

Arthroscopy-Assisted Latarjet Procedure With Coracoid Exteriorization



Juha O. Ranne, M.D., Ph.D., and Terho U. Kainonen, M.D.

Abstract: The Latarjet procedure is a method for treating complicated glenohumeral joint dislocation that is often associated with a bone defect in the anterior glenoid. The Latarjet procedure addresses both soft-tissue and bone deficiencies by creating a biceps tendon sling and through bone reconstruction of the anterior glenoid defect. The arthroscopic Latarjet procedure provides good visual control in the structures and eliminates the need for an arthrotomy. We present an arthroscopy-assisted Latarjet technique where the coracoid is temporarily exteriorized to facilitate shaping and preparation for subsequent fixation to the glenoid. Coracoid debridement, anterior glenoid preparation, and the subscapular split are conducted arthroscopically. Cutting the coracoid process is also conducted under arthroscopic control, and the coracoid is exposed through the anteroinferior portal. Once the coracoid is openly shaped and the drill-holes are made, the coracoid is resituated and fixed to the glenoid edge in arthroscopic visual control. The purpose of this technique is to combine favorable elements of the open and arthroscopic procedures. Additionally, the instrumentation is simple, which makes the operation safe and practical to perform.

The Latarjet procedure is a method for treating complicated glenohumeral joint dislocation that is often associated with a bone defect in the anterior glenoid. The Latarjet procedure addresses both soft-tissue and bone deficiencies by creating a biceps tendon sling and through bone reconstruction of the anterior glenoid defect. The modern Latarjet operation was introduced by Bradley and Walch in 2002.¹ The Latarjet procedure was soon shown to be an excellent method to treat difficult anterior glenohumeral instability. Soon thereafter, Lafosse et al.² published their arthroscopic version of the procedure. Open, arthroscopic, and arthroscopy-assisted techniques with different instrumentations have been used ever since, especially in Europe.^{3,4} However, the

Latarjet procedure is a difficult operation, especially the arthroscopic version. The advantage in the arthroscopic Latarjet procedure is that it provides good visual control in the structures and eliminates the need for an arthrotomy. The skin wounds are also minor, and early-onset postoperative pain is milder compared to many open techniques.⁵ However, the learning curve for arthroscopic techniques is steep and long.

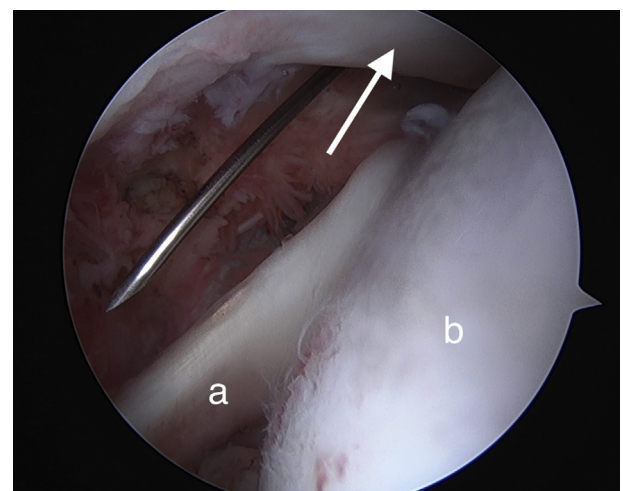


Fig 1. The lateral portal is marked with a needle just in front of the long head of the biceps tendon (arrow) allowing proper access to the subscapularis tendon and the coracoid neck. The subscapularis tendon (a) and humeral head (b). Posterior view, right shoulder.

From the Sports Trauma Research Unit, Hospital Mehiläinen Neo (J.O.R., T.U.K.), and The Paavo Nurmi Centre, Department of Physical Activity and Health, the University of Turku (J.O.R.), Turku, Finland

The authors report the following potential conflict of interest or source of funding: J.O.R. is the inventor of the technique and the instruments. Full ICMJE author disclosure forms are available for this article online, as supplementary material.

Received April 27, 2021; accepted July 2, 2021.

Address correspondence to Juha O. Ranne, M.D., Ph.D., Hospital Mehiläinen Neo, Joukahaisenkatu 6, 20520 Turku, Finland E-mail: rannejuha@gmail.com or juha.ranne@utu.fi

© 2021 by the Arthroscopy Association of North America. Published by Elsevier. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

2212-6287/21661

<https://doi.org/10.1016/j.eats.2021.07.016>

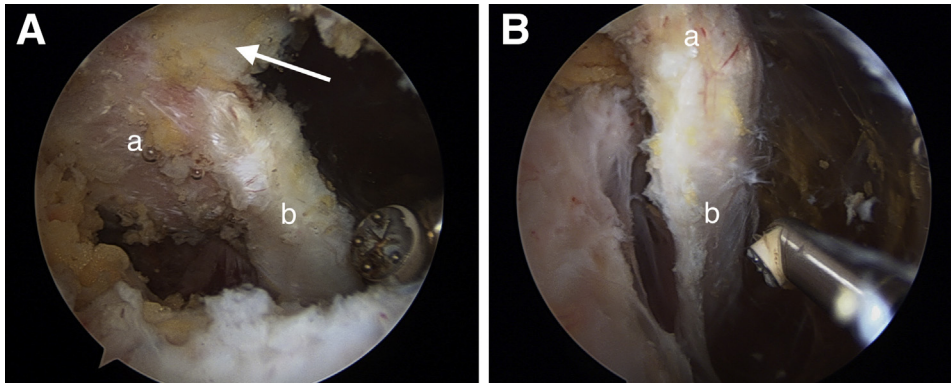


Fig 2. (A) The coracoid process (a) is exposed and the coracoacromial ligament (arrow) is released. The conjoint tendon (b) is left intact. Lateral view, right shoulder. (B) The coracoid process (a). The conjoint tendon (b) is freed from the deltoid fascia and surrounding tissue. Lateral view, right shoulder.

We present an arthroscopy-assisted Latarjet technique where the coracoid is temporarily exteriorized to facilitate shaping and preparation for subsequent fixation to the glenoid. The technique and instrumentation have been refined from an earlier version by the authors.⁶

The surgical technique

The portals and the coracoid process

This is a 5-portal technique. The required portals are the posterior (P), lateral (L), anterolateral (AL), anterosuperior (AS), and anteroinferior (AI) portals. The patient is placed in the beach chair position with their arm hanging in a holder and partially mobile. The operation is initiated by inserting the arthroscope into the joint through the P portal. The L portal is marked using a needle just in front of the long head of the biceps tendon, which allows proper access to the anterior

glenoid, the subscapularis tendon, and the neck of the coracoid (Fig 1). The interval is opened using an electrocautery, and the coracoid process is then exposed, and the coracoacromial ligament is released. The conjoint tendon is freed from the deltoid fascia and surrounding tissue, with care taken not to damage the musculocutaneous nerve, which is located inferior to the coracoid (Fig 2). The AI portal may also be opened at this time. The AI portal is marked using a needle that is aimed at the coracoid so that the brachial plexus is not damaged. A skin incision is made with a scalpel, and the opening is completed bluntly on the anterior edge of the subscapularis tendon. The length of the skin incision is 2 to 2.5 cm. The arthroscope is moved to the L portal using a switching stick. The L portal is the primary viewing portal. The rest of the portals are positioned using a needle. The AL portal provides direct access to the neck of the coracoid. The AS portal is opened in front of the AC joint with direct access to the

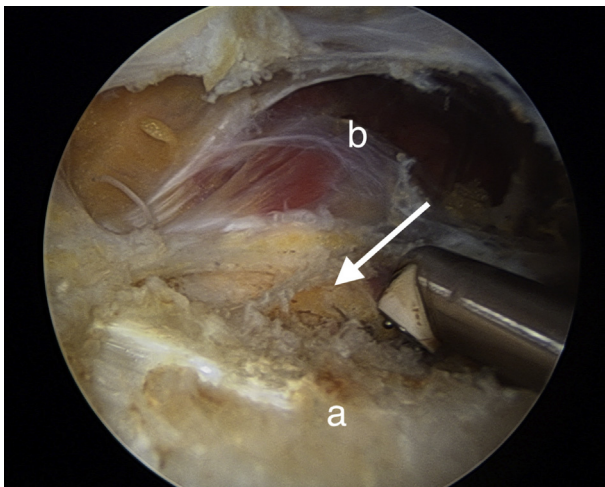


Fig 3. Exposure of the coracoid process (a) is completed and the pectoralis minor tendon (b) is released from its insertion (arrow). Lateral view, right shoulder.

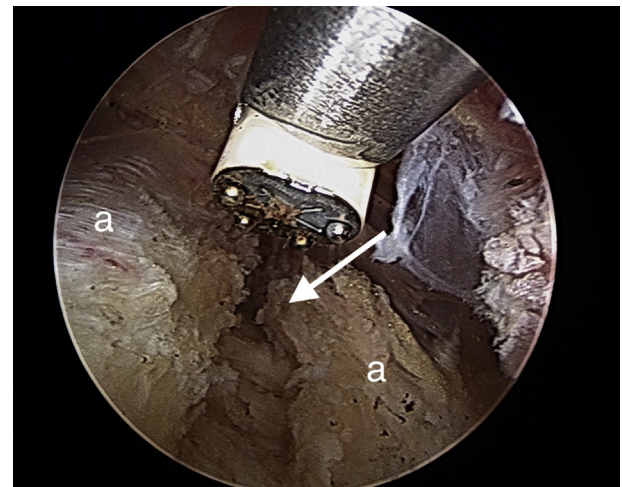


Fig 4. The subscapularis split is conducted using electrocautery. Anterior facet of the subscapularis tendon (a). The split line (arrow). Anterolateral view, right shoulder.

Fig 5. (A) The coracoid (a) is prepared for subsequent cutting. A groove may be ground on the neck of the coracoid (arrow). The conjoined tendon (b). Lateral view, right shoulder. (B) Suture-tape (arrow) is fixed on the proximal end of the conjoined tendon (a) to pull out the cut coracoid.

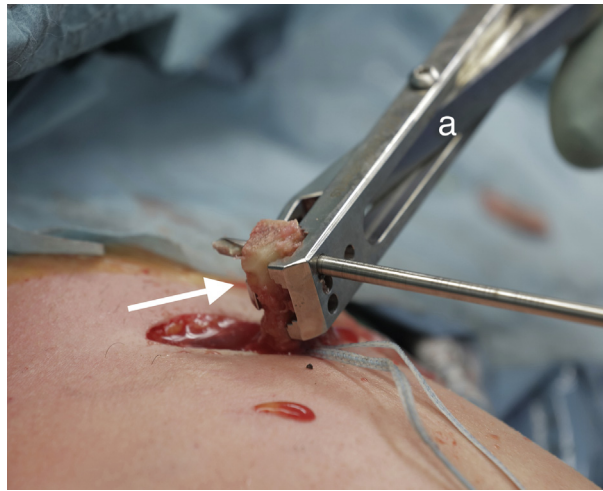
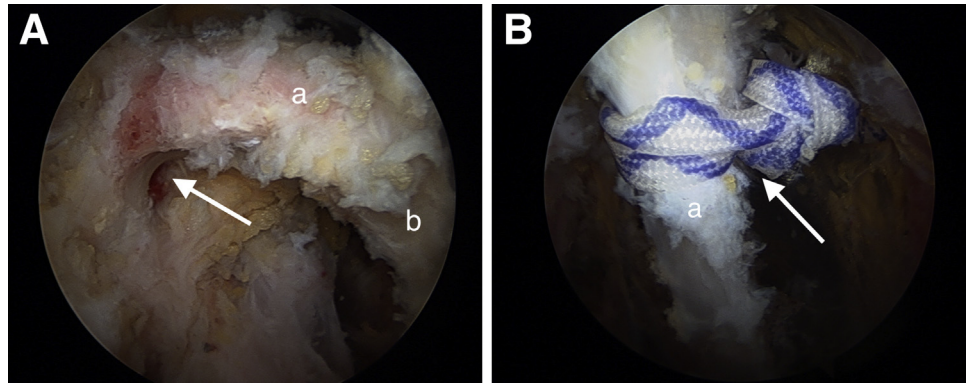


Fig 6. The exteriorized coracoid (arrow) is held in the grasper (a) and cut to the right size. The 4-mm drill holes are made. Lateral view, right shoulder.

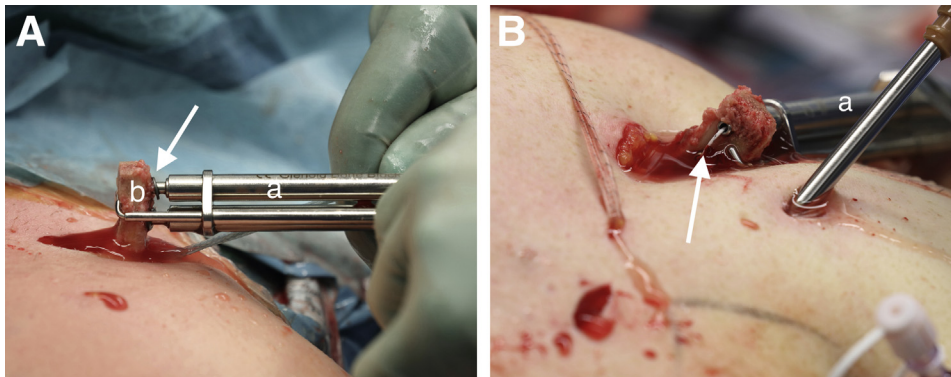


Fig 7. (A) The washers (arrow) may be placed on the passer barrels, and the 4-mm barrels are pushed into the 4-mm coracoid (b) drill holes. Lateral view, right shoulder. (B) The coracoid is secured to the passer (a) with a No. 2 suture (arrow). It is ready to be transferred to the glenoid edge. Posterolateral view, right shoulder.

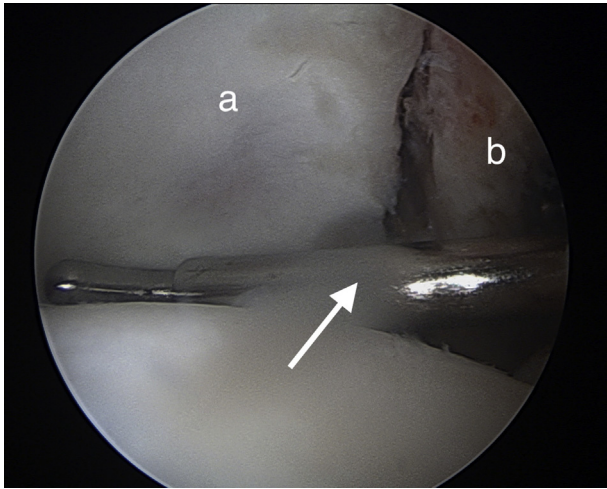


Fig 8. The glenoid surface (a). The coracoid block (b) is placed on to the glenoid edge. The passer hook gauge (arrow) helps to orientate the position of the coracoid block. Lateral view, right shoulder.

neck of the coracoid and the anterior glenoid. The pectoralis minor tendon is released and exposure of the coracoid process is completed (Fig 3).

The subscapular split

The subscapularis tendon is split through the AI and AL portals, as viewed from the L and AL portals. The subscapularis tendon is opened using the electrocautery (Fig 4). The level of the split should be between the lower and middle thirds of the tendon. Careful hemostasis must be maintained. The split must also be controlled from the articular side leaving no residual attachments to the opening. When the opening is completed, suture-tape may be placed through the split to elevate the superior part of the tendon to ease the subsequent coracoid transfer. It is important that the split is extended medially enough to ensure easy passage of the coracoid bone block through the tendon. At this point, the axillary nerve may be viewed inferiorly.

Preparing the glenoid edge

Once the subscapular split is completed, the glenoid edge is prepared. The glenoid edge is easy to reach through the split. All scar tissue, old sutures, and attached bone chips are removed. Care should be taken to level the glenoid edge precisely using a shaver and a rasp to allow for an exact fit with the bone block.

Cutting and preparing the coracoid

Suture-tape is placed around the conjoined tendon through the anteroinferior portal. The cut coracoid is

pulled out using the suture-tape, which also serves as a safety line to avoid losing the detached coracoid. A groove may be ground on the neck of the coracoid using a bur to avoid splintering (Fig 5). The coracotomy is finished using a sharp osteotome or an oscillating saw. Once fully detached, the coracoid is pulled out through the AI portal using the suture-tape and suitable instruments such as a rasp and Kocher forceps. The Block Grasper (GBB; CC-Instruments, Turku, Finland) and Kocher forceps are used to hold the coracoid bone block, and they help to shape the coracoid bone block. The coracoid is cut to the right size with an oscillating saw, and the facet of the coracoid is ground flat to the level of cancellous bone to enhance bone healing and match the glenoid edge. Two 4-mm drill holes are made through the coracoid bone block with a 10-mm offset that matches the Block Passer (Fig 6). The coracoid bone block is then attached to the Block Passer (GBB; CC-Instruments). The possible washers or plates are set onto the passer barrels, and the 4-mm barrels are pushed into the 4-mm coracoid drill holes (Fig 7).⁷ The bone block is secured to the passer with a no. 2 suture. The coracoid is then placed back in through the subscapular opening using the Block Passer (GBB; CC-Instruments). The coracoid block is placed onto the glenoid edge. The passer hook gauge helps to orient the position of the coracoid block (Fig 8).

The coracoid fixation

The coracoid and the well-aligned guide pins are then drilled through the glenoid bone (Fig 9). The pins

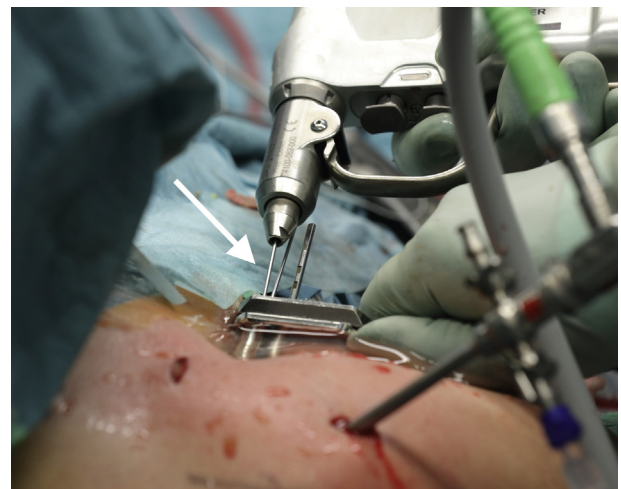
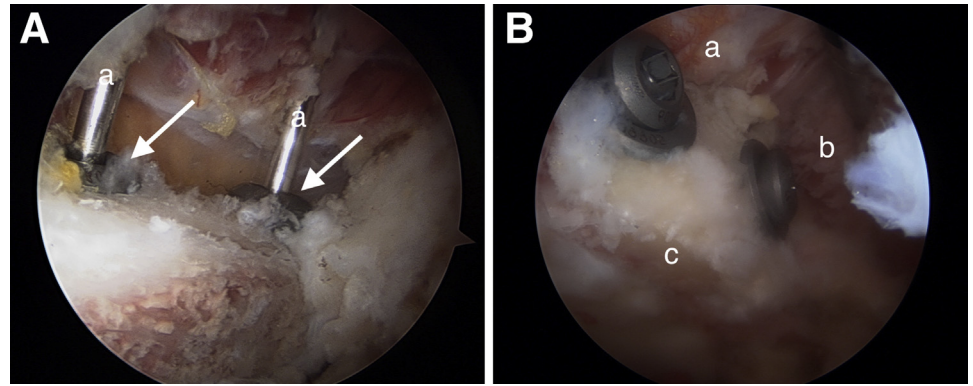


Fig 9. The guide pins (arrow) are drilled through the passer into the glenoid bone. Posterolateral view, right shoulder.

Fig 10. (A) The coracoid bone block is fixed in place using two 4-mm cannulated self-drilling titanium screws (arrow) along the guide pins (a). Lateral view, right shoulder. (B) The titanium screws are in place. Superior screw (a), inferior screw (b). The coracoid bone block (c). Lateral view, right shoulder.



should pierce the opposite cortex. The inner component of the Block Passer is pulled out, and the coracoid bone block is fixed in place using two 4-mm cannulated self-drilling titanium screws (Asnis; Stryker, Kalamazoo, MI). The lower screw is inserted first and is followed by the superior screw (Fig 10). With the fixation now complete, the guidewires and the Block Passer are removed. Joint movement is checked arthroscopically, especially external rotation. The anteroinferior wound is closed in 2 layers. The rest of the wounds are closed using interrupted sutures (Fig 11). A simple dressing is applied. The standard operation time is 90 to 120 minutes (Video 1).

Postoperative treatment

The patients are discharged on the same day as they undergo the surgery, and each patient wears an arm sling for 4 weeks after surgery to allow the coracoid block to heal in place. During that time, the patients are allowed to perform light rotatory movements and passive arm lifting within the limits of pain. Active rehabilitation begins 4 to 5 weeks after surgery. The patients are allowed to resume heavy labor 3 months

after surgery and overhead activity and sports at 4 to 6 months.

Discussion

The advantage of this technique is the combination of favorable features from the arthroscopic and open procedures. Arthroscopy provides accurate and good visualization for debridement of the coracoid process, the glenoid edge, and subscapular split for eventual fixation of the coracoid to the glenoid edge. The bone block fixation can also be made using visual control. Open handling of the coracoid allows easy and safe shaping and drilling of the coracoid away from delicate neural structures. The rigid instrumentation allows advancement of the bone block to the glenoid edge at an angle, and it then allows the tissues to be pushed medially while fixing the bone block to the coracoid without fear of neural damage. The hook gauge helps to align the bone block in the proper position in relation to the glenoid surface. The use of self-drilling cannulated screws makes it easy to fix the block, and no pre-drilling for the screws is needed.

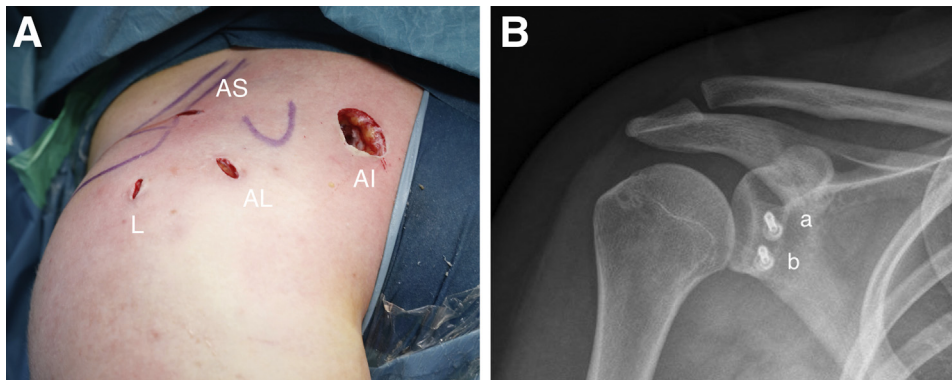


Fig 11. (A) The lateral (L), anterolateral (AL), anterosuperior (AS), and anteroinferior (AI) portals. The posterior portal is not visible. Anterolateral view, right shoulder. (B) The postoperative radiograph. The superior screw (a), and inferior screw (b). An anteroposterior radiograph, right shoulder.

Table 1. Pearls and Pitfalls

Pearls	
Portals	
	Essential to have the portals in right places - always use needles
	Place a needle in front of the biceps tendon and place the L portal there
	AL+AS portals: good access to the anterior glenoid
	AI portal 4-5 cm inferior to the tip of the coracoid. First aim the needle to the coracoid
Subscapular split	
	A suture-tape through the initial opening helps extending the opening.
Glenoid edge	
	The anterior glenoid has to be flat
	Avoid bleeding when debriding the glenoid edge
Coracoid preparation	
	Stay to the bone
	A groove around the neck of the coracoid prevents proximal splintering
	Everything else prepared—then coracoid osteotome and exteriorization
Coracoid transfer and fixation	
	A suture-tape loop through the split facilitates the coracoid transfer
	Properly level the coracoid facet—exteriorization makes it possible
	Always fix the inferior screw first. The inferior screw is the foundation of the fixation of the block.
	If trouble occurs, always be prepared to convert to an open operation
Pitfalls	
Portals	
	Displaced portal—a lot of trouble
Glenoid edge	
	Blurred vision
Coracoid preparation	
	Uncontrolled splintering
	The stump of the cut coracoid bleeds, temporarily blurring the vision
Coracoid transfer and fixation	
	Bad fit
	A compromised fixation of the inferior screw leads to instability of the graft. Risks
Portals	
	Harming the brachial plexus
Coracoid preparation	
	Neural damage
	Trouble in mobilizing the coracoid
	Bad visibility
Glenoid edge	
	Nonunion of the coracoid transfer
Coracoid preparation	
	Neural damage
	Trouble in mobilizing the coracoid
	Bad visibility
Coracoid transfer and fixation	
	Nonunion of the coracoid transfer
	Loosening of the bone graft.

The authors prefer rigid fixation of the coracoid block to ensure proper healing of the bone facets whereas some other techniques rely on button fixations.^{3,4} Preparing the corresponding facets of the block and glenoid edge to ensure that they are flat is important for both of them so that they have a proper fit, which will enhance subsequent fusion. Bony fusion must happen, otherwise the reconstruction will eventually fail. The technique is designed to be simple with guide pins, cannulated self-screwing screws, pull-sutures, and simple sturdy instruments. It is very important to maintain meticulous hemostasis throughout the operation. Similarly, portal placement must be impeccable. The arthroscopic Latarjet operation has been shown to be associated with faster recovery, reduced stiffness, good graft position, identification of additional shoulder pathology, and smaller scars.^{5,8} However, handling the coracoid process arthroscopically may be difficult. Therefore this technique allows easier and more accurate shaping of the coracoid graft, but good experience in arthroscopic shoulder surgery is required to perform this operation (Table 1).

References

- Bradley E, Walch G. The Latarjet procedure for recurrent anterior shoulder instability: Rationale and technique. *Oper Tech Sports Med* 2002;10:25-32.
- Lafosse L, Lejeune E, Bouchard A, et al. The arthroscopic Latarjet procedure for the treatment of anterior shoulder instability. *Arthroscopy* 2007;23. 1242.e1–e5.
- Boileau P, Gendre P, Baba M. A guided surgical approach and novel fixation method for arthroscopic Latarjet. *J Shoulder Elbow Surg* 2016;25:78-89.
- Taverna E, Longo U, Guarella V, et al. A new mini-open technique of arthroscopically assisted Latarjet. *BMC Musculoskelet Disord* 2020;21:285.
- Wong S, Friedman L, Garrigues G. Arthroscopic Latarjet: indications, techniques, and results. *Arthroscopy* 2020;36: 2044-2046.
- Ranne J, Kainonen T, Lehtinen J, Heinonen O. Modified arthroscopic Latarjet procedure with coracoid exteriorization for treatment of anterior glenohumeral instability. *Arthrosc Tech* 2013;2:e361-e365.
- Di Giacomo G, Constantini A, Gasperis N, et al. Coracoid bone graft osteolysis after Latarjet procedure: A comparison study between two screws standard technique vs mini-plate fixation. *Int J Shoulder Surg* 2013;7: 1-6.
- Getz C, Joyce C. Arthroscopic Latarjet for shoulder instability. *Orthop Clin North Am* 2020;51:373-381.