

SHOULDER TECHNIQUE GUIDE

Arthroscopic Technique for Biceps Tenodesis Using the Q-FIX[◇] All-Suture Anchor in a Cinching Loop Technique

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Arthroscopic Technique for Biceps Tenodesis Using the Q-FIX[◇] All-Suture Anchor in a Cinching Loop Technique

*The following technique guide was prepared under the guidance of James Fleischli MD. Created under close collaboration with the surgeon, it contains a summary of medical techniques and opinions based upon his training and expertise in the field, along with his knowledge of Smith & Nephew's products. Smith & Nephew does not provide medical advice and recommends that surgeons exercise their own professional judgement when determining a patient's course of treatment. This guide is presented for educational purposes only. **Prior to performing this technique, or utilizing any product referenced herein, please conduct a thorough review of each product's indications, contraindications, warnings, precautions and instructions as detailed in the Instructions for Use provided with the individual components.***

Introduction

The Cinch Loop Technique is an all-arthroscopic procedure for Biceps Tenodesis using the Q-FIX All-Suture Anchor in a cinching lasso loop technique to treat Long Head Biceps Tendon (LHBT) pathology. Biceps Tenodesis has several advantages over tenotomy, including: "length-tension of the biceps brachii is maintained, and associated muscle atrophy, cramping pain, weakness, and cosmetic deformity such as the so-called Popeye deformity are minimized."¹

There are 4 primary advantages to using the Cinch Loop Biceps Tenodesis technique:

- Similar biomechanical performance to Interference Screw (IS) technique^{1,2,3,4}
- Minimizes damage to biceps tendon^{1,2}
- May reduce complications associated with IS techniques^{2,3}
- Can be performed using standard devices and portals¹

The Cinch Loop technique uses two Q-FIX All-Suture Anchors that are inserted through small 1.8mm holes. The free limbs from the anchors are used to create loop strands that circumferentially wrap around the tendon in a lasso manner without piercing the tendon. Each loop also creates a cinching effect that locks the tendon in place with multiple points of fixation.

There are many studies comparing the biomechanical performance of different techniques for biceps tenodesis in the literature. However, with the recent technological advancements of 'soft' anchors or all-suture anchors, there have been several new studies comparing the biomechanical performance of these devices to the Interference Screw, which has long been considered the gold-standard for biceps tenodesis. Recently, Chiang et al found that "all-suture anchor fixation provides equivalent ultimate failure load and stiffness when compared with the interference screw technique in tenodesis of the proximal biceps tendon."² Baleani et al also found that "the soft anchor technique provides a fixation strength comparable with the interference screw, but without using a screw. It could be considered as an alternative for suprapectoral biceps tenodesis."³ Patzer et al reported that "The modified lasso-loop stitch provides sufficient tendon fixation and is equivalent to interference screws."⁴

Damage to the biceps tendon and complications from Interference Screw tenodesis have been widely documented in the literature.^{5,6} Shon et al found that "most mechanisms of failure for interference screw tenodesis occur as a result of tendon slippage at the screw-tendon-bone interface, and suture anchor tenodesis can result in breakage of the eyelet or longitudinal split of the tendon."¹ Additionally, Lopez-Vidriero et al found that the fixation method used for biceps tenodesis may not be the most important factor but rather, "the most important factor for initial strength is not the attachment site but the quality of the biceps tendon."⁷

The goal of this guide is to provide a simple, robust and reproducible technique for biceps tenodesis that may offer distinct advantages while reducing complications when compared to Interference Screw techniques. Based on my experience, the estimated procedure time for the Cinch Loop technique is comparable with an Interference Screw technique.

References

1. Shon MS, Koh KH, Lim TK, Lee SW, Park YE, Yoo JC. Arthroscopic Suture Anchor Tenodesis: Loop-Suture Technique. *Arthroscopy Techniques*. 2013;2(2):e105-e110. doi:10.1016/j.eats.2012.12.003.
2. Chiang, Florence L. et al. Biomechanical Comparison of All-Suture Anchor Fixation and Interference Screw Technique for Subpectoral Biceps Tenodesis. *Arthroscopy*. 2016;32:1247-1252
3. Baleani, M., Francesconi, D., Zani, L., Giannini, S., & Snyder, S. J. (2015). Suprapectoral biceps tenodesis: A biomechanical comparison of a new "soft anchor" tenodesis technique versus interference screw biceps tendon fixation. *Clinical Biomechanics*,30(2), 188-194. DOI: 10.1016/j.clinbiomech.2014.12.001
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5. Mazzocca, A.D., Cote,M.P., Arciero, C.L., Romeo, A.A., Arciero, R.A., 2008. Clinical outcomes after subpectoral biceps tenodesis with an interference screw. *Am. J. Sports Med.* 36, 1922–1929.
6. Sears, B.W., Spencer, E.E., Getz, C.L., 2011. Humeral fracture following subpectoral biceps tenodesis in 2 active, healthy patients. *J. Shoulder Elb. Surg.* 20, e7–e11.
7. Lopez-Vidriero E., Costic R.S., Fu F.H., Rodosky M.W. Biomechanical evaluation of 2 arthroscopic biceps tenodeses: Double-anchor versus percutaneous intra-articular transtendon (PITT) techniques. *Am J Sports Med.* 2010;38:146–152.

Patient Positioning, Portal Placement, and Anesthesia

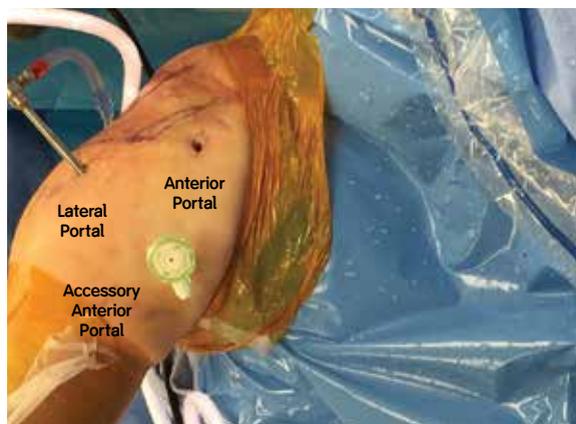


Figure 1

Place the patient in either the lateral decubitus or beach chair position.

The procedure is performed under General Anesthesia, routinely combined with Regional Anesthesia (interscalene block). It is recommended that patient is also paralyzed when performing this technique.

Standard anterior, posterior, and lateral portals are used for this procedure. In addition, an accessory portal is made over the bicipital groove for anchor placement and knot tying. **(Figure 1)**

Arthroscopic Dissection

1. Prior to releasing the biceps, an optional tagging stitch may be passed into tendon if desired. **(Figure 2)** Use 90-degree AMBIENT[®] SUPER TURBOVAC[®] RF wand, basket punch, or arthroscopic scissors to transect the tendon near its insertion on the superior labrum and supra-glenoid tubercle. **(Figure 3)** With the tendon released, use a DYONICS[®] INCISOR[®] PLATINUM[®] arthroscopic shaver blade to debride any remaining prominent stump of tendon tissue.
2. Perform additional required arthroscopic procedures first: Subacromial Decompression, Rotator Cuff Repair, etc. The Biceps Tenodesis is performed last.
3. Place the scope in the Lateral Portal for visualization of the bicipital groove.
4. Make an accessory anterior portal using arthroscopy needle over the biceps sheath. Insert CLEAR-TRAC[®] Disposable Cannulas into the Anterior and Accessory portals.
5. Perform a bursectomy down the face of the humerus anteriorly until the supra-pectoral location is identified.

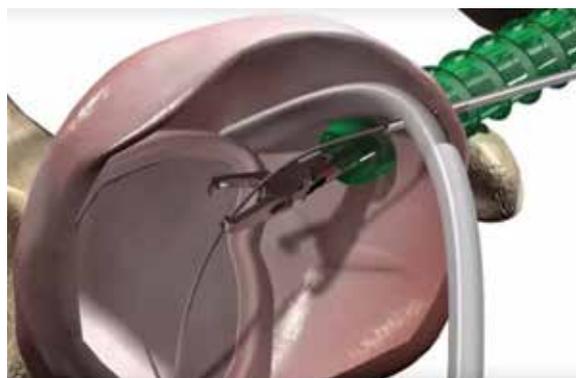


Figure 2



Figure 3



AMBIENT[®] SUPER
TURBOVAC[®] 90
COBLATION[®] Wand



CLEAR-TRAC[®]
Disposable
Cannula Systems



Q-FIX[®] 1.8mm
All Suture Anchor



Figure 4



Figure 5

6. Incise the bicipital sheath superficial to the biceps tendon from distal to proximal until the transverse ligament is reached. **(Figure 4)**
7. Deliver the biceps tendon out of the groove and place a locking grasper on the tendon several centimeters distal to the end to allow for manipulation of the tendon and tensioning. **(Figure 5)**
8. After the bicipital groove is exposed, a burr or shaver may then be used to decorticate the bone, creating a bleeding bed at the entrance on the bicipital groove. An arthroscopic shaver is then used for debridement. There is typically a transverse vessel crossing the inferior/distal aspect of the bicipital groove that can serve as a landmark for first anchor placement.



Figure 6

Pilot Hole Preparation and Anchor Insertion

1. Insert the drill guide through accessory anterior portal and position it as distal as possible at the most inferior aspect of the bicipital groove. The first anchor will be the most distal. **(Figure 6)**
2. Place the drill guide medial to the tendon and retrieve sutures from the lateral aspect of the tendon.
3. Insert and deploy 1.8mm Q-FIX® All-Suture anchor.

Suturing Technique

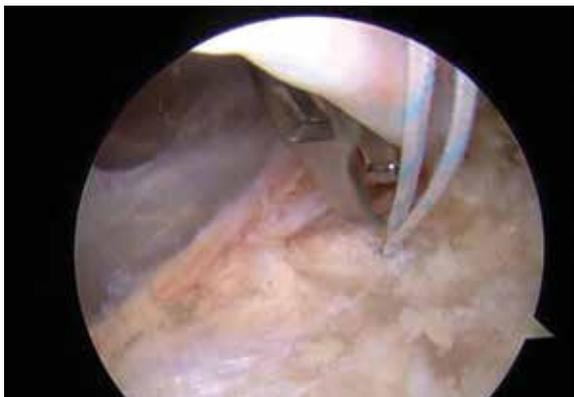


Figure 7

1. With the tendon clasped in the locking grasper, lift the tendon out of the groove and move the tendon medially to visualize the sutures from the anchor. **(Figure 7)**
2. Using the arthroscopic suture grasper, grab one strand of suture from the anchor and pull underneath the biceps tendon to create a 'loop' of suture on the lateral side of the tendon. **(Figures 8-9)**

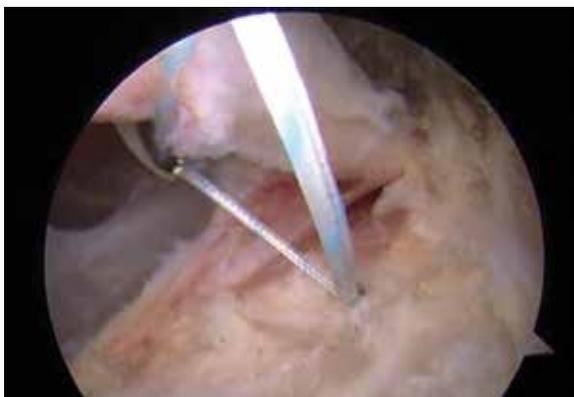


Figure 8

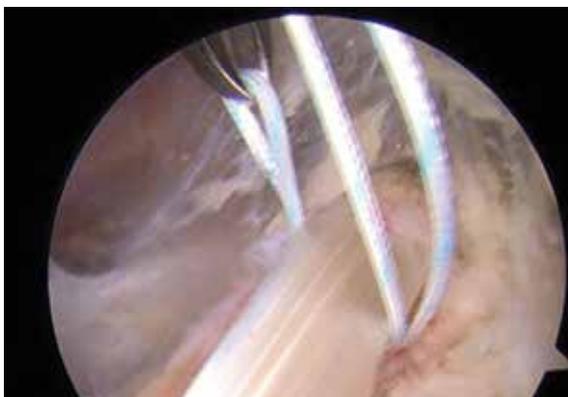


Figure 9

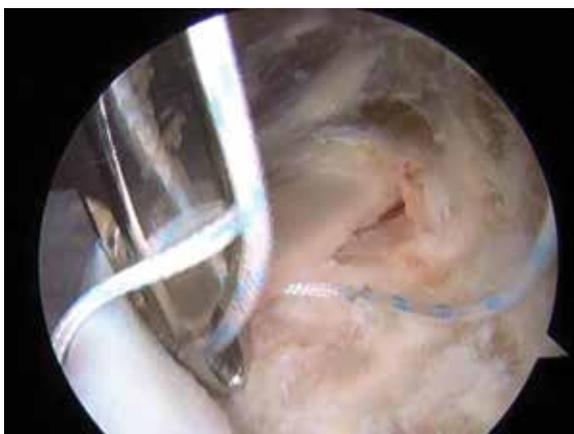


Figure 10

3. Insert grasper back through loop and grab remaining tail from same suture limb. **(Figure 10)**

4. Tension the long head of the biceps with the locking grasper through the anterior portal. Once tensioned maximally, the opposite suture limb is tensioned to tighten the cinch loop and reduce the tendon to the groove. (**Figures 11-12**)



Figure 11



Figure 12

5. While maintaining tension on the post, tie two half-hitches in the same direction, followed by a half-hitch in the opposite direction. Switch the post and tie three additional half-hitches alternating the direction of throw to complete the knot. (**Figure 13**)
6. Use arthroscopic suture cutter to trim suture limbs



Figure 13

Completing the Repair

1. Insert a second Q-FIX® All-Suture Anchor and perform another Cinch Loop lasso approximately 1.5cm proximal to the first anchor. (Figures 14-18)



Figure 14

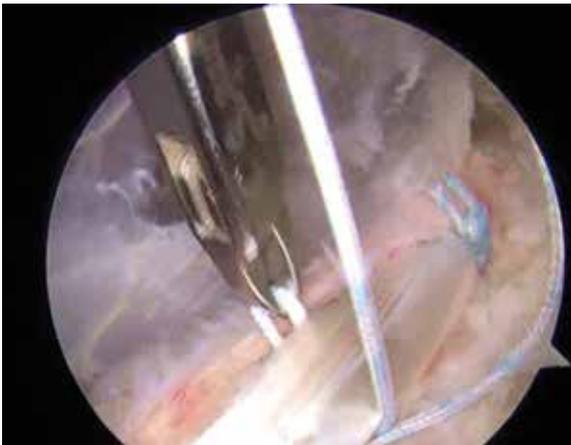


Figure 15

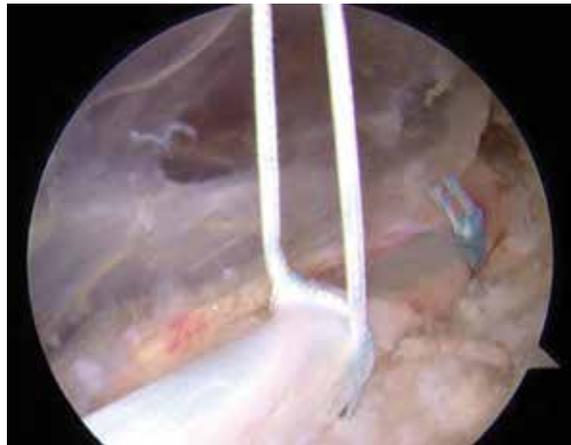


Figure 16



Figure 17

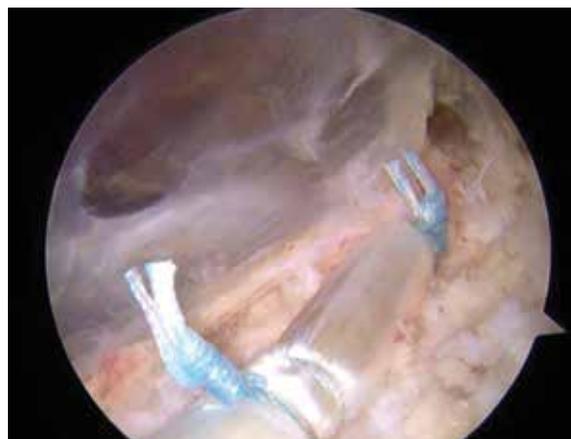


Figure 18

2. After the second fixation point is completed, use RF wand, basket punch, or arthroscopic scissors to excise any excess tendon not incorporated in repair, leaving a 1cm stump. The length of the tendon typically excised after completion of repair is 4 to 5cm, depending on patient body habitus. (Figures 19-22)

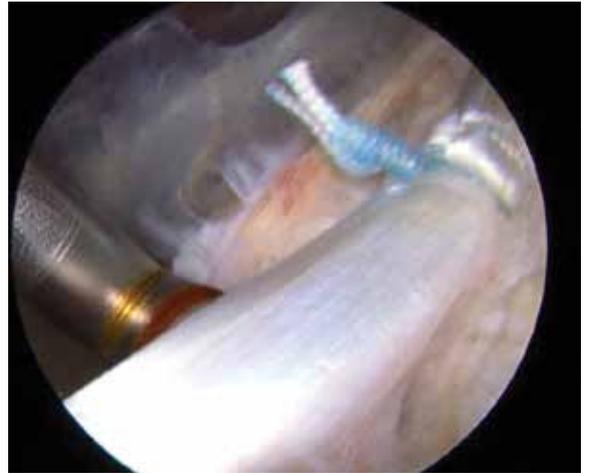


Figure 19

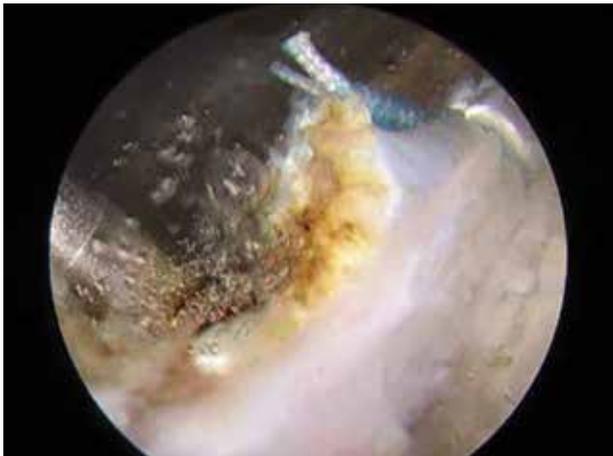


Figure 20



Figure 21

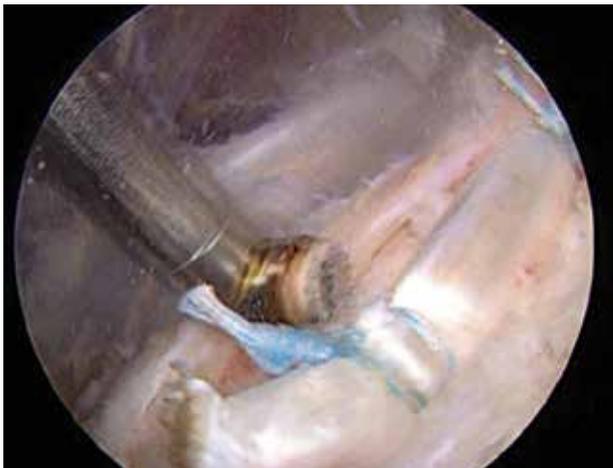


Figure 22

Rehabilitation Protocol

The following technique guide was prepared under the guidance of James Fleischli MD. Created under close collaboration with the surgeon, it contains a summary of medical techniques and opinions based upon his training and expertise in the field, along with his knowledge of Smith & Nephew's products. Smith & Nephew does not provide medical advice and recommends that surgeons exercise their own professional judgement when determining a patient's course of treatment. This guide is presented for educational purposes only. Prior to performing this technique, or utilizing any product referenced herein, please conduct a thorough review of each product's indications, contraindications, warnings, precautions and instructions as detailed in the Instructions for Use provided with the individual components.

PHASE 1

Time Frame: 0-4 weeks

Immobilization: Sling / Immobilizer x 2 weeks. Remove for therapeutic exercises, general hygiene and when awake, alert and in safe environment (i.e. sitting on couch watching TV).

Restrictions: Minimize biceps tension for 6 weeks. Avoid long lever arm flexion range of motion and no resisted forearm supination or elbow flexion.

Exercises: Gripping exercises, wrist and finger ROM. Passive and Active Assist Elbow Flexion. Shoulder A/AAROM in line with restrictions starting with slow, small pendulum exercises. Utilize modalities as needed. Instruct patient on Home Exercise Program (HEP) to perform twice daily.

PHASE 2

Time Frame: 4-8 weeks

Immobilization: None

Restrictions: No biceps tension for 6 weeks to protect repaired tissues. This includes avoiding long lever arm flexion range of motion and no resisted forearm supination or elbow flexion.

Exercises: Gradually increases ROM exercises adding elbow AROM at 4 weeks with arm at side. Also at 4 weeks add scapular squeezes (retraction) and isometric strengthening initially with arms at side (IR, ER, scapular stabilization). Patient may advance to resistance strengthening with bands at 6 weeks postoperatively avoiding stress on biceps (i.e. avoid pulling exercises). Modalities used as needed.

PHASE 3

Time Frame: 8-12 weeks

Immobilization: None

Restrictions: No specific exercise needs to be avoided; however, exercise advancement should be gradual and in slow increments while avoiding pain. If patient develops pain, drop back to early phase of rehabilitation, until pain free.

Exercises: Continue with shoulder PROM and AROM (Goal is 85% or greater of normal PROM by 12 weeks). Continue with shoulder strengthening with advancement to exercises with arms away from body. At 8 weeks patient may gradually add exercises that place stress on the biceps (i.e. resisted elbow flexion/supination).

PHASE 4

Time Frame: 12+ weeks

Immobilization: None

Restrictions: No specific restrictions. Patients ROM, strength and endurance should be advanced progressively while avoiding pain.

Exercises: ROM should be returning to normal; if not, continue to address with stretching and a HEP. Progressive upper-body strengthening may be more aggressive after 12 weeks. Add plyometric training for athletes at 12 weeks. Add exercises simulating work requirements or sport at 14 weeks. Consider work conditioning program at 22 weeks based on patient's job requirements and patient motivation.

Ask The Expert...

Featuring James Fleischli, MD

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Head Team Physician and Orthopedist for UNC at Charlotte Charlotte, North Carolina

What has been your technique history and evolution for Biceps Tenodesis?

Initially, as I transitioned to an arthroscopic approach for biceps tenodesis early in my practice, I used the PITT technique. While effective most of the time, the suture fixation of soft tissue to soft tissue was not ideal and I had some cosmetic failures. Additionally, some patients with good cosmesis continued to have pain localized to the bicipital groove. This may have been related to remaining pathologic tendon or synovitis in the groove or possibly due to ongoing micro-movement of the tendon in the groove.

I wanted to move toward a stronger construct that allowed me to secure the tendon lower down more distally in the groove. I switched to an interference screw technique. This allowed me to take the tendon out of the groove and address additional pathology (such as pathologic tendon, synovitis, or loose bodies), fix it lower down in the groove above the pectoral reflection, with the potential for a stronger construct. However, I had failures with this technique as well. Often, the tendon would get wrapped around the screw or crimped against the sharp cortical edge of the socket during screw insertion. This resulted in damage to the biceps tendon that led to cosmetic failure in a few cases.

What are the primary advantages of this technique over Interference Screw (IS), the PITT technique, or Suture Anchors that pierce and stitch the tendon?

The main advantage of this technique over the PITT technique is a stronger tendon to bone construct with less micromotion of the tendon at the groove. It also allows me to take the tendon out of the groove and address pathology at this location, (e.g. synovitis, tendon tearing, and loose bodies), which are not well visualized with the PITT Technique. The advantages it has versus the IS technique is less injury to the biceps tendon and possibly less morbidity because it isn't necessary to drill a socket in the proximal humerus. I don't like the idea of passing sutures through the tendon, as I worry about damaging the tendon with a suture passer or sutures cutting through the tendon, which might lead to failure.

What are some general tips and tricks for anyone considering the transition from Interference Screw to the Cinch Loop technique?

The transition from IS technique to the Q-FIX Cinch Loop technique is fairly straightforward as the exposure is the same. The fixation is the main difference. My results with this technique have been very good, and better than the other techniques I have used. I did have a couple failures early on due to inadequate tensioning of the biceps prior to tying my sutures. I went back and re-scoped one of them since the patient was unhappy with the cosmetic deformity and found an intact construct with no slippage of the tendon. I simply re-tensioned the tendon and fixed it again with the same technique, correcting the cosmetic deformity. While failures will happen with any technique, failure with this technique is very uncommon in my practice. Residual cosmetic deformity seems to be due to inadequately tensioning the tendon at the time of surgery. To address this problem, I try to grab the tendon as low as possible in the groove with a locking grasper to allow for maximal tensioning of the tendon. I also make sure the patient is paralyzed during the procedure so that I can get the tendon out to length.

Ordering Information

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.

Q-FIX° All Suture Anchor**

Reference #	Description
25-1800	1.8mm Q-FIX° All-Suture Anchor
25-1810	Disposable Kit for 1.8mm Q-FIX Implant, includes Drill, Drill Guide and Obturator
25-2800	2.8mm Q-FIX All-Suture Anchor
25-2810	Disposable Kit for 2.8mm Q-FIX Implant, includes Drill, Drill Guide and Obturator

CLEAR-TRAC COMPLETE Disposable Cannula System*

Reference #	Description
72200902	8.5mm x 90mm Threaded Cannula, with disposable obturator, green, sterile
72200903	8.5mm x 72mm Threaded Cannula, with disposable obturator, green, sterile
72200905	7.0mm x 72mm Threaded Cannula, with disposable obturator, grey, sterile
72200907	5.5mm x 72mm Threaded Cannula, with disposable obturator, blue, sterile
72200908	5.5mm x 45mm Threaded Cannula, with disposable obturator, blue, sterile

CLEAR-TRAC COMPLETE Reusable Obturators*

Reference #	Description
72200910	8.5mm x 90mm Reusable Obturator (4.3mm cannulation), green
72200911	8.5mm x 72mm Reusable Obturator (4.3mm cannulation), green
72200915	7.0mm x 72mm Reusable Obturator (4.3mm cannulation), grey
72201796	5.5mm Reusable Obturator (4.3mm cannulation), blue

CLEAR-TRAC° FLEXIBLE Disposable Cannula System*

Reference #	Description
72200424	8.0mm x 90mm Threaded Cannula, with disposable obturator, lime green, sterile
72200425	8.0mm x 72mm Threaded Cannula, with disposable obturator, lime green, sterile
72200427	6.5mm x 72mm Threaded Cannula, with disposable obturator, orange, sterile
72200429	5.5mm x 72mm Threaded Cannula, with disposable obturator and trocar, blue, sterile
72200431	5.5mm x 55mm Smooth Cannula, with disposable obturator and trocar, blue, sterile

CLEAR-TRAC FLEXIBLE Reusable Obturators*

Reference #	Description
72200899	8.0mm x 90 mm Reusable Obturator (4.3mm cannulation), lime green
72200900	8.0mm x 72mm Reusable Obturator (4.3mm cannulation), lime green
72201846	6.5mm x 72mm Reusable Obturator (4.3mm cannulation)
72201796	5.5mm Reusable Obturator (4.3mm cannulation), blue

DYONICS° INCISOR° Plus Blades*

Reference #	Description
72203013	DYONICS° INCISOR° Plus PLATINUM° 4.5mm Blade
72203519	DYONICS INCISOR Plus PLATINUM 5.5mm Blade

AMBIENT° SUPER TURBOVAC° COBLATION° Wand**

Reference #	Description
ASHA4250-01	AMBIENT SUPER TURBOVAC 90 IFS
ASH4250-01	SUPER TURBOVAC 90 IFS
ASC4250-01	SUPER TURBOVAC 90

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