

Knee Technique Guide

MPFL reconstruction with autologous gracilis tendon using the two bone tunnel technique

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Knee

Hip

Shoulder

Extremities

MPFL reconstruction with autologous gracilis tendon using the two bone tunnel technique

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This surgical technique was prepared under the guidance of Prof. Elvire Servien and Prof. Philippe Neyret. Created under close collaboration with the physician, it contains a summary of medical techniques and opinions based upon her training and expertise in the field, along with his knowledge of Smith & Nephew's BIOSURE HA interference screw.

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 surgical technique is presented for educational purposes only.



Scope / Introduction

Scope

The aim of the medial patellofemoral ligament (MPFL) reconstruction is to re-establish the alignment of the patella in the trochlear groove across the entire range of motion, particularly when approaching full extension. The technique herein described is a mini-open procedure using a free gracilis tendon graft and applying the two bone tunnel technique for anatomical reconstruction of the MPFL.

Introduction

Patellofemoral instability can be caused by congenital anomalies or through traumatic patellar dislocations¹⁻⁴ with the latter being associated with rupture of the MPFL in over 96% of patients^{5,6}. In patients with recurrent dislocations, an increasing insufficiency of the medial patellar restraints can be observed. The combination of MPFL insufficiency with instability predisposing factors, such as trochlea dysplasia or patella alta, results in recurrent and continuous patellar dislocations. It is therefore crucial to restore sufficient function of the MPFL.

Previously the focus was to correct the extensor mechanism by re-establishing proper alignment of the patella, or by arthroscopically tightening the medial joint capsules either alone or in combination with a lateral release. However, anatomical, biomechanical and clinical studies have shown that these procedures are not able to reliably restore patellofemoral stability⁷⁻¹¹, especially in the presence of trochlea dysplasia¹². MPFL reconstruction maintains patellofemoral function even in the presence of trochlea dysplasia^{13,14} and provide good mid and long-term stability, with significant improvements in knee function¹⁴⁻¹⁶.

This guide illustrates mini-open MPFL reconstruction using the two bone tunnel technique. The patellar fixation used in this technique provides good restoration of the MPFL through the wide insertion at the patella, which mimics that of the native MPFL¹⁷.

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Patient Preparation

Patient Preparation

Supine position, arthroscopy table, lowered position of contralateral leg for improved access to medial side of the operated leg.

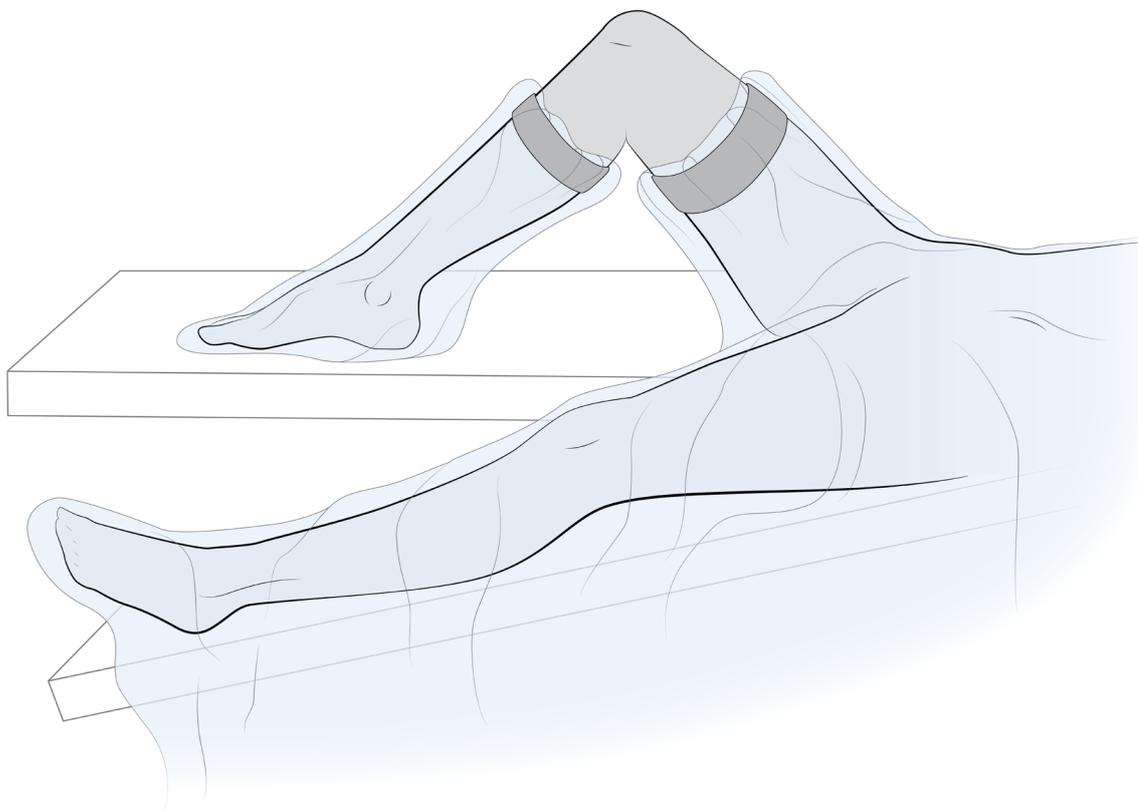
The knee should be positioned at 90° of flexion.

Tip:

The lowered contralateral leg allows for easy access when imaging.

Portal Placement

None required.



Surgical Technique

Surgical Technique

The surgical technique is composed of 6 surgical steps.

1. Graft harvest and preparation

- a. Harvest the gracilis tendon in the standard fashion. A length of 16–20 cm is sufficient for MPFL reconstruction.
- b. Whip-stitch the proximal end of the graft using high strength #2 ULTRABRAID sutures.
- c. The graft is then doubled over a passing suture, and the limbs are sutured together at a length of 2 cm at the looped end (**Fig 1**). The graft produced is Y shaped, with two free whip-stitched limbs and a doubled end with a passing suture.



Figure 1

2. Patella Preparation

- a. Position the knee in 90° of flexion.
- b. A 2–3 cm vertical incision allows exposure of the medial border of the patella.
- c. The incision is made to bone using a #15 blade.
- d. The patella periosteum is divided with a blade (**Fig 2**).
- e. While keeping the knee capsule intact, layer 2 is separated using a Kocher clamp, creating a pocket between the original MPFL and joint capsule.

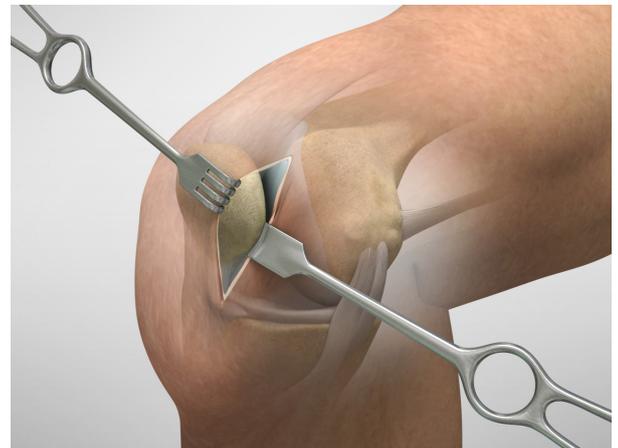


Figure 2



Large Tendon Stripper, closed
Cat. No. 7207179



Tendon Stripper, closed
Cat. No. 013550*



GRAFTMASTER III system
Cat. No. 72202788



ULTRABRAID #2 suture
Cat. No. 72200886

Surgical Technique

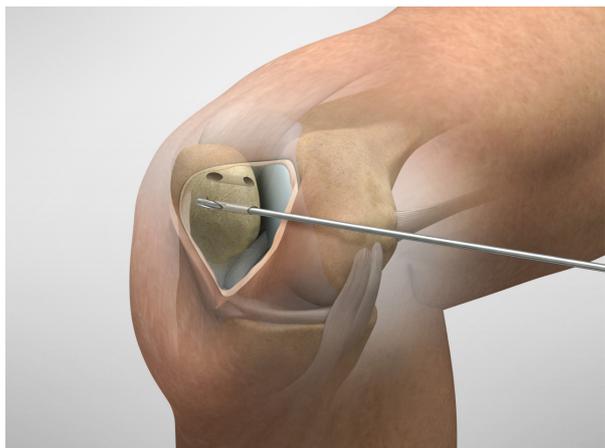


Figure 3

- f. Two tunnels are created 10 mm apart in the proximal third of the patella by sequential drilling using a 3.2 mm and 4.5 mm drill bit. Each tunnel begins on the medial border of the patella and exits on the anterior face 8–10 mm from the medial border (**Fig 3**).

3. Femoral Tunnel Preparation

- a. Position the knee in 30° of flexion.
- b. A 1–2 cm vertical incision is made over the peak of the medial femoral epicondyle and the adductor tubercle. The location is identified by palpation with the knee in varus. The tendon of the adductor magnus and the epicondyle are generally easy to identify. The dissection is carried out to bone.
- c. A guide wire pin with an eyelet is directed from medial to lateral, proximal to the epicondyle and beneath the adductor tubercle, through the metaphysis of the lateral femur and out through the skin of the lateral thigh (**Fig 4**).

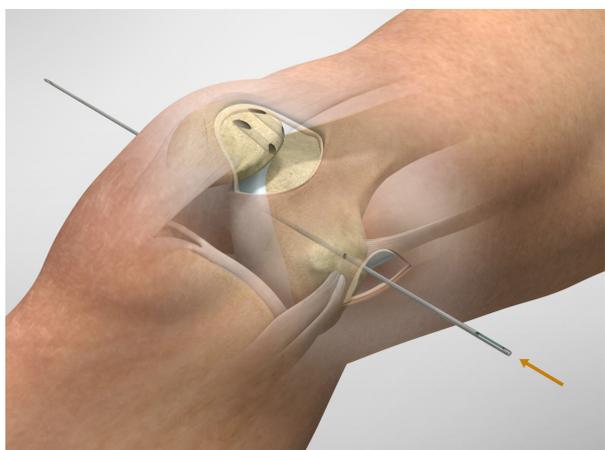


Figure 4

Tip:

Use an image intensifier as a control to avoid gross errors.

- d. Using a 7 mm endoscopic cannulated drill reamer over the guide pin, a blind tunnel is created in the medial epicondyle (**Fig 5**). This tunnel must be of sufficient length (25 mm) to accommodate the folded and sutured end of the graft (20 mm).



Figure 5



Endoscopic
Cannulated Drill
4.5 mm
Cat. No. 7207315



Drill tip passing
pin
Cat. No. 7208678



Endoscopic
Cannulated Drill
bit diameter 7 mm
Cat. No. 013660

Surgical Technique

4. Femoral graft fixation

- a. The passing suture is then pulled through the femur using the eyelet of the guide pin, and then used to pull the graft into the tunnel (**Fig 6 and 7**).
- b. Once adequate insertion has been confirmed, the graft is fixed using a bio-absorbable BioSure HA interference screw (7 mm x 25 mm) (**Fig 8**).

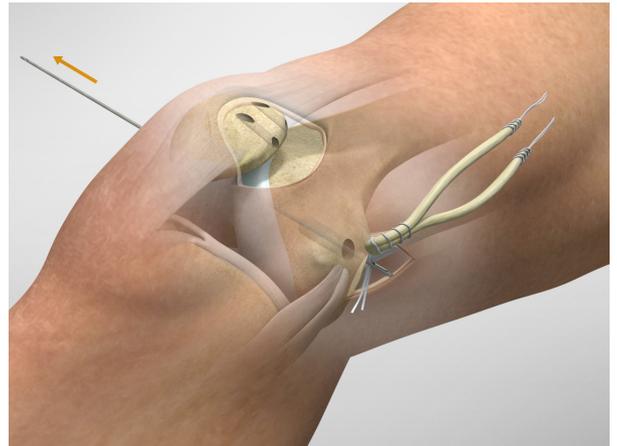


Figure 6

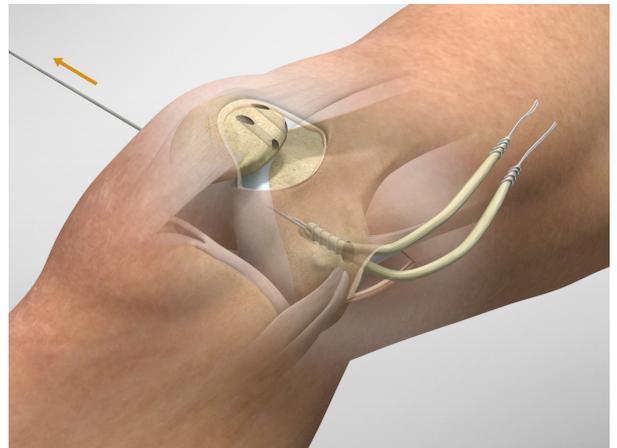


Figure 7



Figure 8



BioSure HA
Interference Screw
7 mm x 25 mm
Cat. No. 72201772



Figure 9

5. Positioning the graft

- a. A pair of artery forceps is then passed from the patella incision to the posterior incision. It is passed in the plane between the residual MPFL fibres and the capsule (between the second and third capsulo-ligamentous layers) (**Fig 9**).
- b. Pass the artery forceps through the patellar tunnel from the anterior entrance. Use the artery forceps to catch the suture of the free limbs of the graft. The free limbs of the graft are passed in the sub capsular plane and pulled into the patella tunnels one-by-one (**Fig 10**).

Note:

The passage of the limbs into the medial patella tunnels is often difficult. The tunnel entrances must be well prepared.

- c. Once through the tunnels, the graft limbs are sewn back onto themselves using an absorbable suture material e.g. vycril (**Fig 11**). The graft is sutured with the knee in 30° of flexion.
- d. The patella must be central whilst the suturing is performed, to obtain proper graft tension.

Important:

This is the least reproducible step. The risk is to over-constrain the patella, which should remain mobile but not subluxatable. Lateral movement of between 7 and 9 mm suggests correct tensioning.

6. Suturing

The skin is closed where possible using subcuticular closure. A combination of Monocryl, Dermabond and suture strips may be used.



Figure 10



Figure 11

Ordering Information

Ordering Information

To order the instruments used in this technique contact an authorised 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.

Endoscopic Drill

Reference #	Description
013499	Endoscopic drill 6 mm
013660	Endoscopic drill 7 mm
7207315	Endoscopic Cannulated Drill bit, 4.5 mm

Graft Harvesting/Preparation Instruments

Reference #	Description
7207179	Large Tendon Stripper, closed, 7.4 mm I.D. x 13.5" working length
013550*	Tendon Stripper, closed, 6.4 mm I.D. x 12" working length
013554*	Tendon Stripper, slotted, 5 mm I.D. x 12" working length
72202788	GRAFTMASTER III System
72202452	GRAFTMASTER III Preparation board
72202316	GRAFTMASTER III Sliding base (2)
72202315	GRAFTMASTER III Tissue grasper (2)
72202317	GRAFTMASTER III Cutting strip
72202453	GRAFTMASTER III BTB Holder
72202319	GRAFTMASTER III Slotted Sizing block
72202441	GRAFTMASTER III System Tray

Drill-Tip Passing Pins

with eyelet for graft passage

Reference #	Description
7208678	2.4 mm x 15" (38 cm) Graduated Drill-Tip Passing Pin, sterile, single use

Sutures

Reference #	Description
7210914	ULTRABRAID #2 white suture + needle assembly, 38", single package, sterile (10 per box)
7210915	ULTRABRAID #2 COBRAID suture + needle assembly, 38", single package, sterile (10 per box)

Interference Screw and Other

Reference #	Description
72201722	7 mm x 25 mm BIOSURE HA Screw
7211138	BIOSURE Guide Wire, 1.2mm x 9" (5 per box)
72201887	BIOSURE driver

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