Arthroscopic Rotator Cuff Repair With Graft Augmentation of Fascia Lata for Large and Massive Tears

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Abstract: Excellent clinical results of arthroscopic repair of rotator cuff tears have been reported. However, retears after surgical repair of large and massive rotator cuff tears are one of the most common complications. We present single-row repair with graft augmentation of the fascia lata for large and massive rotator cuff tears to reduce tension at the tendon-bone repair site, and this technique may prevent retears of the repaired rotator cuff. A candidate for this technique is a patient who has a large or massive rotator cuff tear in which the torn edge cannot reach the footprint after mobilization of the torn rotator cuff. This technique could provide an excellent option for irreparable large and massive rotator cuff tears.

Excellent clinical results of arthroscopic repair of rotator cuff tears have been reported.[1,2] However, retears have been a common complication after surgical repair of large and massive rotator cuff tears. Although the development of fixation methods for rotator cuff tears has improved the success rate of rotator cuff repair, retears after rotator cuff repair of large tears could occur because of the large defect in a portion of the tendon and the high tension within the repair site. Single-row repair with medialization of the footprint to prevent tension overload is a solution for irreparable large and massive rotator cuff tears if sufficient tendon-to-bone contact was not achieved because of large tendon retraction.[3] Single-row repair has also provided excellent clinical outcomes and patient satisfaction when good rotator cuff integrity was achieved without retears.[1]

Therefore, we performed a single-row repair with graft augmentation of the fascia lata for large and massive rotator cuff tears to reduce tension at the tendon-bone repair site. This technique may prevent retears of the repaired rotator cuff. A candidate for this technique is a patient who has a large or massive rotator cuff tear in which the torn edge cannot reach the footprint after mobilization of the torn rotator cuff. This technique could provide an excellent option for irreparable large and massive rotator cuff tears.

Surgical Technique

1. The patient is placed in the beach-chair position. The anterior, anterolateral, posterolateral, posterior, and anchor portals are typically used. The anchor portals are placed next to the lateral edge of the acromion depending on the patient. All pathologies of the glenohumeral joint are addressed in the posterior view; subscapularis repair is initially performed if required.
2. The arthroscope is introduced into the subacromial space, and synovectomy, subacromial decompression, and release of the torn tendons are performed. The patient is considered a candidate for graft augmentation with the fascia lata when there is a large traction force to the rotator cuff and the edge of the torn rotator cuff cannot reach the footprint of the greater tuberosity after mobilization of the torn rotator cuff.
3. The medial articular cartilage is abraded 5 to 10 mm, and the insertion points of the suture anchors are

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advanced medially. Afterward, 3 sutures (No. 2 FiberWire [Arthrex, Naples, FL] or No. 2 Orthocord [DePuy Mitek, Raynham, MA]) are placed 10 mm medially from the edge of the torn rotator cuff (Fig 1A).

4. The fascia lata graft (size, 3 × 6 cm) is harvested from the lateral aspect of the contralateral thigh distal to the greater trochanter (Fig 2A). The fascia lata is folded in half (size, 3 × 3 cm), and an anchoring suture is placed at each corner (Fig 2B).
5. After completion of the single-row repair using 3 double-loaded suture anchors (4.5-mm PEEK [polyether ether ketone] Corkscrew FT with FiberWire [Arthrex] or 4.5-mm Healix Advance BR Anchor with Orthocord [DePuy Synthes]) before graft augmentation (Fig 1B), the sutures placed on the edge of the torn rotator cuff before the single-row repair are passed through the medial edge of the fascia lata outside the joint (Fig 2C).
6. The fascia lata is introduced into the glenohumeral joint through the anterolateral portal using a soft-type cannula (10-mm PassPort Button Cannula; Arthrex) in which the inside valve has been removed (Fig 2C). Afterward, the single-row repair site is covered by pulling the anchoring sutures from the anterior and posterior portals.
7. The medial sutures are tied to enable the fascia lata to contact the rotator cuff (Fig 1C), and the fascia lata is secured above the footprint using medial sutures according to the suture bridge technique (4.75-mm PEEK SwiveLock; Arthrex) (Fig 1D, Video 1).

Discussion

One of the major complications after arthroscopic rotator cuff repair is a retear of the repaired rotator cuff. It has been reported that the causes of retearing in large to massive rotator cuff tears are poor quality of the tendon tissue, chronic retraction of the tendon, fatty degeneration of the muscle, and devascularization of the torn tendon by aggressive release.[2,4-6] Therefore, tension overload to the repaired site in larger rotator cuff tears might cause mechanical failure of the initial fixation. For better outcomes after arthroscopic rotator cuff repair, retearing of the repaired rotator cuff should be prevented.

There have been several reports of applying an augmentation method using artificial materials or fascia lata for rotator cuff repair to avoid large traction force on the repair site. A polypropylene patch,[7] poly-L-lactic acid bioabsorbable patch,[8] and human dermal matrix[6] were used in large and massive rotator cuff repairs as augmentation materials and were associated with improvements in clinical outcomes with low retear rates. In a cadaveric study, rotator cuff repair with augmentation using a fascia lata patch decreased the amount of gap

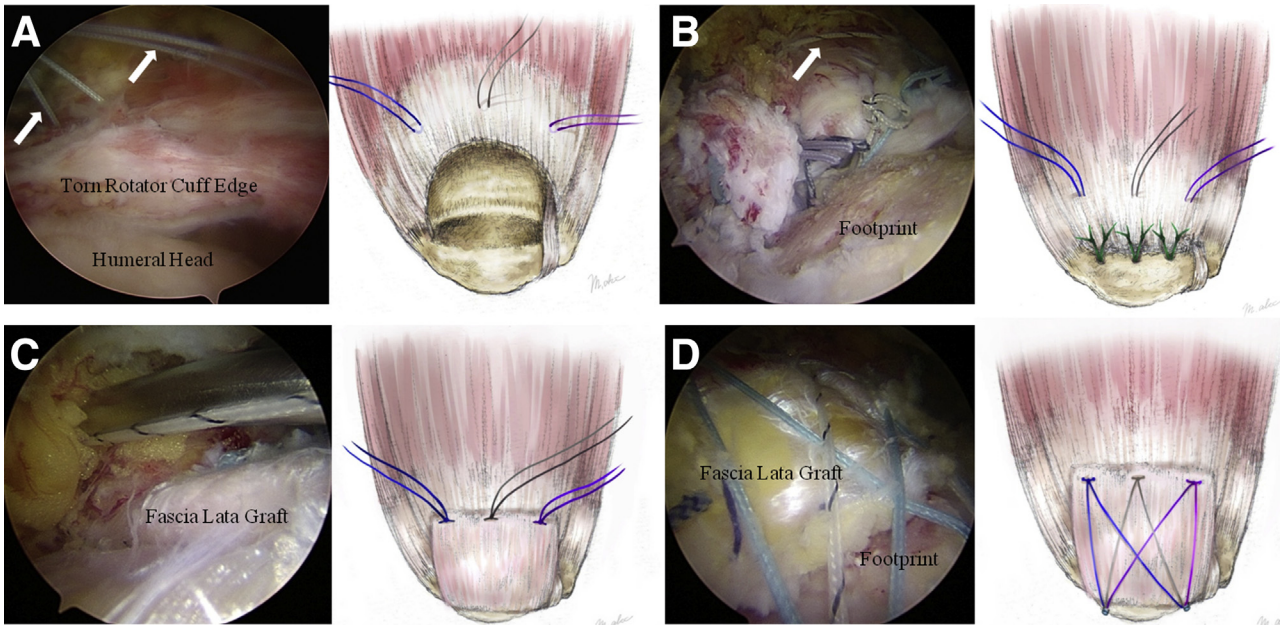

Fig 1. Fascia lata graft augmentation method. (A) View of a right shoulder from the anterolateral portal in the beach-chair position. Three sutures are placed 5 mm medially from the edge of the torn rotator cuff. The arrows indicate sutures placed 10 mm medially from the edge of the torn rotator cuff. (B) View of a right shoulder from the posterolateral portal in the beach-chair position. A single-row repair using 3 double-loaded suture anchors is completed before graft augmentation. The arrow indicates a suture placed 10 mm medially from the edge of the torn rotator cuff. (C) View from the posterolateral portal. The fascia lata is introduced into the glenohumeral joint through the anterolateral portal. The medial sutures are tied to enable the fascia lata to contact the rotator cuff. (D) View from the posterolateral portal. The fascia lata is secured above the footprint using medial sutures according to the suture bridge technique.

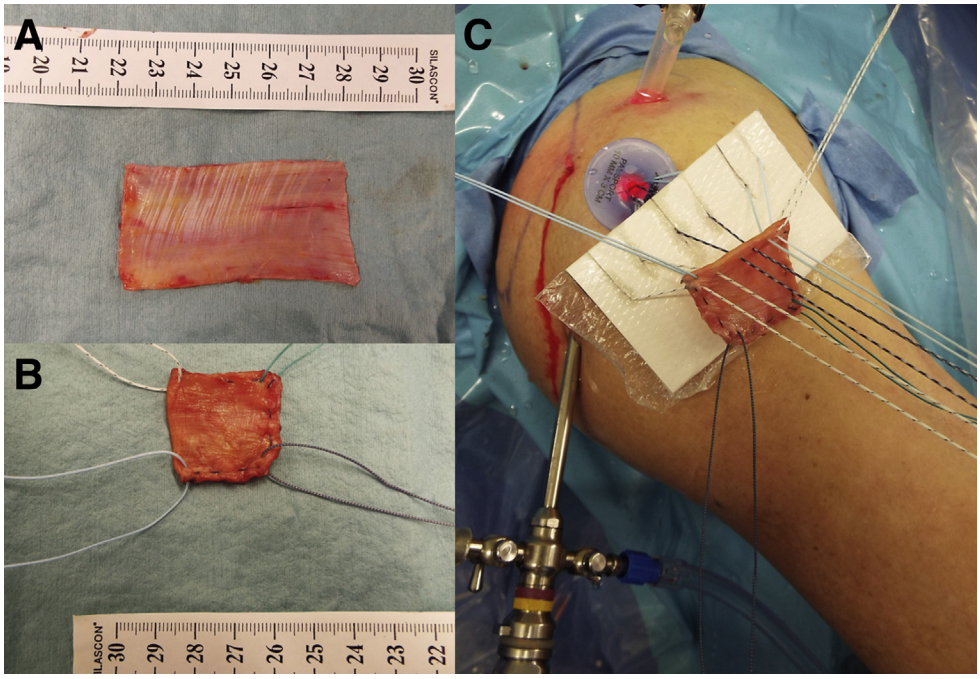

Fig 2. Preparation of fascia lata graft. (A) The fascia lata (size, 3 × 6 cm) is harvested from the lateral aspect of the left thigh. (B) The fascia lata is folded in half (size, 3 × 3 cm), and an anchoring suture is placed at each corner. (C) The sutures placed on the edge of the torn rotator cuff are passed through the medial edge of the fascia lata outside the joint. The fascia lata is introduced into the right glenohumeral joint through the anterolateral portal using a soft-type cannula in which the inside valve has been removed.

formation at the bone-tendon junction with cyclic loading compared with non-augmented repair, indicating the possibility of the fascia lata patch to reduce the incidence of rotator cuff repair failure.[9] The graft augmentation method could promise a low retear rate and excellent postoperative clinical outcomes.

The described technique has some advantages (Table 1). First, even a large to massive rotator cuff tear that cannot be repaired primarily could be a candidate for graft augmentation. If the torn edge of the rotator cuff cannot reach the original footprint, medialization of the footprint would enable primary single-row repair. Second, no special device is required for this technique. During the operation, the surgeon can change the operative method from standard repair to graft augmentation repair according to the intraoperative findings. Third, because the augmentation material in this technique is autologous, there is no concern of an immune reaction, zoonosis, or foreign body reaction.

Table 1. Advantages and Limitations of Arthroscopic Rotator Cuff Repair With Graft Augmentation of Fascia Lata

Advantages
Possibility to reconstruct rotator cuff even for primarily irreparable tear
No special device required
No concern of immune reaction, zoonosis, or foreign body reaction
Limitations
Somewhat complicated technique
Impossible when edge of torn rotator cuff cannot reach humeral head
Sacrifice of normal tissue

There are some disadvantages and limitations to our technique (Table 1). First, because the operative technique is somewhat complicated, skill and experience are needed. The operative time also tends to increase. Second, if the size of the rotator cuff tear is too massive and the torn edge of the rotator cuff does not reach the humeral head even after release of the torn tendons, it is impossible to perform this graft augmentation method. Third, fascia lata graft requires the sacrifice of normal tissue. Further investigations to determine whether this technique provides a true benefit compared with non-augmented repair are required.

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