Superior Capsular Reconstruction for Massive Irreparable Rotator Cuff Tears

Surgical Technique
Superior Capsular Reconstruction for Massive Irreparable Rotator Cuff Tears

Introduction

The most common signs of irreparable rotator cuff tears are pain from subacromial impingement, muscle weakness in the shoulder joint, and as a result, limitation of arm elevation. These signs result mainly from a loss of the superior stability of the glenohumeral joint because of dysfunction of the rotator cuff muscles.

Patients with irreparable rotator cuff tears also have a defect of the superior capsule, which is located on the inferior surface of the supraspinatus and infraspinatus tendons. The shoulder capsule plays a role in stabilizing the glenohumeral joint. Superior migration of the humeral head due to dysfunction of the rotator cuff complex and superior capsule results in pain, muscle weakness, loss of motion and functional limitations.

A new surgical technique, arthroscopic superior capsular reconstruction (ASCR), was developed to restore the superior stability of the glenohumeral joint.

ArthroFLEX® Acellular Bio-Implant for Soft Tissue Repair

- Over 15,000 ArthroFLEX grafts distributed
- Superior suture retention strength*
- More than 97% DNA removal through LifeNet Health’s Matracell® process
- Mature extracellular dermal matrix
- Hydrated and ready to use
- Sterile for patient safety

ArthroFLEX Ultimate Load

<table>
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<tr>
<th>Ultimate Load (N)</th>
<th>2,000</th>
<th>1,600</th>
<th>1,200</th>
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<tr>
<td>ArthroFLEX 3 mm</td>
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<td>ArthroFLEX 2 mm</td>
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<td>ArthroFLEX 1.5 mm</td>
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* data on file
Positioning
Surgeon preference will dictate patient positioning.

**Beach Chair:** Position the arm in neutral abduction, flexion and rotation to help correctly set the graft tension.

**Lateral Decubitus:** Position the arm in 15-30 degrees of abduction.

Tissue/Bone Prep
The subacromial bursa, degenerative tissues, and sutures from previous repairs must be thoroughly excised to provide a clean and clear arthroscopic view of the glenoid and humeral footprint. The glenoid and tuberosity bone beds are prepared and the PowerPick™ drill tip can be used to maximize vascular channels. Biceps Tenodesis is often performed as many of the patients also have biceps tendon tears and/or instability.

Glenoid Anchors
Surgeon preference will dictate the position of the glenoid anchors to be placed just medial to the superior labrum. Drill and insert two 3 mm SutureTak® anchors into the superior glenoid through percutaneous skin incisions spanning the glenoid from anterior to posterior.

Tuberosity Anchors
The graft will be fixed to the humerus using a knotless SpeedBridge™ repair. Insert two 4.75 mm SwiveLock® anchors with FiberTape® suture into the articular margin spanning the humerus from the bicipital groove to the infraspinatus.
**Graft Sizing Recommendations**

- Extend the graft length at least 5 mm around the anchors to avoid the suture from cutting through.
- Extend the graft length about 10-15 mm on the tuberosity side for footprint coverage.

Use a marking pen and a ruler to measure out the graft and mark the anchor locations. A scalpel or scissors can be used to cut the graft into form.

Punch holes at the lateral anchor locations using a 2 mm tissue biopsy punch. Pre-punched holes make it easier for the sutures to slide through this very thick graft.

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**Graft Measurement Preparation**

There are four critical dimensions measured between the anchors using an arthroscopic measurement probe:

- **X1** Anterior-posterior distance between glenoid anchors
- **X2** Anterior-posterior distance between tuberosity anchors
- **Y1** Medial-lateral distance between posterior anchors
- **Y2** Medial-lateral distance between anterior anchors
Align and orientate the prepared graft in its implanted position outside a lateral 10 mm PassPort Button™ Cannula. Use a SutureTape™ retriever to carefully pull the FiberTape® sutures through the PassPort Button Cannula and then through the appropriate punched holes in the graft. Retrieve and pass the four separate SutureTak® sutures with a Scorpion™ suture passer for the double-pulley side of the repair. To avoid tangling, care should be taken to tension the passed sutures prior to removal of additional sutures out the PassPort Button Cannula.

Graft Delivery
Grasp the leading edge of the graft with a tissue grasper. Push the graft through the PassPort Button Cannula past the cannula dam. Maintain the graft orientation and do not twist the grasper during insertion.
Glenoid Graft Fixation
With the graft in place, the sutures may be tied over the graft with a static surgeon’s knot. Additional fixation can be achieved using A/P knotless 2.9 mm PushLock® anchors or 3.5 mm SwiveLock® anchors with cinch stitches.

Graft Positioning
Pull the slack suture through the graft from the FiberTape® and FiberWire® sutures. Continue to pull the FiberWire suture until the graft is positioned over the SutureTak® anchors firmly onto the glenoid.

Humeral Fixation
Tension the FiberTape sutures while pushing down on the graft to be sure all suture slack is removed from under the graft. Complete the SpeedBridge™ repair with two lateral 4.75 mm SwiveLock anchors and cut the remaining suture limbs.
Margin Convergence
Pass 2-3 margin convergence stitches to the remaining infraspinatus and subscapularis with a lasso or Scorpion™ suture passer.

Careful attention should be paid to not overtighten the anterior aspect to help avoid shoulder contracture after surgery. Over-constraining the anterior graft may result in decreased rotational motion and increased risk of graft or tissue failure. Anterior graft attachment may not be necessary.

Bone Preparation
Burr, ClearCut™, TR, 6 Flute AR-8450CTS
PoweRasp™, 5.5 mm x 13 cm AR-8550PR
PowerPick™, 45° 6 mm Drill Depth AR-8150PX-45

Glenoid Fixation
BioComposite™ SutureTak®, 3 mm x 14.5 mm, w/two #2 TigerTail® AR-1934BCFT-2
3 mm SutureTak Percutaneous Insertion Kit
(includes: disposable 17-gauge Spinal Needle, 1.1 mm Nitinol wire, Portal Dilator, Spear and Drill) AR-1934PI-30
BioComposite PushLock®, 2.9 mm x 12.5 mm (short) AR-2923BC
BioComposite SwiveLock®, 3.5 mm x 15.8 mm AR-2325BCC
#2 FiberLink™ w/closed Loop, 26 inches (blue) AR-7235

Humeral Fixation
SpeedBridge™ Implant System with BioComposite SwiveLock includes:
Two - 4.75 mm BioComposite SwiveLock C w/one preloaded FiberTape® Loop
(one blue, one white/black) for medial row, two - 4.75 mm BioComposite SwiveLock C for lateral row, one - Disposable Punch AR-2600SBS-4

Other
ArthroFLEX® 3 mm, Decellularized Dermis with MATRACECELL®, 40 x 70 mm ARFLEX301
Arthroscopic Measurement, Probe, 220 mm, 60° degree AR-4070-01
Arthrex PassPort Button™ Cannula, 10 mm I.D. x Length
(Length = XX = 20, 30, 40 and 50 mm) AR-6592-10-XX
#2 FiberWire® w/Tapered Needle (blue) AR-7200
SutureTape™, 1.3 mm, w/Tapered Needle (white/blue) AR-7500
This description of technique is provided as an educational tool and clinical aid to assist properly licensed medical professionals in the usage of specific Arthrex products. As part of this professional usage, the medical professional must use their professional judgment in making any final determinations in product usage and technique. In doing so, the medical professional should rely on their own training and experience and should conduct a thorough review of pertinent medical literature and the product’s Directions For Use.

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