

ToggleLoc™ and ToggleLoc XL

for ACL reconstruction using a quadruple semitendinosus graft

Surgical Technique
by Alcindo Silva, MD

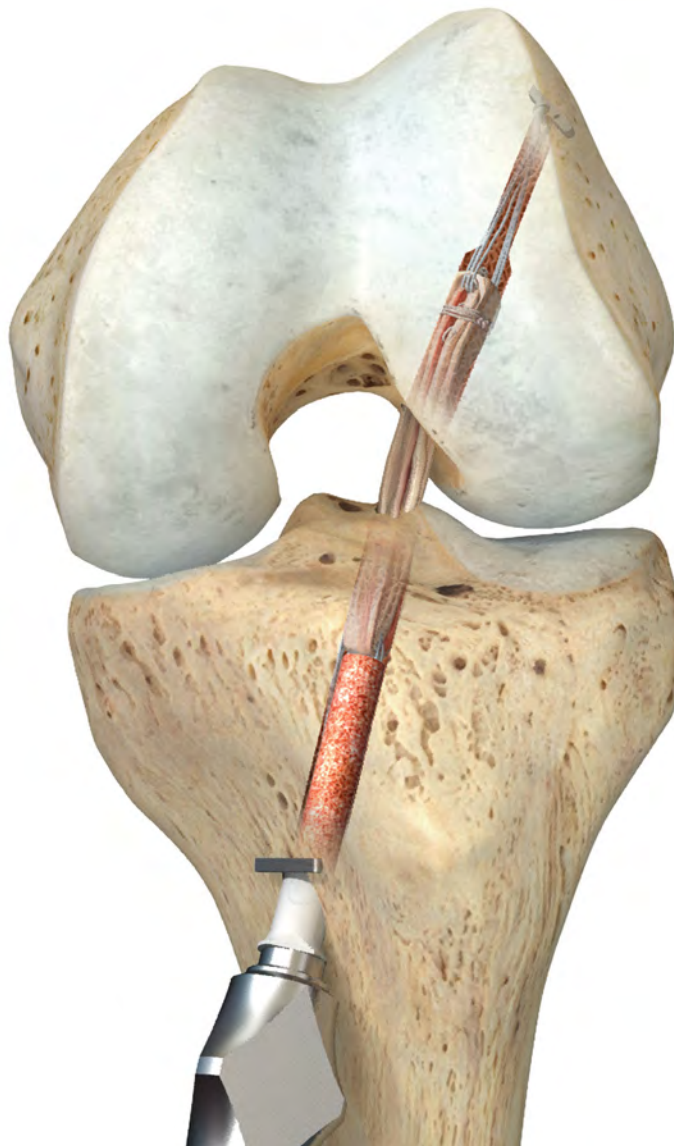


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Figure 1A

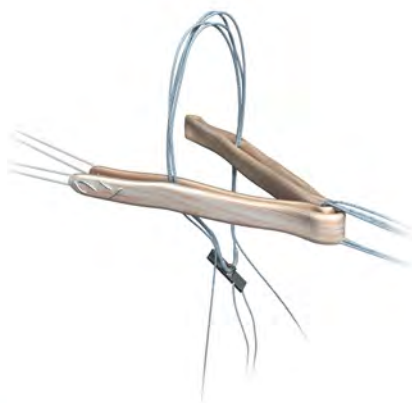


Figure 1B

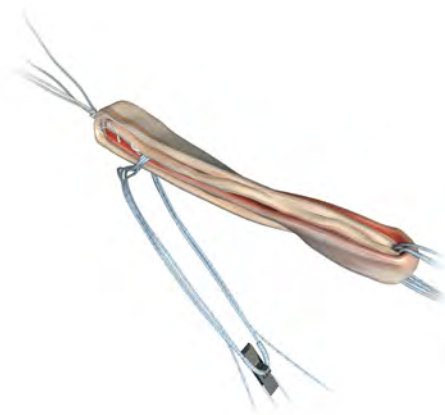


Figure 1C

Introduction

We would like to introduce an ACL reconstruction technique that aims to preserve bone stock and spares the gracilis. The semitendinosus graft construct is prepared in a quadruple way and fixed with a cortical button in both tunnels. To avoid the learning curve associated with the all-inside technique (drilling incomplete tibial tunnel and preserving the external cortex for fixation), the technique presented requires a full tibial tunnel, but the tunnel is refilled at the end of the surgery with a bone dowel (collected from the tibial tunnel).

Patient positioning

Place the patient in the supine position, with a post to assist with a valgus moment, and a foot and thigh holder to hold the leg at 90° of flexion.

Graft harvest

Harvest the semitendinosus graft through a traditional approach with an oblique incision over the pes anserinus tendons. A 24 cm semitendinosus length is necessary to obtain a minimum of 6 cm quadruple graft construct.

Graft preparation

Stitch both free ends of the semitendinosus over a length of 20 mm, using #2 ExpressBraid™ suture. Utilize two adjustable-length loop cortical button devices: ToggleLoc Device with ZipLoop™ Technology, for the femur, and ToggleLoc XL Device with Inline ZipLoop Technology, for the tibia. Fold the tendon graft symmetrically over the tibial cortical button loop, and pass the doubled graft through the femoral cortical button loop, and fold symmetrically again (Figures 1A). One free end strand of the graft passes through the tibial button loop and tie both free ends of the graft together (Figures 1B). Then tie the same sutures over the graft itself with four knots (Figures 1C).

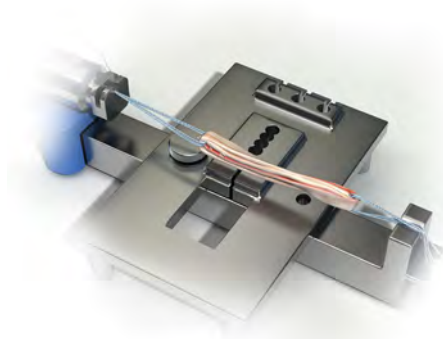


Figure 2

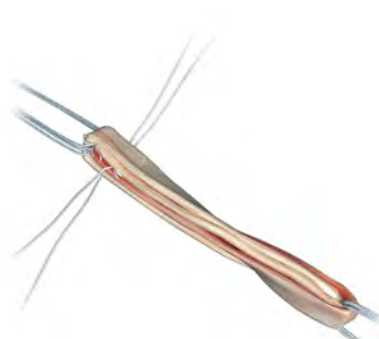


Figure 3A

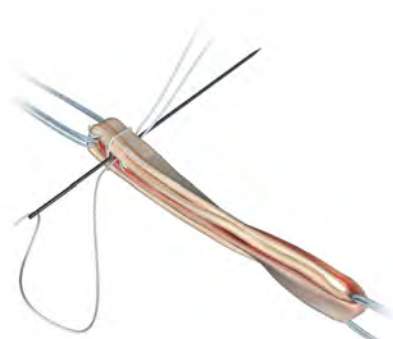


Figure 3B

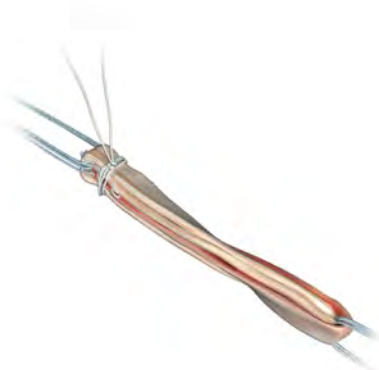


Figure 3C



Figure 4

Graft preparation (cont.)

Finally, place the graft construct in the Graft Tensioning Table (Figures 2), and reinforce the four-stranded graft at the tibial side, using cerclage-type suture #2 ExpressBraid. For that, utilize a buried-knot technique, starting from the inside of the graft and stitching outwards, through the second, third and fourth graft limbs (Figures 3A). Wrap the suture around the graft and stitch back through the first graft limb (Figures 3B).

Tie the suture with three manual knots (Figures 3C). Pretension the graft construct at 300N for two minutes in the graft station. Measure the graft length both before and after tensioning (Figures 4).



Precision Curved Offset Femoral Guide

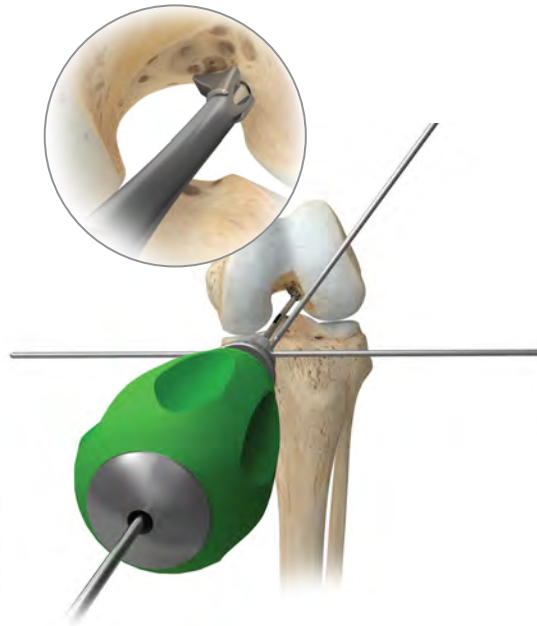


Figure 5



Figure 6

Femoral Tunnel

Create a standard lateral portal for arthroscopic visualization. Make the medial portal at the medial edge of the patellar tendon at the joint line. With the knee flexed at 90° and using a ruler through the anterolateral portal, determine the I.D.E.A.L.™ (Isometric, Direct Fibers, Eccentric, Anatomic, Low Tension) femoral tunnel position within the ACL footprint.¹ Select an appropriate Precision Curved Offset Femoral Guide according to the desired margin of corticocancellous bone at the posterior femur. Introduce the Precision Curved Offset Femoral Guide at the I.D.E.A.L. femoral tunnel position through the medial portal. For optimal guide placement, insert an alignment rod through either the coronal hole or the trajectory hole in the collar of the guide (Figure 5).

Place the alignment rod in the coronal hole and parallel to the joint line. Alternatively, in the trajectory hole, the alignment rod indicates the exit of the flexible guide wire on the lateral femoral cortex. Once the Precision Femoral Guide is in position, drill a flexible guide wire and advance through the lateral femoral cortex, to exit the skin on the lateral thigh, until the black laser line on the flexible guide wire meets the femoral bone in the notch (Figure 6).



Figure 7



Figure 8



Figure 9

Femoral Tunnel (cont.)

Measure the length of the femoral tunnel by sliding the Precision Depth Gauge down the flexible guide wire, through the skin and subcutaneous tissue at the lateral thigh, until contacting the femoral cortical bone (Figure 7). Remove the Precision Curved Femoral Guide and a Precision Flexible Reamer with the diameter of the graft is drilled over the guide wire until the desired tunnel depth is reached (Figure 8). Then use a 4.5 mm Precision Flexible Reamer to ream over the flexible guide wire, perforating the lateral cortex of the femur (Figure 9).

Thread the free ends of a #2 MaxBraid™ suture through the eyelet of the flexible guide wire and pull proximally on the flexible guide wire, to place the relay suture into the joint space and through the femoral tunnel.



Figure 10



Figure 11A

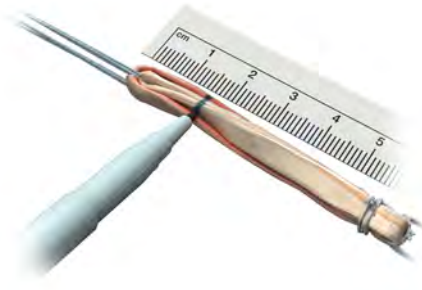


Figure 11B

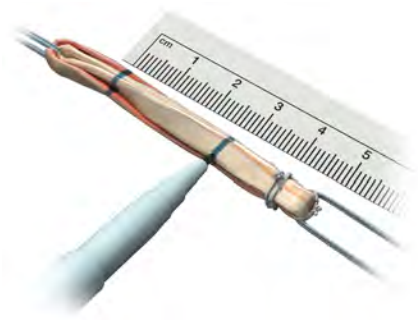


Figure 11C

Harvest of the bone dowel and create the tibial tunnel

To create the tibial tunnel, set the preferred Tibial Guide at 55°, and drill the guide wire through the center of the of the native ACL footprint. Subsequently, remove the cortex at the distal end of the tibial tunnel with a reamer the diameter of the graft. Then, insert a cannulated plunger over the K-wire, and impact the size specific harvesting tube over the cannulated plunger and the K-wire to the subchondral bone (Figure 10). Rotate the harvesting tube clockwise and counterclockwise to break the tip of the bone dowel from the subchondral bone, and remove the harvesting tube from the tunnel. In the end, ream the tibial tunnel through the subchondral bone.

Passage of the graft

The first distance that should be measured and marked on the graft construct is the length of the total femoral tunnel. Mark this distance on the adjustable graft loop, measuring from the proximal tip of the cortical suspensory button, while the surgeon holds the button in a “pre-flipped” position (Figure 11A). The second distance to consider is the length of the graft inside the femoral tunnel, and it depends on the total length of the graft. A typical amount is between 15 mm and 20 mm. Mark this distance on the graft itself, measuring from the femoral graft end (Figure 11B). Finally, mark the length of the graft inside the joint, usually 25 mm (Figure 11C).

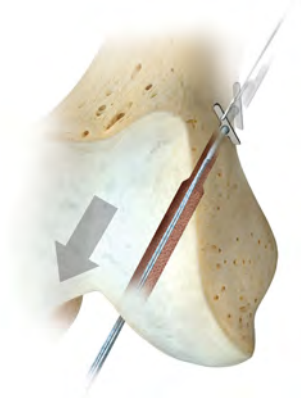


Figure 12

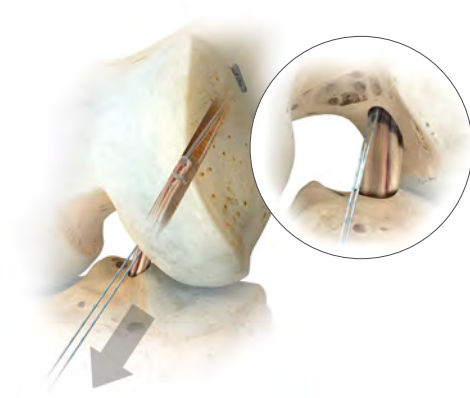


Figure 13

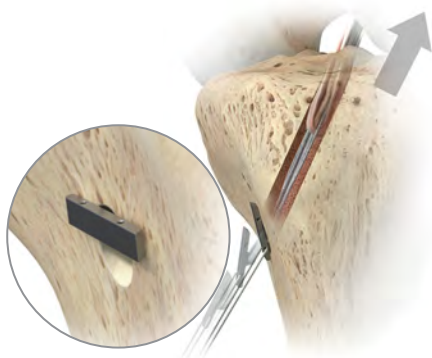


Figure 14



Figure 15

Passage of the graft (cont.)

Pull the femoral adjustable graft loop into the femoral tunnel through the tibial tunnel until the mark on the graft loops of the femoral ToggleLoc device reaches the tunnel aperture (Figure 12). Under direct arthroscopic visualization, ensure that the button has exited the femoral cortex proximally and is ready to flip. Once the button flips, pull the graft back to ensure solid femoral fixation. Next, tension the femoral pull sutures to advance the graft up into the femoral tunnel (Figure 13).

Then, with the knee in full extension, pull the tibial ToggleLoc XL Inline tensioning sutures until the graft and the button are seated in the tibial tunnel and on the cortical tibial bone, respectively (Figure 14). Cycle the knee through its range of motion 30 times, followed by retention pulling the tibial sutures by hand in full extension. Finally, compact the bone dowel into the tibial tunnel (Figure 15).

INDICATIONS FOR USE

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

Shoulder

Bankart lesion repair
SLAP lesion repairs
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 during orthopedic reconstruction procedures, such as Anterior Cruciate (ACL) or Posterior Cruciate (PCL) Reconstruction, as well as fixation in cases of unanticipated intraoperative complications, such as cortical breaching.

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 neurologic 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.

Reference

1. Howell, S., M.D. (n.d.). The Rationale Behind the I.D.E.A.L. Femoral Tunnel Position Philosophy (Tech. No. 0386.1-US-en-REV0316). Zimmer Biomet.

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Biomet Sports Medicine
56 East Bell Drive
P.O. Box 587
Warsaw, Indiana 46581
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