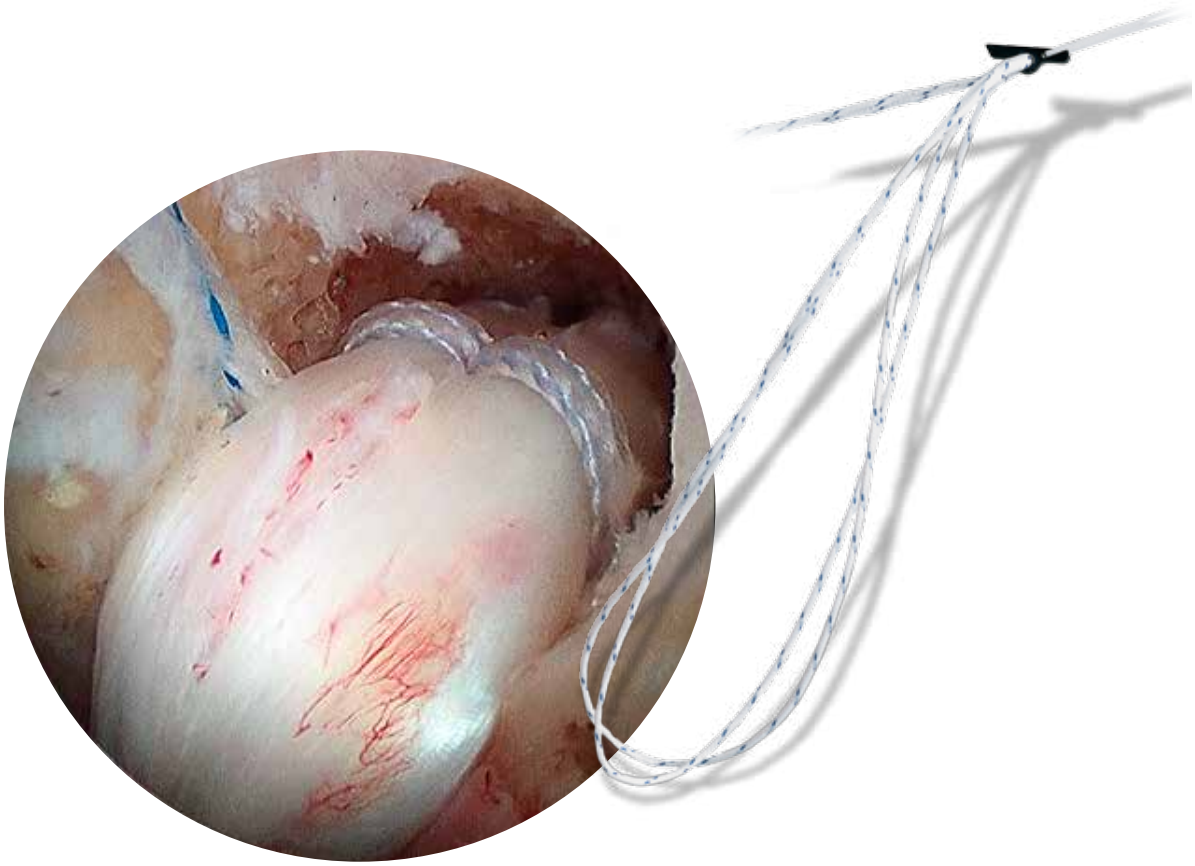

Tendon Suspension System for Intraosseous Arthroscopic Tenodesis of the Long Head of the Biceps with the **ToggleLoc Fixation Device with ZipLoop Technology**

SURGICAL TECHNIQUE

described by Dr. Angel Calvo

BIOMET
SPORTS MEDICINE

ToggleLoc Fixation Device with ZipLoop Technology Tendon Suspension System

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Introduction

Traditionally, the long head of the biceps (LHB) has played a major role in anterior shoulder pain, both separately and associated with rotator cuff tears. Furthermore, LHB is often accounted responsible for postoperative pain following rotator cuff tear repair.

Treatment of LHB lesions by tenotomy is commonly used therapy. Tenodesis techniques have undergone great advances in recent years, which is likely due to the development of arthroscopic techniques. The theoretic reduction in the aesthetic impact of tenotomy and maintenance of supination force in athletes and manual laborers may be the reason why many surgeons prefer tenodesis to tenotomy.

LHB tenodesis techniques attempt to obtain the solid primary fixation of the tendon and surgeons may achieve this arthroscopically. The objective in developing this technique was to obtain easy, reproducible arthroscopic LHB tenodesis to provide maximum intraosseous fixation, thereby limiting potential damage caused by the screw to the tendon. For this purpose we have employed tendon suspension systems frequently used on the knee to repair the cruciate ligaments.

Implant

The ToggleLoc fixation device is designed to capture the cortical bone after passing through the tunnel created, providing excellent fixation. This implant also includes MaxBraid suture and the innovative ZipLoop Technology, an adjustable lengthening #7 polyethlene suture. The adjustable loop allows one of the loops to be pulled in order to shorten the other two that transport the tendon, adapting itself to the length of the tunnel, providing the optimal tension for the tendon, maximizing contact between the tendon and bone. This limits unnecessary measurements allows reduced inventory since one size is appropriate for most procedures.

ToggleLoc Fixation Device with ZipLoop Technology Tendon Suspension System

Preoperative Planning

Place the patient in the sitting position (beach chair) with the arm suspended facilitating comfortable access of the anterior and posterior parts of the shoulder (Figure 1).

Figure 1

Portals

To perform the technique, the four portals used are described below.

1. **Standard Posterior Portal (P):** Made in the soft spot between the infraspinatus and teres minor round muscles. This is the initial viewing portal.

2. **Anterolateral Portal (AL):** Aligned with the anterior edge of the acromion. From here, the acromioplasty is performed and the arthroscope is inserted to expose the bicipital groove region.

3. **Anterior Portal (A):** In the anterior region of the shoulder. This allows the ability to draw a straight line to the posterior portal. This is the only portal where an 8 mm cannula is used.

4. **Anterior Accessory Portal (AA):** The mid-point between the anterior and anterolateral portal, just on the surface of the bicipital groove which is normally identified by tactile feel. Its main function will be to expose the biceps, but at certain times it is also used as a viewing portal as it provides an excellent view of the tunnel, and on other occasions, is converted into the portal from which the tunnels are made. The bone tunnel normally is made from this port, and the implant is inserted

(Figures 2a and 2b)

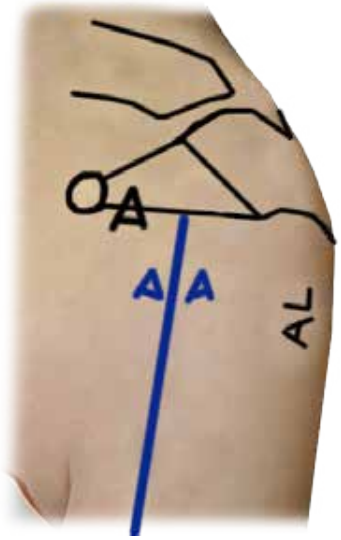

Figure 2a

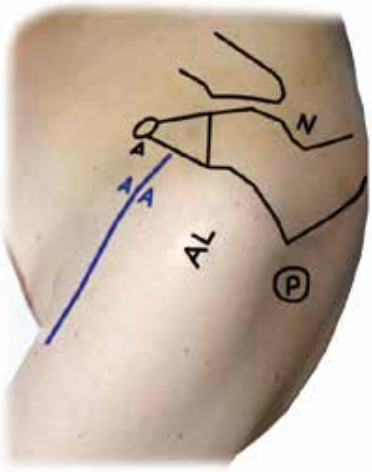

Figure 2b

ToggleLoc Fixation Device with ZipLoop Technology Tendon Suspension System

Surgical Technique

Glenohumeral Preparation

With the arthroscope inserted through the P portal, perform a complete examination of the joint and evaluate the biceps tendon. Place an 8 mm cannula in the A portal and from there, pass a MaxBraid suture using the lassoloop technique through the base of the LHB to be used as a safety suture in order to limit the chance of losing the tendon after performing the tenotomy (Figure 3).

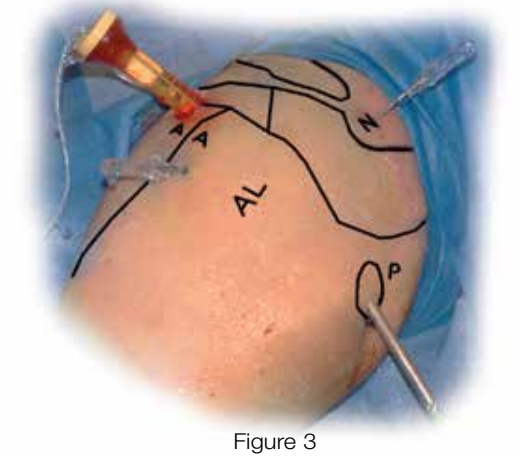

Figure 3

At the point where the AA portal is marked, insert a spinal needle to exactly follow the direction of the biceps (Figure 4).

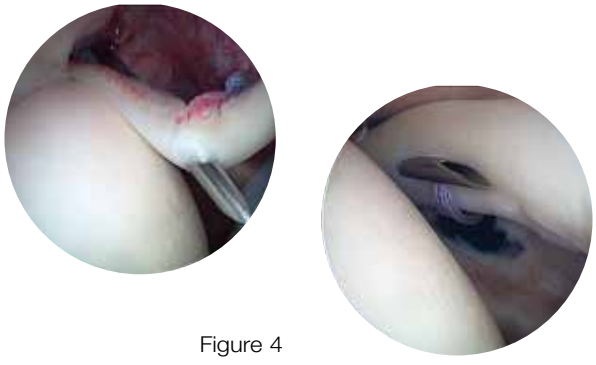

Figure 4

This needle is important because it will mark the groove in the subacromial space (Figure 3). Perform the LHB tenotomy.

Locate the Bicipital Groove

Keeping the arthroscope in the P portal, access the subacromial space. From the AL portal, perform the anterior bursectomy, identifying the coracoacromial ligament (Figure 5). The spinal needle is in a lateral position to this ligament, marking the groove, and in the medial region of the ligament is the cannula with the suture that controls the LHB.

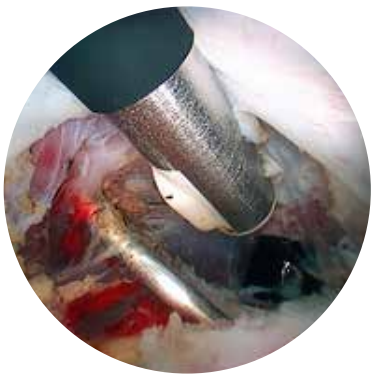

Figure 5

Pass the arthroscope through to the AL portal and make the AA portal with the scalpel, where the spinal needle is placed (Figure 6).

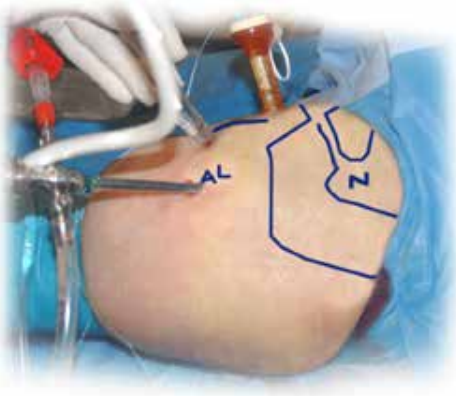

Figure 6

In the AA portal, locate the bicipital groove (Figure 7).

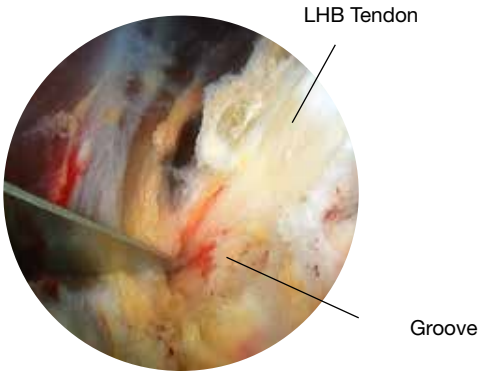

Figure 7

Carefully open the groove with a scalpel or a radiofrequency electrode. Complete the transversal ligament cross-section to expose the LHB in the AA portal (Figure 8).

Figure 8

Prepare the Tendon

After exposing the LHB, make a Krackow-type traction suture at the free end using a MaxBraid #2 suture. Start the suture 30 mm from the free end of the LHB, marking the length of the biceps the same as the length of the bone tunnel (Figures 9a and 9b).

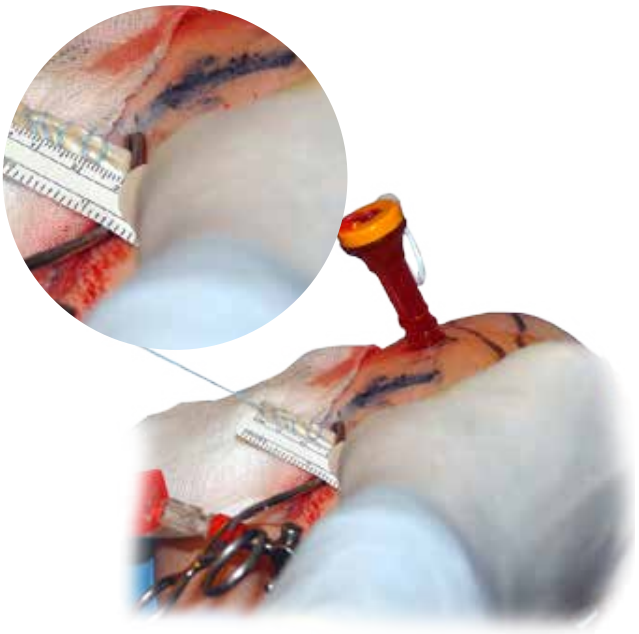

Figure 9a

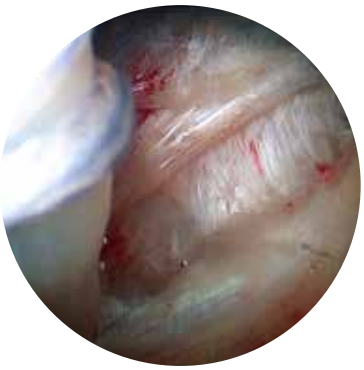

Figure 9b

Surgical Technique (Cont.)

Create the Bone Tunnels

With the arthroscope in the AL portal, a good view of the bicipital groove is obtained.

Pass the 2.4 mm guide pin from the bicipital groove to about 3 cm from the point where the articular cartilage starts, aiming at a point slightly lower than the posterior viewing portal (Figure 10).

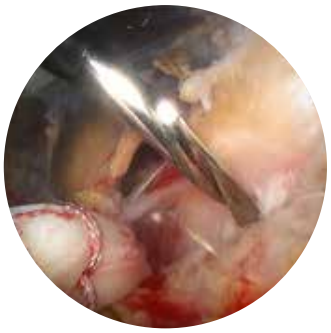

Figure 10

A test must be performed from the A or AL portal to ascertain whether the correct direction of the pin is obtained. Place the arm at maximum anteflexion and horizontally with respect to the ground. Insert the pin vertically, applying gentle taps until it emerges correctly at the back of the arm (Figure 11).

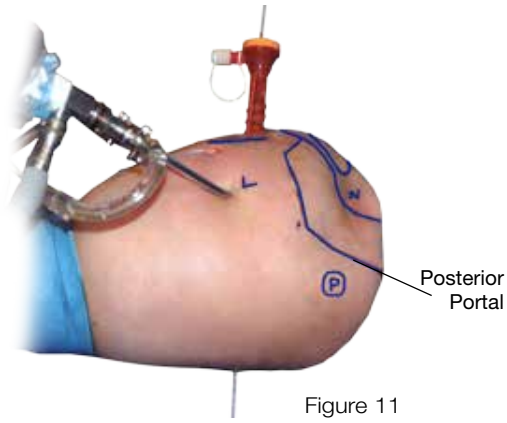

Figure 11

Once the pin is in position, create a tunnel with a length of 30 mm using a 7 mm reamer for the biceps socket (Figure 12). Then with the 4.5 mm reamer, ream to the base of the tunnel and posterior cortical bone (Figures 13a and 13b). The normal length of the tunnel will be about 40 mm. Note the total length based on the reading from the 4.5 mm reamer as a check and balance.

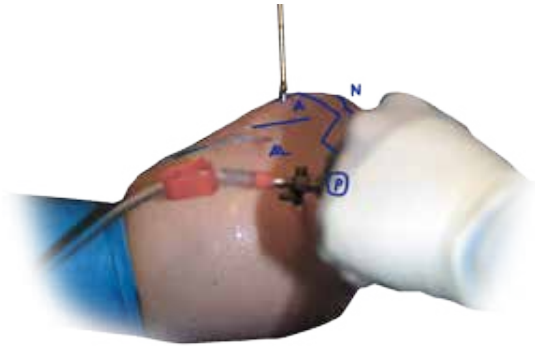

Figure 12

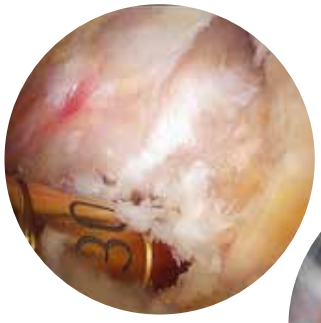

Figure 13a

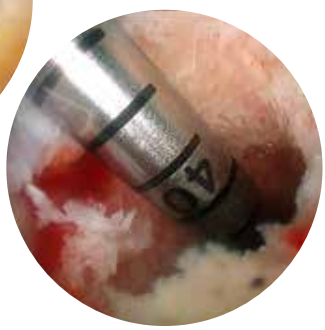

Figure 13b

In the AA portal, check the position and integrity of the tunnel walls (Figure 14). It is advisable to smooth the lowest edge of the tunnel entrance with the shaver, as friction could be generated in this area between the tendon and the bone.

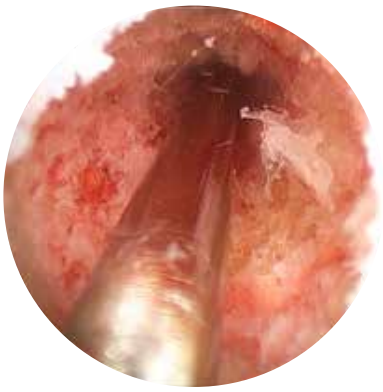

Figure 14

Attach the Tendon to Device

The tendon and MaxBraid suture must be in the same portal as the guide pin.

Mark the total length of the tunnel on the double loops of the ToggleLoc device by measuring from the distal end of the ToggleLoc button. Secure the whip stitched tendon to the double loops of the ToggleLoc device (Figures 15a and 15b). Thread the passing strands of the ToggleLoc device in the beath pin and pull it until the suture emerges at the proximal end of the shoulder.

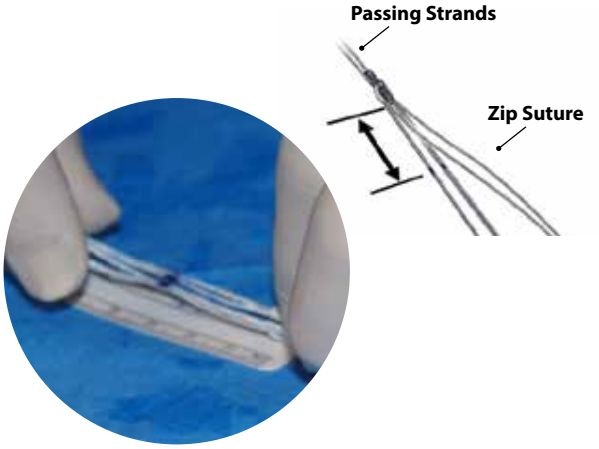

Figure 15a

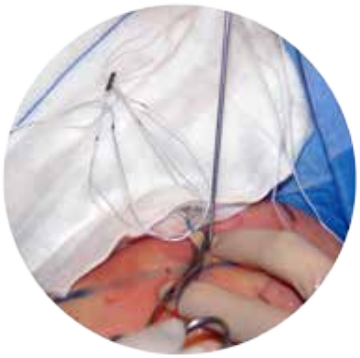

Figure 15b

ToggleLoc Fixation Device with ZipLoop Technology Tendon Suspension System

Implant Insertion

Continue by gently pulling on the ToggleLoc passing strands until the mark made on the tendon enters the tunnel (Figures 16a and 16b). Then gently pull on the implant to set the ToggleLoc button on the posterior cortex of the humerus.

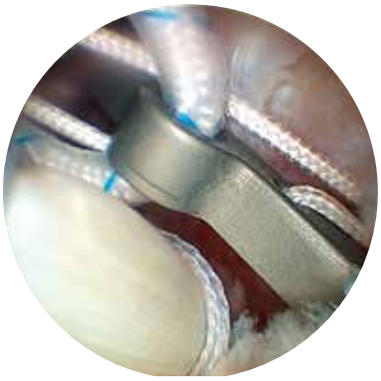

Figure 16a

Figure 16b

Finally, pull the ZipLoop zip strand (closed loop) to sequentially zip the graft into the tunnel. Insert the tendon into the 30 mm tunnel, which coincides with the previously made marking on the suture (Figures 17a and 17b).

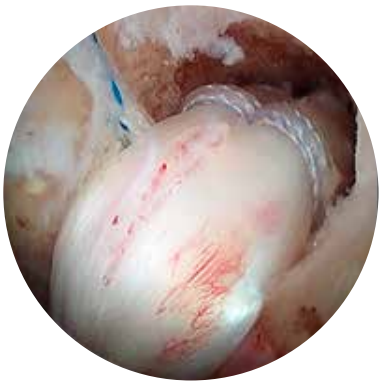

Figure 17a

Figure 17b

Implant Insertion (cont.)

With a probe, check the stability and tension of the LHB. Cut the ZipLoop zipping strands flush against the bone (Figures 18a and 18b).

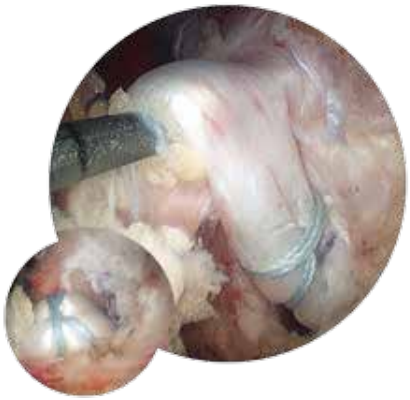

Figure 18a

Figure 18b

Postoperative Protocol

Place the patient in a sling for comfort. Based upon surgeon preference, begin therapy immediately. Do not allow active counter-resistance bending of the elbow for two months.

Radiological Evaluation

Figure 19: X-ray position of the ToggleLoc implant

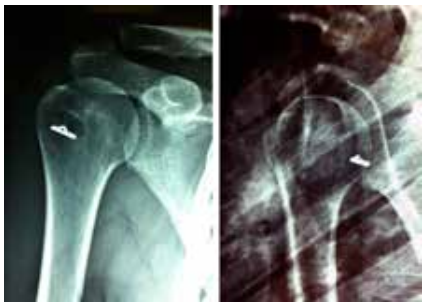

Figure 19

Figure 20: MR evaluation after three months, showing the direction of the tunnel on the different planes and the appropriate positioning of the tendon.

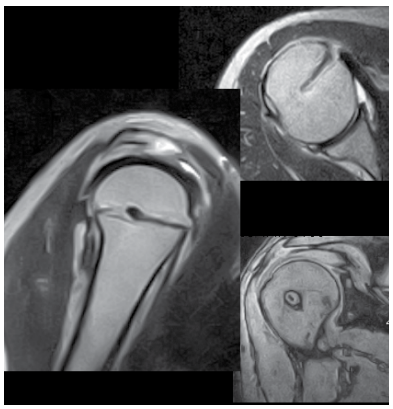

Figure 20

ToggleLoc Fixation Device with ZipLoop Technology Tendon Suspension System

Indications and Contraindications

Indications for Use

The ToggleLoc System devices, except the ToggleLoc XL device, are intended for soft tissue to bone fixation for the following indications:

Shoulder
Bankart lesion repair
SLAP lesion repair
Acromio-clavicular repair
Capsular shift/capsulolabral reconstruction
Deltoid repair
Rotator cuff tear repair
Biceps tenodesis

Foot and ankle
Medial/lateral repair and reconstruction
Mid-and forefoot repair
Hallux valgus reconstruction
Metatarsal ligament/tendon repair or reconstruction
Achilles tendon repair

Ankle syndesmosis fixation (syndesmosis disruptions) and as an adjunct in connection with trauma hardware for Weber B and C ankle fractures (only for ToggleLoc with Tophat/ZipTight Fixation Devices)

Elbow
Ulnar or radial collateral ligament reconstruction
Lateral epicondylitis repair
Biceps tendon reattachment

Knee
ACL/PCL repair/reconstruction
ACL/PCL patellar bone-tendon-bone grafts
Double-tunnel ACL reconstruction
Extracapsular repair: MCL, LCL, and posterior oblique ligament
Iliotibial band tenodesis
Patellar tendon repair
VMO advancement
Joint capsule closure

Hand and Wrist
Collateral ligament repair
Scapholunate ligament reconstruction
Tendon transfers in phalanx
Volar plate reconstruction

The ToggleLoc XL device is used for fixation of tendons and ligaments in cases of unanticipated intraoperative complications such as cortical breaching during orthopedic reconstruction procedures, such as Anterior Cruciate (ACL) or Posterior Cruciate (PCL) Reconstruction.

Contraindications

1. Infection.
2. Patient conditions including blood supply limitations, and insufficient quantity or quality of bone or soft tissue.
3. Patients with mental or neurological conditions who are unwilling or incapable of following postoperative care instructions.
4. Foreign body sensitivity. Where material sensitivity is suspected, testing is to be completed prior to implantation of the device.

Implants

Part Number	Description
909846	Disposable ToggleLoc Fixation Device with ZipLoop Technology Kit
909848	ToggleLoc Fixation Device with ZipLoop Technology Implant Kit System
900335	MaxBraid PE Suture #2
900312	Blue MaxBraid PE Suture #5 with C Needles

Instruments

Part Number	Description
909617	7.0 mm Cannulated Reamer
909618	8.0 mm Cannulated Reamer

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