Full Arthroscopic Eden-Hybinette Procedure Using 2 Cortical Suture Buttons for the Reconstruction of Anteroinferior Glenoid Defects

Philippe Valenti, MD, Natalia Martinez-Catalan, MD,**
*Jean-David Werthel, MD,† and Efi Kazum, MD**

Abstract: Therapeutic management of recurrent anterior shoulder instability with an anterior glenoid defect and a Hill-Sachs lesion requires a bone graft to restore the width of the glenoid. The Latarjet procedure is the most popular technique but an iliac crest bone graft is preferred when the coracoid process is dysplastic or too short or after failure of Latarjet or Bristow-Latarjet. The purpose of this manuscript is to describe a full arthroscopic Eden-Hybinette-guided technique with 2 cortical suture buttons for bone graft fixation. This procedure allows reconstruction of severe glenoid bone defects and treatment of concomitant capsulolabral lesions and humeral bone loss, while preserving the subscapularis muscle. In addition, the use of 2 cortical buttons for bone graft fixation simplify graft transport and positioning, provides good control of the rotation, improving healing of the iliac crest bone graft to the anterior glenoid rim.

Key Words: arthroscopic Eden-Hybinette, anterior glenoid defect, anterior shoulder instability, suture button

(*Tech Hand Surg* 2021;00: 000–000)

Reconstruction of the chronic anteroinferior glenoid defect using the Eden-Hybinette procedure or the iliac crest bone graft (ICBG) transfer technique has been previously reported to be a safe and efficient treatment in either primary cases of anterior shoulder instability[1–3] or after failed Bristow-Latarjet procedures.[4–6] This technique, which involves harvesting of a bone graft from the iliac crest and transferring it to the anterior glenoid rim, stabilizes the shoulder restoring glenoid width and concavity.[7,8]

Several modifications for the Eden-Hybinette procedure technique have been described[1–6,9–13] and include open or arthroscopic approaches, different bone graft fixation methods, various bone harvesting sites, and use of allografts. The authors' preferred technique is a full arthroscopic procedure using 2 cortical suture buttons for the fixation of an autologous tricortical iliac crest bone graft.

Reported drawbacks of the open surgical technique focus on postoperative subscapularis (SSC) muscle dysfunctions and include (1) disturbance of musculotendinous unit integrity and (2) increased risk of muscle atrophy and fatty infiltration.[14] Open revision surgery may pose additional challenges because of the fact that the medial boundary normally given by the coracoid process and conjoint tendon is no longer present. Therefore, dissection of the scarred SSC muscle potentially endangers the neurovascular structures,[3,4,15] in particular the axillary and musculocutaneous nerves.

Contrarily, aside from avoiding the presented potential threats, the arthroscopic technique enables treatment of other associated intra-articular lesions.[5,6] Furthermore, the use of suture-button fixation instead of screws avoids complications related to screw fixation and simplifies shuttling of the graft through the rotator interval, allowing precise placement of bone graft.[6]

The aim of this manuscript is to describe step by step the surgical technique of full arthroscopic Eden-Hybinettte with a fixation of the ICBG with 2 cortical suture button fixation for a recurrent anterior shoulder instability.

ANATOMY

The glenohumeral stability depends on static restraints (glenohumeral ligaments, glenoid labrum, articular congruity and version, and negative intra-articular pressure) and dynamic restraints (rotator cuff muscles, rotator interval, long head of the biceps, and periscapular muscles). In case of recurrent anterior instability, there is usually anterior glenoid bone loss (associated in some cases to a posterosuperior humeral bone loss) and lesion of the anteroinferior labrum. The objective of the surgical treatment is to restore the "bony effect" by increasing the anterior glenoid surface area (using a bone graft) and to repair the anteroinferior capsulolabral complex. The anterior part of the glenoid is in close contact with the SSC muscle, which lies between the glenoid rim and the conjoint tendon. Brachial plexus is just medial to the conjoint tendon and any attempt to work anterior to the SSC may put at risk the neurovascular structures, especially axillary and musculocutaneous nerves. The axillary nerve passes anterior to the subcapularis toward its inferior border, while the musculocutaneous nerve penetrates the coracobrachialis muscle.

To restore the anterior bone defect using an iliac crest bone graft, the ideal position of the graft is defined as below the glenoid equator (in the vertical plane) and flush to the glenoid rim (in the horizontal plane). Introduction of the ICBG to the anterior border of the glenoid can be achieved either through the rotator interval or through the SSC muscle. However, dissection through the anterior compartment in front of SSC to gain access to the front of the glenoid through a muscle split may damage SSC and neurovascular structures, while arthroscopic access through the rotator

From the *Paris Shoulder Unit; and †Hopital Ambroise Paré, Paris, France.
This study was classified as observational (noninterventional) by our local ethics committee statutory and ethical obligations of observational (noninterventional) studies in France. According to the past Huriet law on biomedical research, and the current regulation that went into effect in August 2006 (law no. 2004-806), such studies do not require prior submission or approval to/from an IRB, and they do not require written consent. There is a current discrepancy on observational studies between the French legal requirements and the editors' requirements. This observational research on data fulfils current French regulatory and ethical obligations.
P.V. is a consultant for VIMS and has developed the implants and the instruments used to perform the arthroscopic-guided Latarjet procedure with suture-button fixation. For the remaining authors none were declared.
Address correspondence and reprint requests to Natalia Martínez-Catalán, MD, Paris Shoulder Unit Clinique Bizet Paris, 33 Rue Fortuny, 75017 Paris, France. E-mail: natalia.martinezcat@gmail.com.

interval is safe and opening can be performed from intra-articular or from subacromial space. The rotator interval is an anatomic region in the anterosuperior aspect of the glenohumeral joint between the supraspinatus and the subcapularis muscle that includes fibers of the coracohumeral and superior glenohumeral ligaments.

Anatomy of the Iliac Crest

The ICBG is obtained from the anterior part of the iliac crest. Bone is harvested from the gluteal or iliac tubercle region about 4 to 5 cm posterior to the anterior superior iliac spine. It is important to begin 3 cm posterior to the anterior superior iliac spine to avoid the lateral femoral cutaneous nerve. In addition, the external oblique musculature is subperiosteally elevated avoiding the ilioinguinal and iliohypogastric nerves.

INDICATIONS/CONTRAINDICATIONS

Indications

ICBG can be performed in case of primary recurrent anterior shoulder instability associated to glenoid bone loss or in case of revision after previous failed stabilization surgery. Recently, Moroder et al[16] did not find any clinical or radiological difference between Latarjet and Eden-Hybinette procedures as primary treatments for anterior shoulder instability in a prospective randomized study. However, in cases of primary anterior shoulder instability, this technique can be proposed for those in which coracoid-transfer techniques may not provide sufficient restoration of the bone loss. These instances include (1) severe glenoid rim defect displaying a wider superior than inferior half of the glenoid (inverted pear)[3,17,18]; (2) a bipolar glenoid bony defect exceeding 25% associated with large medial Hill-Sachs[17]; and (3) a restricting coracoid process morphology, that is, dysplastic or too short, rendering it inadequate for glenoid's rim restoration. Moreover, when attempting to treat a persistent shoulder instability pursuing a failed Bristow-Latarjet, arthroscopic Eden-Hybinette procedure using 2 cortical buttons for graft fixation is indicated.

Contraindications

Patients with active infections, nerve injury, uncontrolled seizures, multidirectional instability, or the inability to follow postoperative directions are contraindications to the Eden-Hybinette procedure.

TECHNIQUE

Surgery is performed with the patient under general anesthesia with an interscalene block. The patient can be either placed in a semi beach-chair position or in lateral decubitus. The shoulder and the ipsilateral iliac crest are prepped and draped in a sterile manner with the arm free to allow shoulder mobilization. In the beach chair position, the arm is positioned in neutral rotation and 30 degrees of forward flexion with only 1 kg of distal traction to easily mobilize the shoulder as needed, whereas a 4 kg traction is used in lateral decubitus. A 30-degree arthroscope is used throughout the entire procedure, and the arthroscopic pump in set at 50 mm Hg of pressure to limit bleeding.

Step1: ICBG Harvesting and Preparation

ICBG harvesting is performed first to maximize efficiency and avoid alternating between surgical sites. A tricortical bone graft is harvested from the ipsilateral side (Fig. 1A). The length dimension of the bone block is typically 20 mm, although its size can be customized depending on the patient's morphology. Before wound closure, the created defect in the anterior iliac crest is sealed with bone wax. Using an oscillating saw, the bone block is shaped so that the cancellous surface can be positioned on the anterior glenoid neck with a slight oblique cut (Fig. 1B). The bone graft is then clamped in the designated coracoid guide and 2 3.0-mm holes are drilled through the graft, 7 mm from the lateral edge of the block (Fig. 1C). Two polydiaxonone sutures (PDS) are introduced through the drill hole to facilitate shuttling of the threads of the 2 cortical buttons.

Step 2: Glenoid Preparation

The arthroscope is introduced in the posterior portal, and an anterior and an anterolateral portal are established with a needle for instrumentation. An intra-articular inspection of the joint is systematically performed to evaluate the status of the labrum, glenohumeral ligament, capsule, cartilage, long head of the biceps, and the articular part of the rotator cuff. The posterior Hill-Sachs lesion (HSL) is systematically visualized statically and dynamically with the arm mobilized in abduction and external rotation, for engaging lesion detection.[17] The rotator interval is widely opened with a radiofrequency ablation (RFA) device (Fig. 1D), and the anterior labrum is completely elevated to expose the glenoid defect.

The anterior wall is debrided and flattened with a flat burr (PowerRasp; Arthrex, Naples, FL) to the point of a bleeding bone bed. The equator of the glenoid is marked on the glenoid edge using the RFA device. Preparation for the future Bankart repair, which will be completed at the end of the procedure, then follows. The labrum, the inferior glenohumeral ligament, and the anterior capsule are entirely released from the glenoid until fibers of the SSC muscle are visualized. Two to 3 caspulolabral lasso-loop braided nonabsorbable sutures (FiberWire; Arthrex) are then passed and retrieved through the anterolateral portal.

Step 3: Glenoid Drilling

With the arthroscope into the anterolateral portal to visualize the posterior aspect of the glenoid, the RFA device is moved to the posterior portal and a posteroinferior capsulotomy of 1 cm in length is performed to expose the posterior rim of the glenoid (Fig. 1E). The posterior labrum is spared to avoid extensive posterior capsulolabral deficiency. The posterior portal is expanded to 10 mm skin incision, and the interval between the infraspinatus and the teres minor is split with blunt scissors. The glenoid guide (Fig. 1F) is inserted until complete contact with the posterior wall of the glenoid is obtained. To avoid malposition of the graft (1) the anteroinferior edge of the glenoid should be flattened (2), the blade should be parallel to the articular surface, and (3) the guide locked on the anterior glenoid rim below the equator, at the desired location of graft positioning. The guide is secured posteriorly by using an external medial rod against the skin on the scapular spine and anteriorly with the help of a blunt trocar inserted intra-articularly through the anterior portal (Fig. 1G).

Two 3.0 mm tunnels are drilled through the guide, 7 mm medial to the anterior glenoid rim, without passing through the SSC muscle to avoid an iatrogenic axillary nerve lesion. The 2 cannulas exit through the tunnels at 3 and 5 o'clock positions (Fig. 1H). A PDS is passed through each cannula and retrieved from the anterior portal (Fig. 2A). The 2 cannulas are then removed leaving the 2 PDS sutures inside the glenoid tunnels.

Step 4: Implant Positioning

Using the 2 glenoidal PDS suture and a shuttle relay technique, the superior and inferior strands of the cortical buttons (ArthroVIMS

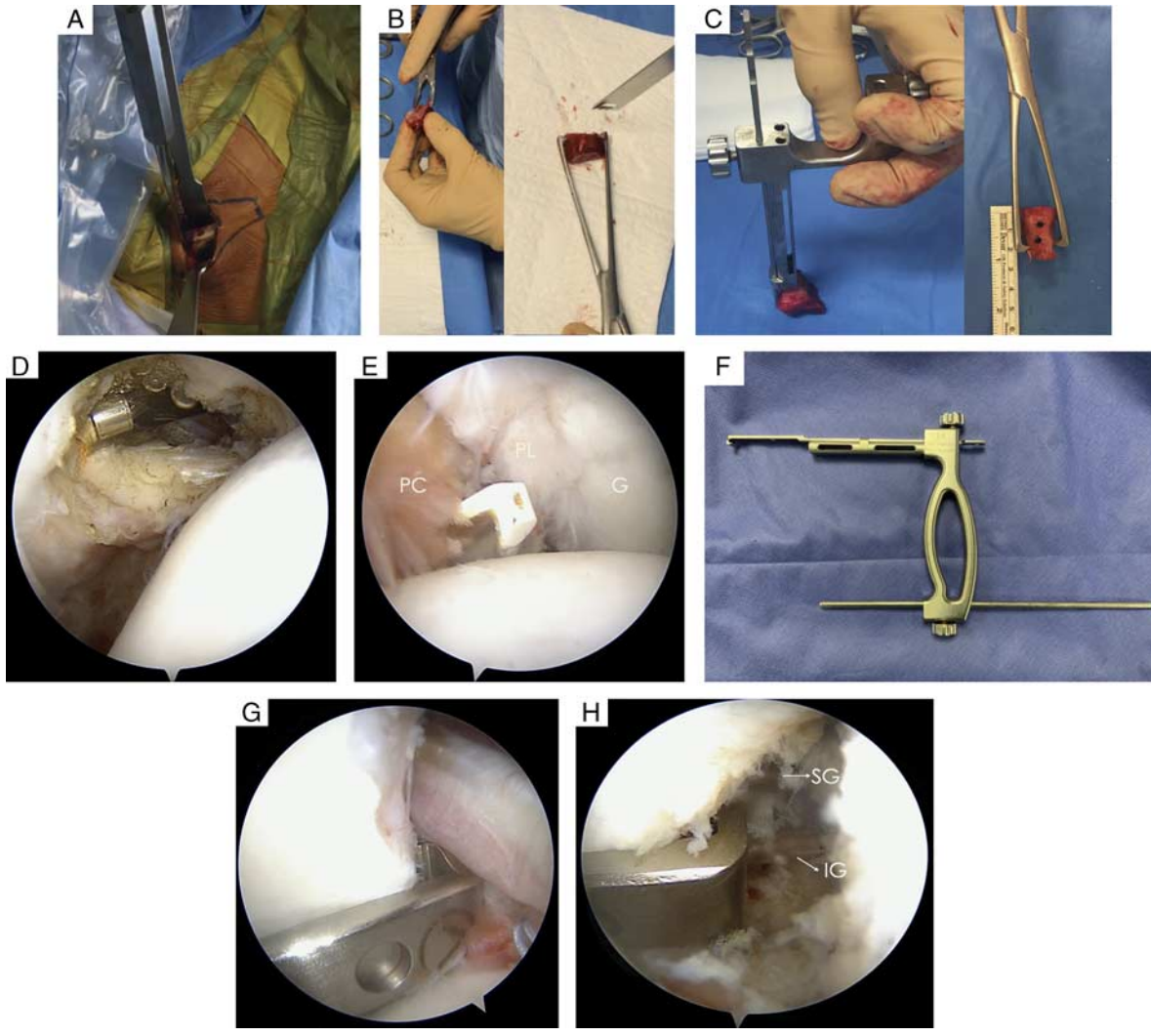

FIGURE 1. A and B, Iliac crest bone graft (ICBG) harvesting and preparation. C, Two 3.0-mm holes are drilled through the graft. D, Opening of the rotator interval. E, Posterior glenoid preparation. F, Glenoid guide. G, Guide positioning. H, Glenoid tunnel drilling. G indicates glenoid; IG, inferior glenoid cannula; PC, posterior capsule; PL, posterior labrum; SG, superior glenoid cannula.

Button, Vims, France) are passed through the glenoid in a posterior to anterior direction (Fig. 2B). Subsequently, each suture of the device is passed through the respective superior and inferior holes of the ICBG that have been previously prepared (Fig. 2C). The cortical buttons are pulled down to reach the superior aspect of the ICGB by retracting gently and alternatively on the strands exiting through the posterior aspect of the glenoid (Figs. 2D, E).

Step 5: Graft Passing and Placement

The anterior portal is expanded to 10 mm skin incision to facilitate the introduction of the bone graft into the joint. The ICBG is introduced into the glenohumeral joint through the enlarged rotator interval, held and directed by a grasper to position the graft above the SSC, through the rotator interval. The strands of the superior button are pulled first to horizontalize the ICBG, and the strands of the inferior button are tightened only once the bone graft is applied on the anterior glenoid wall. This progressive alternate pull on the lower and upper strands, under arthroscopic control through the anterolateral portal, allows seating of the graft on the anterior glenoid neck (Fig. 2F). The use of 2 cortical buttons prevents the rotation of the bone block and facilitates guiding of the bone block.

Step 6: Graft Fixation

The implants are tightened with a tensiometer (Fig. 2G) to secure the graft in its subequatorial position and flush with the joint. Tensioning is complete once 100N of force is achieved twice (200N) (Fig. 2H). A sliding-locking knot is tied posteriorly. Three additional locking knots are tied to lock the construct, and the sutures are cut with an arthroscopic suture cutter. Graft stability and correct positioning are assessed with a hook into the anterior portal and under control of the scope into the anterolateral portal.

Step 7: Bankart Repair

Two to 3 2.9 mm knotless anchors (PushLock, Arthrex) are loaded with the capsulolabral nonabsorbable sutures (FiberWire; Arthrex) that had been prepared and impacted to in the margin of the glenoid at 3 and 5 o'clock positions. This capsuloligamentous retensioning from inferior to superior recreates a glenoid concavity by creating a real anterior "bumper" effect and ensures the extra-articular positioning of the bone graft.

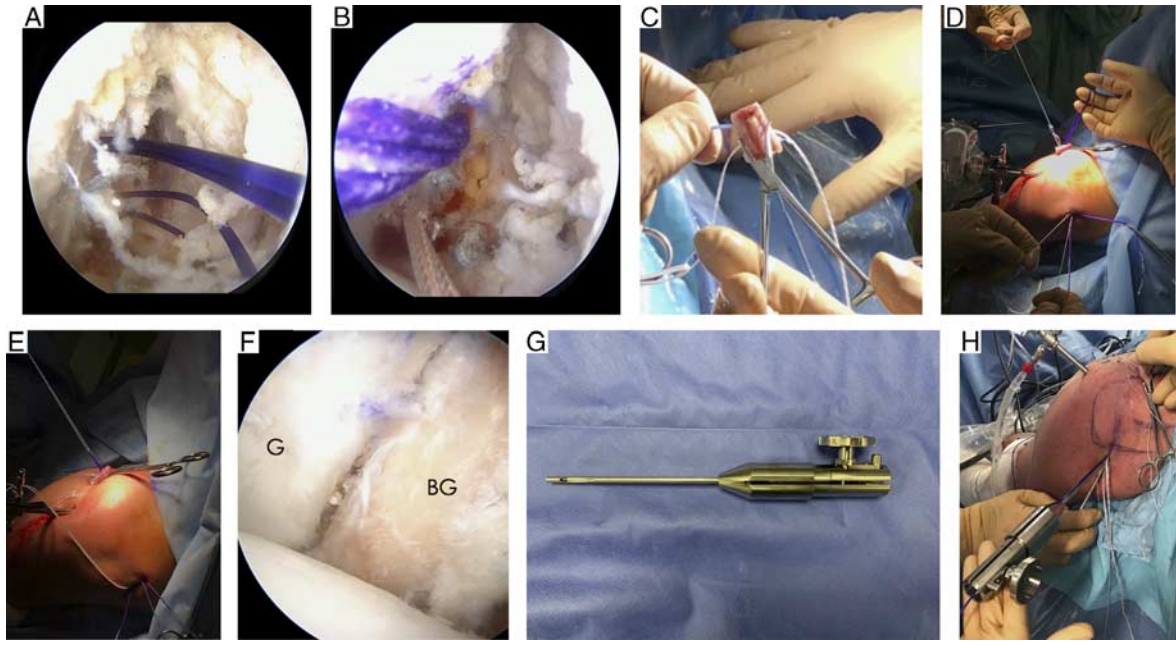

FIGURE 2. A, A polydiaxonone suture is passed through each cannula and retrieved from the anterior portal. B, Using the 2 glenoidal polydiaxonone sutures the superior and inferior strands of the cortical buttons are passed through the glenoid from posterior to anterior. C, Each suture of the device is passed through the respective superior and inferior holes of the iliac crest bone graft. D and E, The cortical buttons are pulled down by retracting gently and alternatively on the strands exiting through the posterior aspect of the glenoid. F, Iliac crest bone graft positioned on the anterior glenoid neck. G, Suture tensioner. H, Implants are tightened with a suture tensioner. G indicates glenoid; BG, bone graft.

Step 8: Posterosuperior Remplissage

In the presence of HSL with a dynamic engaging lesion an infraspinatus capsulotenodesis may be performed at the end of the procedure. With the scope located at the posterior portal, an accessory posterolateral percutaneous portal is created with the aid of a 13-G spinal needle. Through the posterolateral portal, a cannula is inserted and the spinal needle is used to abrade the HSL to promote healing of the tenodesis structures. The 2 double-loaded titanium anchors are introduced through the posterolateral portal and are fixed, 1 at the superomedial part of the HSL and the other at the inferolateral part of the lesion, at a right angle from one another. The scope is then switched to the subacromial space for suture retrieval, after removal of the bursa. All sutures are then retrieved through the posterolateral portal using a penetrating grasper. A suture-bridge technique is used to tie the sutures: a knot is performed with 1 suture of each anchor and pulled against the infraspinatus. As the sutures are tied, the bone defect is filled with the transferred soft tissue. A second suture bridge is performed to complete the remplissage. Intra-articular water is drained, before tightening the knots to obtain an optimal contact surface between the infraspinatus, the capsule, and the abraded HSL.

REHABILITATION

The upper limb is maintained in a sling with the shoulder kept in neutral rotation during the first week. At the beginning of the second week, the patient is encouraged to begin with self-assisted during 3 weeks. Passive forward elevation assisted by the contralateral upper limb is allowed, while external rotation is restricted. One month postoperatively, the patient begins an active mobilization protocol in forward elevation and external rotation guided by a physiotherapist. Return to all types of

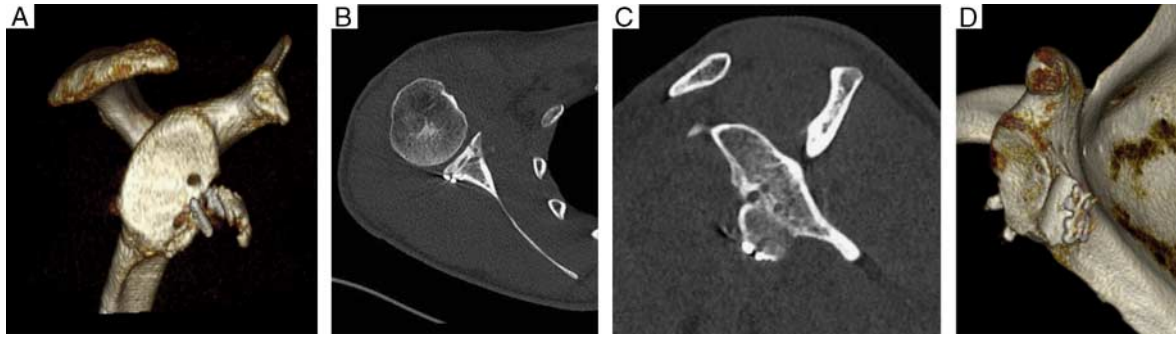

FIGURE 3. A, Three-dimensional-computed tomography (CT) scan reconstruction image of coracoid fracture and avulsion. B–C, Axial and sagittal views of postoperative CT scan showing adequate bone graft positioning and healing. D, Three-dimensional CT scan (B) reconstruction (C) postoperative image showing iliac crest bone graft subequatorial and flash to the glenoid.

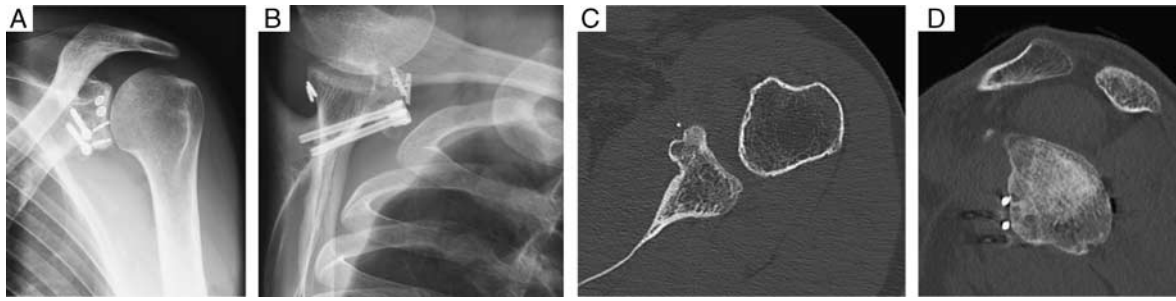

FIGURE 4. Postoperative anteroposterior (A) and Bernageau glenoid profile (B) radiographs showing anteroinferior glenoid reconstruction with ICBG using 2 cortical buttons in a patient with previous medialized coracoid. Axial (C) and sagittal (D) views of postoperative CT scan showing adequate bone graft postioning and healing.

sports activities varies between 3 and 6 months postoperatively and depends on muscle strength status and graft integration as demonstrated on computed tomography scan (Figs. 3, 4).

EXPECTED OUTCOMES

Arthroscopic Eden-Hybinette using cortical buttons for graft fixation has been reported to be a safe and effective procedure, leading to excellent functional and radiologic midterm outcomes.[6,9]

In case of primary cases, Avramidis et al[9] in a series of 28 patients with primary anterior shoulder instability treated with arthroscopic Eden-Hybinette and 2 cortical buttons reported 0% recurrent rate, 89% excellent satisfaction, and 100% graft correct positioning and healing at a mean follow-up of 3 years. In this study, the patient is placed in lateral decubitus position, the graft is introduced through the rotator interval by using a metal cannula and the suture buttons are introduced into the glenoid from anterior to posterior using a different guide.

In case of revision surgery following Latarjet failure at a mean follow-up of 21 months, Boileau et al[6] reported 1 case of instability recurrence (14%) and satisfactory clinical and radiographical outcomes with arthroscopic Eden-Hybinette procedure using 1 suture button in revision surgery. Compared with the use of 1 cortical button,[6] the authors of this article consider the use of 2 cortical buttons to allow adequate fixation for a larger bone block, facilitate shuttling of the bone block through the rotator interval, provide better control over graft rotation, reduce the risk of osteolysis, and to improve healing of the ICBG to the anterior glenoid rim. To improve graft healing, the implants are tightened with a tensiometer to increase bone compression to 200N. Biomechanical studies of coracoid graft fixation showed the median ultimate load to failure of endobutton to be ~200N[19] and, although traditionally 100N has been chosen in previous studies using similar technique,[6] our preference is tightening it to 200N due to the bigger size of ICBG compared with the size of the coracoid.

Compared with open techniques, the arthroscopic performance of this procedure allows an additional Bankart repair by placing the graft extra-articularly[3,6] and a thorough assessment of humeral bone loss.[6] The presence of significant glenoidal and Hill-Sachs defects has recently been found to be a risk factor for failure of Latarjet procedure.[20,21]

Apart from the obvious advantages of arthroscopic surgery that include reduced postoperative pain and risk of infection, decreased bleeding and preferred cosmesis, arthroscopic Eden-Hybinette procedure allows the preservation of the SSC muscle and avoids dissection near the brachial plexus and the axillary nerve which are often located in the vicinity of the previous SSC split. Although some authors perform an arthroscopic split of the SSC muscle[5,22] to enable hardware removal and graft passage, the authors' preference is to introduce the ICGB inside the glenohumeral joint through the rotator interval to preserve the SSC muscle[6] and small branches of the axillary nerve.

The use of suture-button fixation with a guided technique instead of screws simplifies graft shuttling and positioning, allowing precise placement of the bone graft. In addition, the use of small drill holes (3 mm) needed for suture-button fixation is an advantage when compared with the larger (3.5 mm) double drilling holes needed for screw fixation. In case of revision surgery, it facilitates management of previous devices (screws or suture-buttons). Finally, the intra-articular-guided glenoid drilling technique from posterior to anterior prevents brachial plexus injury anteriorly and suprascapular nerve injuries posteriorly.[6,23–25]

COMPLICATIONS

Reported complications include transient lateral femoral cutaneous nerve palsy from iliac crest harvesting,[9] nonunion of the bone graft, persisted apprehension, and recurrent instability.

CONCLUSIONS

Full arthroscopic Eden-Hybinette-guided technique using 2 cortical suture buttons for bone graft fixation allows reconstruction of severe glenoid bone defects and treatment of concomitant capsulolabral lesions and humeral bone loss, while preserving the SSC. In addition, the use of 2 cortical buttons for bone graft fixation facilitates graft transport and positioning, allows control over graft rotation, and enhances healing of the ICBG to the anterior glenoid rim.

REFERENCES

1. Taverna E, Garavaglia G, Perfetti C, et al. An arthroscopic bone block procedure is effective in restoring stability, allowing return to sports in cases of glenohumeral instability with glenoid bone deficiency. *Knee Surg Sports Traumatol Arthrosc*. 2018;26:3780–3787.
2. Warner JJP, Gill TJ, O'hollerhan JD, et al. Anatomical glenoid reconstruction for recurrent anterior glenohumeral instability with glenoid deficiency using an autogenous tricortical iliac crest bone graft. *Am J Sports Med*. 2006;34:205–212.
3. Scheibel M, Habermeyer P. Subscapularis dysfunction following anterior surgical approaches to the shoulder. *J Shoulder Elbow Surg*. 2008;17:671–683.
4. Lunn JV, Castellano-Rosa J, Walch G. Recurrent anterior dislocation after the Latarjet procedure: Outcome after revision using a modified Eden-Hybbinette operation. *J Shoulder Elbow Surg*. 2008;17:744–750.

5. Giannakos A, Vezeridis PS, Schwartz DG, et al. All-arthroscopic revision Eden-Hybbinette procedure for failed instability surgery: Technique and preliminary results. *Arthroscopy*. 2017;33:39–48.
6. Boileau P, Duysens C, Saliken D, et al. All-arthroscopic, guided Eden-Hybbinette procedure using suture-button fixation for revision of failed Latarjet. *J Shoulder Elbow Surg*. 2019;28:377–388.
7. Moroder P, Hitzl W, Tauber M, et al. Effect of anatomic bone grafting in post-traumatic recurrent anterior shoulder instability on glenoid morphology. *J Shoulder Elbow Surg*. 2013;22:1522–1529.
8. Yamamoto N, Muraki T, Sperling JW, et al. Stabilizing mechanism in bone-grafting of a large glenoid defect. *J Bone Joint Surg Am*. 2010;92:2059–2066.
9. Avramidis G, Kokkineli S, Trellopoulos A, et al. Excellent clinical and radiological midterm outcomes for the management of recurrent anterior shoulder instability by all-arthroscopic modified Eden-Hybinette procedure using iliac crest autograft and double-pair button fixation system: 3-Year clinical case series with no loss to follow-up. *Arthroscopy*. 2020;S0749-8063:30892–30896.
10. Tytherleigh-Strong G, Mulligan A. Arthroscopic all-intra-articular revision eden-hybinette procedure for recurrent instability after coracoid transfer. *Arthrosc Tech*. 2019;8:e121–e130.
11. Eden RT. Zur Operation der habituellen Schulterluxation unter Mitteilung eines neues Verfahrens bei Abriss am inneren Pfannenwande [Surgery for recurrent shoulder instability: a new procedure in case of glenoid bone loss]. *Dtsch Z Chir*. 1918;269:44–53.
12. Hybbinette S. De la transplantation d'un fragment osseux pour remédier aux luxations récidivantes de l'epaule: constatations et résultats opératoires [Bone graft transfer for treatment of recurrent shoulder instability: findings and outcomes]. *Acta Chir Scand*. 1932;71: 411–445.
13. De Palma AF. *Surgery in the Shoulder*. Philadelphia, PA: Lippincott; 1983.
14. Steffen V, Hertel R. Rim reconstruction with autogenous iliac crest for anterior glenoid deficiency: Forty-three instability cases followed for 5-19 years. *J Shoulder Elbow Surg*. 2013;22:550–559.
15. Levine WN, Arroyo JS, Pollock RG, et al. Open revision stabilization surgery for recurrent anterior glenohumeral instability. *Am J Sports Med*. 2000;28:156–160.
16. Moroder P, Schulz E, Wierer G, et al. Neer Award 2019: Latarjet procedure vs. iliac crest bone graft transfer for treatment of anterior shoulder instability with glenoid bone loss: A prospective randomized trial. *J Shoulder Elbow Surg*. 2019;28:1298–1307.
17. Burkhart SS, De Beer JF. Traumatic glenohumeral bone defects and their relationship to failure of arthroscopic Bankart repairs: significance of the inverted-pear glenoid and the humeral engaging Hill-Sachs lesion. *Arthroscopy*. 2000;16:677–694.
18. Burkhart SS, DeBeer JF, Tehrany AM, et al. Quantifying glenoid bone loss arthroscopically in shoulder instability. *Arthroscopy*. 2002;18:488–491.
19. Kazum E, Chechik O, Pritsch T, et al. Biomechanical evaluation of suture buttons versus cortical screws in the Latarjet-Bristow procedure: a fresh-frozen cadavers study. *Arch Orthop Trauma Surg*. 2019;139:1779–1783.
20. Mook WR, Petri M, Greenspoon JA, et al. Clinical and anatomic predictors of outcomes after the Latarjet procedure for the treatment of anterior glenohumeral instability with combined glenoid and humeral bone defects. *Am J Sports Med*. 2016;44:1407–1416.
21. Yang JS, Mazzocca AD, Cote MP, et al. Recurrent anterior shoulder instability with combined bone loss: Treatment and results with the modified Latarjet procedure. *Am J Sports Med*. 2016;44:922–932.
22. Anderl W, Kriegleder B, Heuberer PR. All-arthroscopic implant-free iliac crest bone grafting: New technique and case report. *Arthroscopy*. 2012;28:131–137.
23. Boileau P, Gendre P, Baba M, et al. A guided surgical approach and novel fixation method for arthroscopic Latarjet. *J Shoulder Elbow Surg*. 2016;25:78–89.
24. Butt U, Charalambous CP. Complications associated with open coracoid transfer procedures for shoulder instability. *J Shoulder Elbow Surg*. 2012;21:1110–1119.
25. Maquieira GJ, Gerber C, Schneeberger AG. Suprascapular nerve palsy after the Latarjet procedure. *J Shoulder Elbow Surg*. 2007;16:e13–e15.