of the hook over the glenoid rim. Make a second posterior skin incision and push the 'bullet' into the joint until it reaches the posterior neck of the glenoid (**Figure 2d**).

Glenoid drilling

Advance a second 2.8mm drill and sleeve from posterior to anterior through the Glenoid Drill Guide until both are visible from the anterior glenoid.

Remove the drill and 'bullet', leaving the sleeve in place. Reintroduce the drill into the sleeve for additional stability and reduced saline leakage (**Figure 2e**).

Posterior spreader placement

Slide the half cannula under the Glenoid Drill Guide, remove the guide, and replace with the Subscapularis Spreader with Sliding Block (ensuring the spreader is closed at this stage). Remove the cannula. In a lateral direction, gently push the Subscapularis Spreader through the subscapularis muscle, below the labrum and at the same level as the drill and sleeve (5 o'clock). Lock the Subscapularis Spreader against the skin of the posterior aspect of the shoulder (**Figure 2f**).

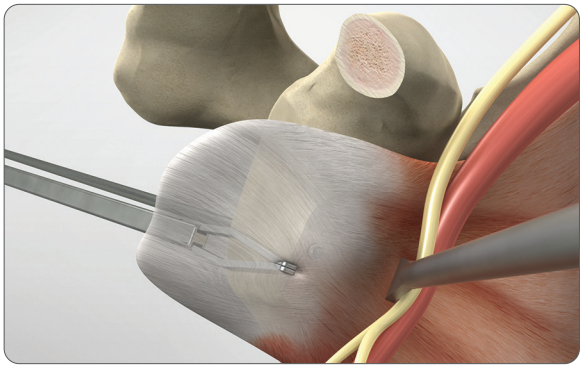


Figure 3a

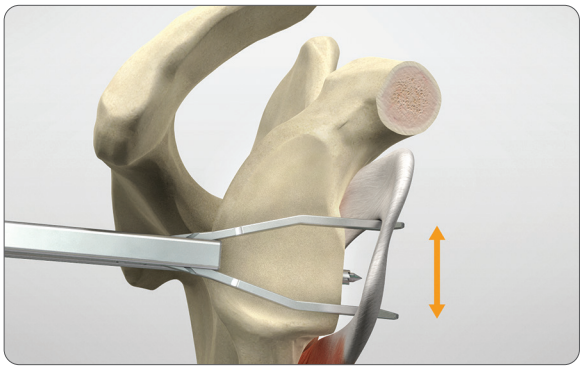


Figure 3b

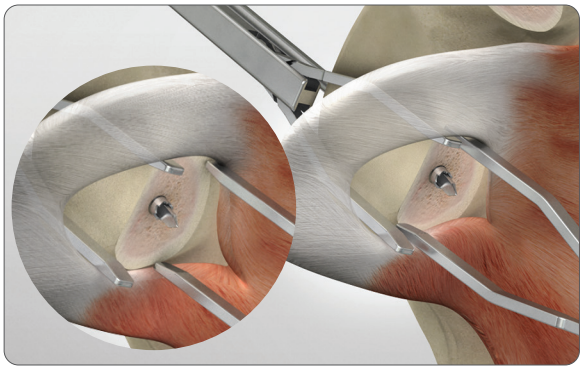


Figure 3c

Subscapularis split

Anterior bursectomy and 'three sisters' identification

With the scope in the W portal, use a radio frequency device through the S portal to remove the bursae of the subscapularis and identify the anterior axillary vessels (the so called 'three sisters').

Axillary and musculo-cutaneous nerves identification and protection

Following medially, the 'three sisters' lead to the 'two brothers': the axillary and musculo-cutaneous nerves. Introduce the Tissue Retractor through the S portal, to retract the nerves medially (**Figure 3a**).

Lateral subscapularis split

After checking the position of the Subscapularis Spreader (correct at the 2/3 superior 1/3 inferior junction of the subscapularis tendon), gently open it. Use a radio-frequency device through the S portal to further open the tendon (**Figure 3b**).

Medial split

From the E portal, introduce the Long Half Cannula through the pectoralis major and aim towards the base of the coracoid graft. Slide the Subscapularis Spreader along the cannula at the level of the drill. Open the Subscapularis Spreader and go gently medial while sliding the jaws under the neck of the scapula this will allow one to visualize the abraded neck of the glenoid and to get clear sight of the drill and sleeve. Together, the two Spreaders create a 'safe window' through the subscapularis muscle.

For repositioning of the spreaders close the jaws to prevent torque and high side forces when in contact with bone (**Figure 3c**).

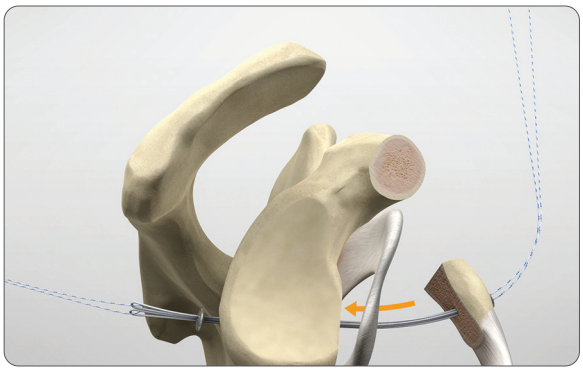


Figure 4a

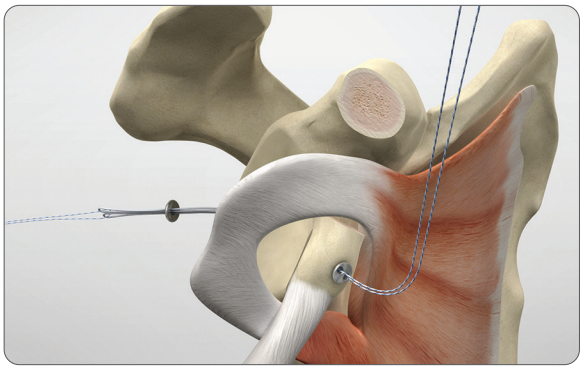


Figure 4b

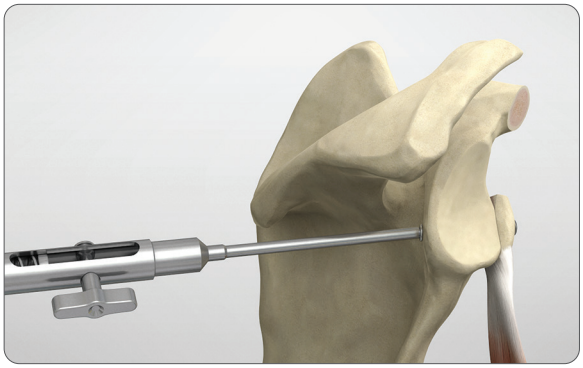


Figure 4c

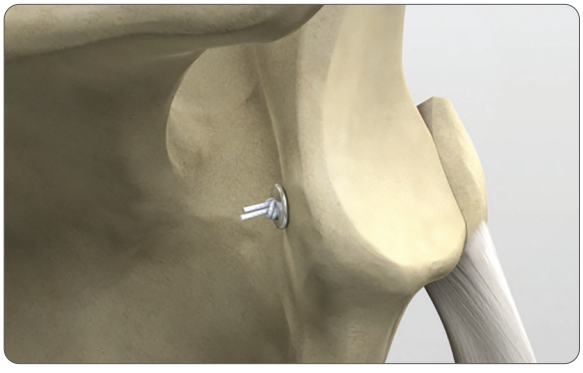


Figure 4d

Coracoid transfer and fixation

Suture shuttling

Remove the glenoid drill from the sleeve and introduce a Suture Retriever. Introduce a suture grasper through the N portal to retrieve the PDS suture (attached to the white suture) and direct it to the mouth of the Suture Retriever. Capture the PDS suture with the retriever and pull posteriorly through the glenoid. Before transferring the white suture through the glenoid, remove the sleeve from the glenoid using the Pin Puller (**Figure 4a**).

Coracoid transfer

Pull on the blue/white cobraid suture from the P portal to transfer the coracoid bone graft. There must be no resistance when pulling. Introduce the Bone Grasper through the S portal, and use it to adjust the rotation of the graft in order to be flush with the glenoid surface. (Check for a smooth pulley by alternating pulls on the two suture loops) (**Figure 4b**).

Posterior button placement & knot tightening

Using the Suture Retreiver, pass the four white sutures through the posterior ENDOBUTTON◊. Tie a Nice knot (sliding locking knot) making sure that the loop with the blue/white cobraid remnant is the post. Advance the Suture Tensioner through the P portal and apply a tension of 50 Newtons. Reintroduce the scope through the P portal to control placement and rotation of the bone block, ensuring no lateral overhang. The positioning and the rotation of the coracoid graft are controlled with the help of the Bone Grasper through the S portal if needed. Further compression of 50 Newtons (total 100 Newtons) on the bone graft against the anterior glenoid neck is obtained by using the Suture Tensioner. Remove the tensioner and lock the construct using three square knots (**Figure 4c to 4d**).

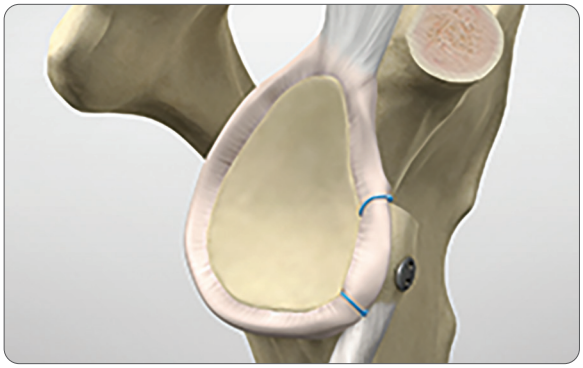


Figure 5

Bankart repair

Using the previously placed SUTUREFIX® ULTRA S anchors, reattach the capsule and labrum to the glenoid rim, leaving the bone graft in an extra-articular position (**Figure 5**).

Postoperative management*

- The arm is immobilized for two weeks in a neutral rotation sling; this allows healing of the conjoint tendon in the muscular part of the subscapularis muscle and avoids loss of external rotation.
- Pendulum exercises start after two weeks (five times a day, five minutes each session). Patient is allowed to remove the sling at night and to sleep with the operated arm inside a t-shirt.
- After four weeks, the sling is removed and formal rehabilitation with a physiotherapist is started.
- Swimming pool therapy is encouraged. No heavy lifting is allowed for the first 12 weeks.
- Return to all types of sports activities, including collision and contact-overhead sports, is allowed between three to six months post-operatively.

* The views and opinions expressed for postoperative care are solely those of the surgeon and do not reflect the views of Smith+Nephew. In no event shall Smith+Nephew, be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising out of the use of or inability to use the expressed views.

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1. Latarjet M. A propos du traitement des luxations récidivantes de l'épaule. [Treatment of recurrent dislocations of the shoulder]. Lyon Chir 1954;49:994-7. **2.** Walch G. La luxation récidivante antérieure d'épaule. [Recurrent anterior shoulder instability]. Rev Chir Orthop Reparatrice Appar Mot 1991;77(Suppl 1):177-91. **3.** Walch G, Boileau P. Latarjet-Bristow procedure for recurrent anterior instability. *Tech Shoulder Elbow Surg* 2000;1:256-61. **4.** Balg F, Boileau P. The instability severity index score. A simple preoperative score to select patients for arthroscopic or open shoulder stabilisation. *J Bone Joint Surg Br* 2007;89:1470-7. **5.** Beran MC, Donaldson CT, Bishop JY. Treatment of chronic glenoid defects in the setting of recurrent anterior shoulder instability: a systematic review. *J Shoulder Elbow Surg* 2010;19:769-80. http://dx.doi.org/10.1016/j.jse.2010.01.011. **6.** Bhatia S, Frank RM, Ghodadra NS, Hsu AR, Romeo AA, Bach BRJ, et al. The outcomes and surgical techniques of the Latarjet procedure. *Arthroscopy* 2014;30:227-35. http://dx.doi.org/10.1016/j.arthro.2013.10.013. **7.** Burkhart SS, De Beer JF, Barth JRH, Cresswell T, Criswell T, Roberts C, et al. Results of modified Latarjet reconstruction in patients with anteroinferior instability and significant bone loss. *Arthroscopy* 2007;23:1033-41. http://dx.doi.org/10.1016/j.arthro.2007.08.009. **8.** Provencher MT, Bhatia S, Ghodadra NS, Grumet RC, Bach BR, Dewing CB, et al. Recurrent shoulder instability: current concepts for evaluation and management of glenoid bone loss. *J Bone Joint Surg Am* 2010;92(Suppl 2):133-51. http://dx.doi.org/10.2106/JBJS.J.00906. **9.** Schmid SL, Farshad M, Catanzaro S, Gerber C. The Latarjet procedure for the treatment of recurrence of anterior instability of the shoulder after operative repair: a retrospective case series of forty-nine consecutive patients. *J Bone Joint Surg Am* 2012;94:e75. http://dx.doi.org/10.2106/JBJS.K.00380. **10.** Shah AA, Butler RB, Romanowski J, Goel D, Karadagli D, Warner JJP. Short-term complications of the Latarjet procedure. *J Bone Joint Surg Am* 2012;94:495-501. http://dx.doi.org/10.2106/JBJS.J.01830. **11.** Giles JW, Boons HW, Elkinson I, Faber KJ, Ferreira LM, Johnson JA, et al. Does the dynamic sling effect of the Latarjet procedure improve shoulder stability? A biomechanical evaluation. *J Shoulder Elbow Surg* 2013;22:821-7. http://dx.doi.org/10.1016/j.jse.2012.08.002. **12.** Patte D, Bernageau J, Bancel P. The anteroinferior vulnerable point of the glenoid rim. In: Bateman JE, Welsh, editors. *Surgery of the shoulder*. New York: Marcel Dekker; 1985. p. 94-9. **13.** Boileau P, Thelu CE, Mercier N, Ohl X, Houghton-Clemmey R, Carles M, et al. Arthroscopic Bristow-Latarjet combined with Bankart repair restores shoulder stability in patients with glenoid bone loss.Clin Orthop Relat Res 2014;472:2413-24. http://dx.doi.org/10.1007/s11999-014-3691-x. **14.** Mizuno N, Denard PJ, Raiss P, Melis B,Walch G. Long-term results of the Latarjet procedure for anterior instability of the shoulder. *J Shoulder Elbow Surg* 2014;23:1691-9. http://dx.doi.org/10.1016/j.jse. 2014.02.015. **15.** Allain, J, Goutallier, D,Glorion, C. Long-term results of the Latarjet procedure for the treatment of anterior instability of the shoulder. *J Bone Joint Surg Am* 1998;80:841-52. **16.** Bessiere C, Trojani C, Carles M, Mehta SS, Boileau P. The open Latarjet procedure is more reliable in terms of shoulder stability than arthroscopic Bankart repair. Clin Orthop Relat Res 2014;472:2345-51.http://dx.doi.org/10.1007/s11999-014-3550-9. **17.** Bhatia DN, De Beer JF, du Toit DF. Coracoid process anatomy: implications in radiographic imaging and surgery. Clin Anat 2007;20:774-84. http://dx.doi.org/10.1002/ca.20525. **18.** Collin P, Rochcongar P, Thomazeau H. Résultat de la butée coracoïdienne type Latarjet pour instabilitée antérieure chronique de l'épaule. [Treatment of chronic anterior shoulder instability using a coracoid bone block (Latarjet procedure): 74 cases]. Rev Chir Orthop Reparatrice Appar Mot 2007;93:126-32. **19.** Hovelius L, Sandstrom B, Olofsson A, Svensson O, Rahme H. The effect of capsular repair, bone block healing, and position on the results of the Bristow-Latarjet procedure (study III): long-term followup in 319 shoulders. *J Shoulder Elbow Surg* 2012;21:647-60. http://dx.doi.org/10.1016/j.jse.2011.03.020. **20.** Boileau, P, et al. A guided surgical approach and novel fixation method for arthroscopic Laterjet. *J Shoulder Elbow Surg* 2015:1-13. http://dx.doi.org/10.1016/j.jse.2015.02.019.

Ordering information

Set number: 7193R004, Instruments, Arthroscopic Guided Latarjet and Bankart Procedure	
Reference #	Description
71935618	Arthroscopic Latarjet/Bone Block Tray
71935619	Arthroscopic Latarjet/Bone Block Lid
71935461	Glenoid Drill Guide, Short Bullet
71935612	Single Posterior Glenoid Drill Guide
71935616	Offset Coracoid Drill Guide 10mm
71935607	Suture Tensioner
71935610	Tissue retractor – 90°
71935611	Tissue retractor – 45°
71935615	Coracoid Drilling Guide
71935613	Subscapularis Spreader
71935614	Subscap Spreader Sliding Block
71935608	Half Cannula – Long
71935609	Half Cannula Obturator – Long
71935463	Half Cannula – Short
71935464	Half Cannula Obturator – Short
71928166	Pin Puller
71935459	Bone grasper

Implants, Arthroscopic Guided Latarjet and Bankart Procedure	
Reference #	Description
71934989	1-hole Round ENDOBUTTON◊
71934993	Round ENDOBUTTON S2 3/4 Suture Loop

Specific disposables for Implants, Arthroscopic Guided Latarjet and Bankart Procedure	
Reference #	Description
013593	Suture Retriever (Box 6)
014771	2.8mm Drill and Sleeve (2)
71935042	Reciprocating Saw Blade
71935043	Straight Cut Reciprocating Rasp

Additional instruction

To order the instruments used in this technique, call **+1 800 343 5717** in the U.S. or contact an authorized Smith+Nephew representative. Prior to performing this technique, consult the Instructions for Use documentation provided with individual components – including indications, contraindications, warnings, cautions and instructions.

Caution: U.S. Federal law restricts this device to sale by or on the order of a physician.

Learn more at **smith-nephew.com**

Endoscopy
Smith & Nephew, Inc.
150 Minuteman Road
Andover, MA 01810

www.smith-nephew.com
T +978 749 1000
US Customer Service:
+1 800 343 5717