

Lateral Meniscus Repair Using Posterolateral Portal: Suture Hook Technique



Felipe Galvão Abreu, M.D., João Luís Moura, M.D., Carlos Mesquita Queirós, M.D., Lionel Helfer, M.D., Thais Dutra Vieira, M.D., and Bertrand Sonnery-Cottet, M.D.

Abstract: Lateral meniscus lesions result in loss of meniscus hoop stresses and can lead to lateral compartment overload and early degenerative changes. Arthroscopic suture repair provides good long-term results. However, posterior vertical tears in the peripheral area of the meniscus can be technically challenging to resolve. This Technical Note describes the suture hook technique using an accessory posterolateral portal. We believe it is a safe, effective method for repairing full vertical tears of the lateral meniscus.

The meniscus has a critical role in load bearing and force distribution in the knee. This is of particular importance in the lateral compartment because of the convexity of the lateral tibial plateau.

Lateral meniscus tears have been well described and are considered serious lesions. If not treated appropriately, they can quickly lead to chondrolysis of the lateral knee compartment.¹ If these tears are not repaired, the lateral compartment is subjected to unfavorable dynamic contact mechanics similar to those resulting from a partial or even total lateral meniscectomy in the case of full radial tears.^{2,3} Meniscal preservation with suture repair is currently considered the gold standard of treatment, with very good long-term results.⁴⁻⁶ Although a number of surgical techniques have been described, they can be very technically demanding.⁴⁻⁸ The aim of this Technical Note was to present a safe and effective method to

repair longitudinal tears of the lateral meniscus using an accessory posterolateral portal.

Surgical Technique

The surgical technique is presented in [Video 1](#).

Patient Setup

The patient is placed supine on the operating table in the standard arthroscopy position with a lateral post just proximal to the knee, at the level of the padded tourniquet, and a foot roll to prevent the hip from externally rotating and to maintain 90° of knee flexion. This allows the knee to be moved freely through its full range of motion ([Fig 1](#)).

Exploration

A full diagnostic arthroscopy is performed; any associated cartilage lesions and medial meniscus tears are

From Centre Orthopédique Santy, FIFA Medical Center of Excellence, Ramsay-Générale de Santé, Hôpital Privé Jean Mermoz, Lyon, France.

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Address correspondence to Bertrand Sonnery-Cottet, M.D., Centre Orthopédique Santy, FIFA Medical Centre of Excellence, Hôpital Privé Jean Mermoz, Groupe Ramsay GDS, 69008 Lyon, France. E-mail: sonnerycottet@aol.com

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Fig 1. Patient setup for a left knee.

Table 1. Pearls and Pitfalls

	Pearls	Pitfalls
Diagnosis	A direct transnotch view of the posterolateral compartment is required to diagnose lesions.	By viewing the posterior horn of the lateral meniscus only from the anterior compartment, some vertical tears may be difficult to manage.
Posterolateral approach	Transillumination allows the surgeon to pinpoint the veins and nerves that must be avoided. The needle is inserted in the posterolateral corner of the joint aiming anteriorly.	The portal must stay anterior and superior to the biceps femoris tendon. There is a potential for damage to the popliteus tendon.
Suture placement	The surgeon should insert as many sutures as required, depending on the length of the tear.	Care must be taken to avoid tangling the sutures.

treated. The knee is placed in the figure-of-4 position, and the lesion is probed to determine the tear morphology. The tear's reparability is then assessed. The transnotch maneuver for posterolateral-compartment exploration is used for direct visualization and for better diagnosis of the lesions (Table 1).

Posterolateral Approach

In the case of a posterior segment tear, a posterolateral approach is performed with the knee still in the figure-of-4 position (Fig 2). Transillumination allows the surgeon to pinpoint the veins and nerves that must be avoided. The point where the needle is introduced is between the long and short heads of the biceps femoris tendon, placed 1 cm proximal to the joint line and 1 cm posterior to the posterior condyle. The needle must be introduced from outside to inside, in the direction of the lesion. The approach is performed with a No. 11 blade scalpel under arthroscopic control, with dissection through the same approach, again under arthroscopic control (Fig 3). We use this single posterolateral portal without a cannula.

Meniscus Suture Repair

An all-inside suture repair can now be performed. First, the lesion is debrided, and the edges of the tear are trimmed with a shaver. A left curved hook is used for a left knee and vice versa for a right knee. A 25° hook

(QuickPass Lasso, Low Profile; Arthrex, Naples, FL) loaded with No. 0 absorbable monofilament suture (PDS; Ethicon, Somerville, NJ) is introduced through the posterolateral portal. The suture hook is manipulated by hand so that the sharp tip penetrates the peripheral wall of the lateral meniscus from outside to inside. Next, the suture hook is passed through the central part (inner portion) of the lateral meniscus. The free end of the suture in the posterolateral space is grasped and brought up to the posterolateral portal. A sliding knot (fishing-knot type) is applied to the most posterior part of the meniscus with the help of a knot pusher and then cut. This maneuver is repeated as required depending on the length of the tear (1 knot every 10 mm). Care is taken to avoid tangling the sutures. Once the posterolateral stage is finished, the camera returns to the anterior view; the suture repair is tested, and the procedure is repeated if necessary. When the tear extends to the body of the lateral meniscus, an outside-in suture with No. 0 PDS is added. The stability of this suture is then tested with a probe (Fig 4).

Postoperative Protocol

Postoperatively, active and passive range of motion is limited to 0° to 90° in the first 6 weeks, with progression to full weight bearing by the fourth postoperative

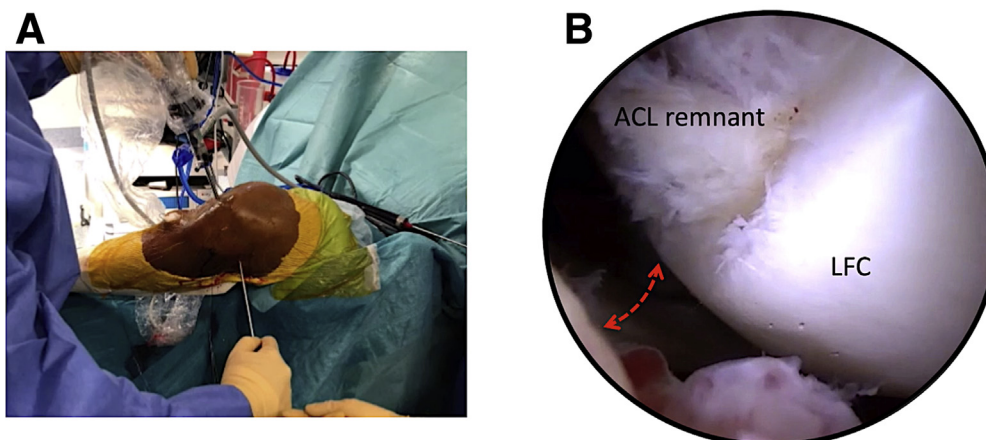
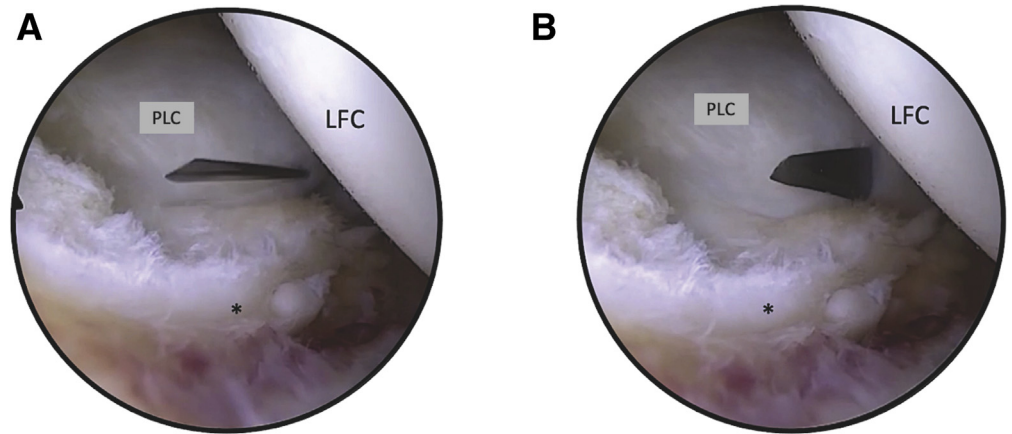


Fig 2. (A) The left knee is placed in the figure-of-4 position. (B) Intra-articular view of left knee. In the figure-of-4 position, the anterolateral compartment is opened (arrow) to allow easy access of the scope to the posterolateral compartment. (ACL, anterior cruciate ligament; LFC, lateral femoral condyle.)

Fig 3. Posterolateral portal placement in a left knee using the transnotch view. *Torn posterior horn of the lateral meniscus. (A) A needle is introduced from outside to inside 1 cm above the joint line and 2 cm posterior to the posterior edge of the lateral femoral condyle (LFC) toward the meniscal lesion. (B) The needle is removed, and the portal is created with a scalpel blade in the same orientation as the needle.



week. Jogging is permitted after 3 months, and full activity is permitted after 4 months.

Discussion

In the described technique, using an accessory posterolateral instrumentation portal provides a better

approach to the meniscus and a direct view for all-inside suture hook placement. The main advantage of our technique is that longitudinal lesions of the posterior horn of the lateral meniscus can be repaired while avoiding the risk of iatrogenic nerve or vascular injury. Having a direct transnotch view provides a clearer

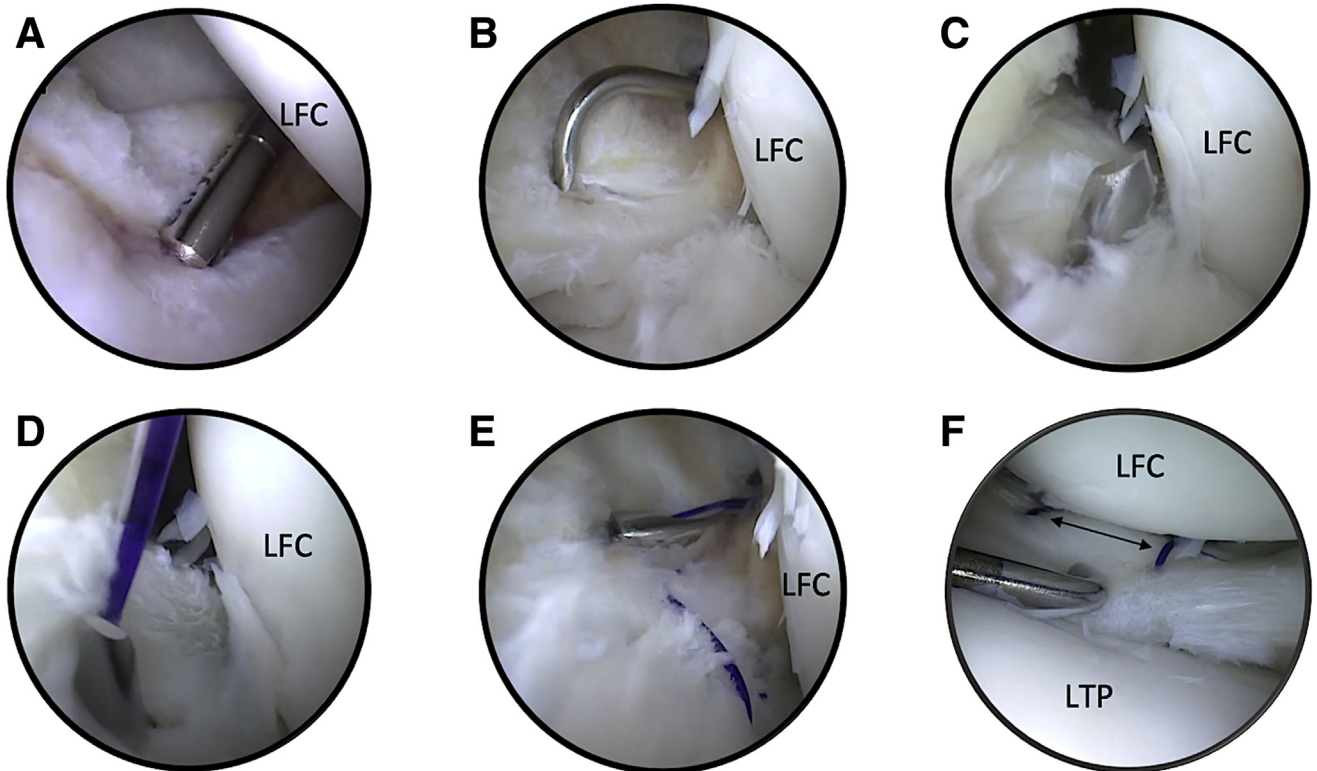


Fig 4. A transnotch view (A-E) and anterior view (F) of the left knee are shown. (A) Debridement of the lesion with the shaver introduced through the posterolateral portal. (B) The suture hook loaded with a PDS suture is introduced through the posterolateral portal to catch the peripheral edge of the meniscal lesion. (C) The tip of the hook emerges in the center of the meniscal lesion. (D) In the second step, the anterior edge of the meniscal lesion is penetrated and the PDS suture is delivered inside the joint. (E) Once the hook is removed, a sliding knot is tied with a knot pusher; the knot is positioned toward the most peripheral part of the lesion, away from the femoral condyle. (F) Anterior view of repaired meniscus. The suture points are separated by at least 10 mm (arrow). (LFC, lateral femoral condyle; LTP, lateral tibial plateau.).

Table 2. Advantages and Disadvantages

Advantages
Single posterolateral portal
No need for cannula
Better view of posterior horn of lateral meniscus
Improved diagnosis of lesions
Improved quality of debridement before repair
Direct view of lesion reduction
Placement of vertical sutures perpendicular to deep fibers of meniscus
Disadvantages
Additional incision
Significant learning curve in placing and tying sutures
Technically challenging
Difficult to manage instruments with lower limb in figure-of-4 position

understanding of the tear pattern,⁹ allowing anatomic reduction and debridement of the lesion. Similarly to the technique described for ramp-lesion repair on the medial meniscus, using a 25° suture hook through the posterolateral portal helps with the placement of 1 or more vertically oriented sutures, resulting in a strong and safe fixation.

The successful use of 2 posterolateral portals has also been described; however, by using a 25° suture hook, 1 posterolateral portal is sufficient to handle and suture the posterior horn.¹⁰ Nevertheless, there is a significant learning curve for this all-inside suture technique through a posterolateral portal. Even though the risk of neurovascular injury during posterolateral portal creation is low, special care should be taken during this surgical step to avoid potential damage not only to the neurovascular structures but also to the popliteus tendon. Advantages and disadvantages of the technique are summarized in [Table 2](#).

References

- Steiner SRH, Feeley SM, Ruland JR, Diduch DR. Outside-in repair technique for a complete radial tear of the lateral meniscus. *Arthrosc Tech* 2018;7:e285-e288.
- Bedi A, Kelly N, Baad M, et al. Dynamic contact mechanics of radial tears of the lateral meniscus: Implications for treatment. *Arthroscopy* 2012;28:372-381.
- Allaire R, Muriuki M, Gilbertson L, Harner CD. Biomechanical consequences of a tear of the posterior root of the medial meniscus. Similar to total meniscectomy. *J Bone Joint Surg Am* 2008;90:1922-1931.
- Song HS, Bae TY, Park BY, Shim J, In Y. Repair of a radial tear in the posterior horn of the lateral meniscus. *Knee* 2014;21:1185-1190.
- Anderson L, Watts M, Shapter O, et al. Repair of radial tears and posterior horn detachments of the lateral meniscus: Minimum 2-year follow-up. *Arthroscopy* 2010;26:1625-1632.
- Ahn JH, Lee YS, Yoo JC, Chang MJ, Park SJ, Pae YR. Results of arthroscopic all-inside repair for lateral meniscus root tear in patients undergoing concomitant anterior cruciate ligament reconstruction. *Arthroscopy* 2010;26:67-75.
- Moulton SG, Bhatia S, Civitarese DM, Frank RM, Dean CS, LaPrade RF. Surgical techniques and outcomes of repairing meniscal radial tears: A systematic review. *Arthroscopy* 2016;32:1919-1925.
- Soejima T, Tabuchi K, Noguchi K, et al. An all-inside repair for full radial posterior lateral meniscus tears. *Arthrosc Tech* 2016;5:e133-e138.
- Peltier A, Lording TD, Lustig S, Servien E, Maubisson L, Neyret P. Posteromedial meniscal tears may be missed during anterior cruciate ligament reconstruction. *Arthroscopy* 2015;31:691-698.
- Ahn JH, Kim SH, Yoo JC, Wang JH. All-inside suture technique using two posteromedial portals in a medial meniscus posterior horn tear. *Arthroscopy* 2004;20:101-108.