

Diagnosis by Manual Maneuver of Medial Meniscus Ramp Lesions



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Abstract: The intra-articular injury most often associated with a chronic anterior cruciate ligament tear involves the posterior horn of the medial meniscus. A specific type of medial meniscal injury, called a ramp lesion, has received greater attention for identification and treatment because of its considerable incidence and diagnostic difficulty. Based on their location, these lesions may be arthroscopically “hidden” during traditional anterior visualization. The purpose of the present Technical Note is to describe the Recife maneuver. This maneuver diagnoses injuries to the posterior horn of the medial meniscus using additional arthroscopic management through a standard portal. The Recife maneuver is performed with the patient in the supine position. A 30° arthroscope is inserted through the anterolateral portal, and the posteromedial compartment is accessed according to the transnotch view (modified Gillquist view). In the proposed maneuver, with the knee in 30° of flexion, a valgus stress with internal rotation is performed, followed by palpation of the popliteal region and digital pressure on the joint interline. This maneuver allows a greater visualization of the posterior compartment, allowing the diagnostic evaluation of the integrity between the meniscus and the capsule, in a safer way, being able to identify ramp tears without the need to create a posteromedial portal. We recommend that the addition of the diagnostic visualization step of the posteromedial compartment as described by the Recife maneuver be performed to assess the meniscal status in routine anterior cruciate ligament reconstruction.

Meniscal injuries often are seen concomitantly with anterior cruciate ligament (ACL) tears, with involvement of the posterior horn of the medial meniscus being the most common occurrence.¹ Greater attention to their identification and treatment has been noted recently as a result of the considerable incidence, from 9% to 40%, and the high rate of underdiagnosis, which can occur in up to 48% of cases.²

Although authors disagree on the definition of a “ramp lesion,” most describe it as meniscocapsular separations and meniscosynovial tears, with variable insertion of meniscotibial ligament injuries and tears in the red–red zone of the posterior horn of the medial meniscus.^{1–4}

A classification system for medial meniscus ramp lesion was proposed by Thauinat et al.³ The authors

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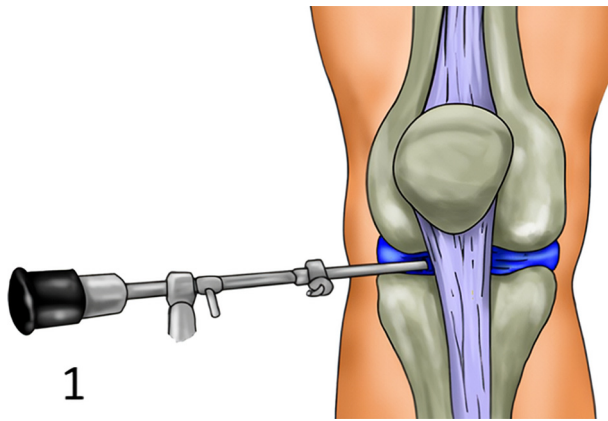


Fig 1. Illustration demonstrating the introduction of the arthroscopic device into the anterolateral portal in a right knee. Right knee is flexed on the side of the table. The camera is positioned at the lateral portal.

classified the lesions into 5 distinct subtypes, according to the anatomical location of the laceration and the layer(s) involved, and according to arthroscopic visibility. Type 1, defined as meniscocapsular lesions, present a more peripheral location in the synovial sheath and low mobility on probing. Type 2 are partial upper lesions, stable and with equally low mobility on probing. Type 3 are characterized by partial tearing of the inferior meniscus associated with tears of the meniscotibial ligament, resulting in high probing mobility. Type 4 involve complete tears in the red-red zone and high mobility on probing, and type 5 are identified by a double lesion.³

As the result of their posterior location, ramp lesions present high diagnostic difficulty and, therefore, are commonly overlooked during arthroscopy. Although magnetic resonance imaging (MRI) is touted as a reliable diagnostic modality for most medial meniscal pathologies, the diagnosis of ramp lesion has been reported to have a low sensitivity and specificity.⁵

Although arthroscopic evaluation is still considered the gold standard in the diagnosis of ramp tears, several techniques to explore the posteromedial compartment have been reported.⁶ This variety can be attributed to the relative proximity of the neurovascular bundle, a factor that requires precautions to avoid iatrogenic injuries during this procedure.¹

In light of this, the objective of this Technical Note is to describe a maneuver for the diagnosis of injuries to the posterior horn of the medial meniscus, especially during ACL reconstruction, using additional arthroscopic management through a standard portal with manual maneuvers. We call this technique the Recife maneuver.

Surgical Technique (With Video Illustration)

The patient is positioned supine, under anesthesia, a pneumatic tourniquet is placed at the top of the thigh,



Fig 2. Left knee with valgus stress with knee in 30° of flexion, with internal rotation and arthroscope inserted through the anterolateral portal.

and an epidural or spinal anesthetic block is performed. Then, a 30° arthroscope is introduced through the standard anterolateral portal, directly adjacent to the patellar tendon, as illustrated in [Figure 1](#).

Inspection of the posterior horn of the medial meniscus is performed with the insertion of the arthroscope between the medial femoral condyle and the posterior cruciate ligament, a maneuver called the transnotch view, according to the modified Gillquist visualization technique.⁷ From this stage onwards, we propose an additional management, which we call the Recife maneuver.

In the Recife maneuver, after accessing the posteromedial compartment, the arthroscope enters the space at the posteromedial edge of the condyle with the application of a valgus stress with the knee at 30° of flexion, shown in [Figure 2](#).

Internal rotation is applied to the tibia to promote posterior meniscocapsular visualization, causing subluxation of the posterior tibial plateau and posterior translation of the medial segment. At this time, two-thirds of peripheral lesions from the posterior segment to the middle segment can be visualized ([Video 1](#)). It should be noted that the transcondylar insertion of the arthroscope is not always easy, especially in knees with

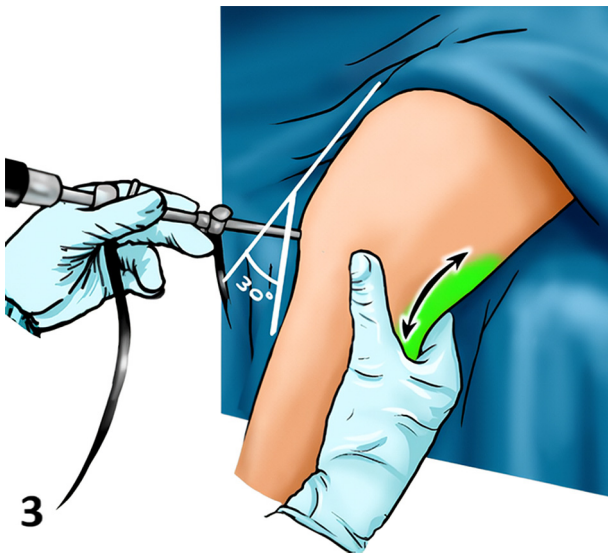


Fig 3. Left knee positioned at 30° of flexion, valgus stress and internal rotation, with palpation of the popliteal region and digital pressure on the joint interline.

intact cruciate ligaments and in patients with osteoarthritis.

The next step of the proposed maneuver consists of palpating the posteromedial knee at the popliteal region, with the knee positioned at 30° of flexion, with an applied valgus stress and internal rotation, with digital pressure on the joint interline (Fig 3).

The Recife maneuver allows a greater visualization of the posterior compartment of the medial meniscus, allowing the diagnostic evaluation of the integrity between the meniscus and the capsule, in a safer way, being able to identify a ramp tear, without the need to make a posteromedial portal (Fig 4).

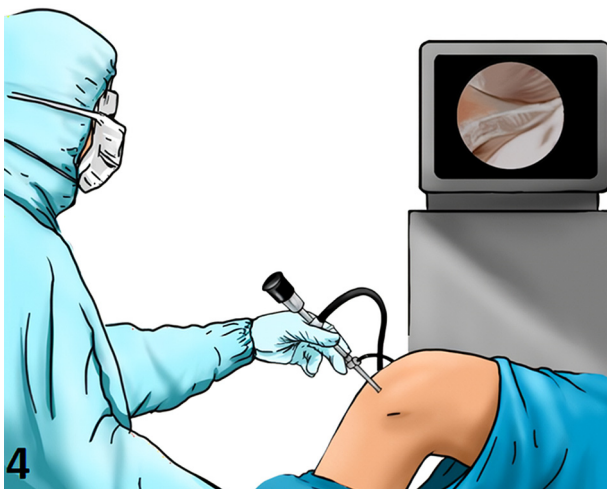


Fig 4. Illustration of the arthroscopic diagnosis of a lesion between the meniscus and the capsule on a left knee flexed.

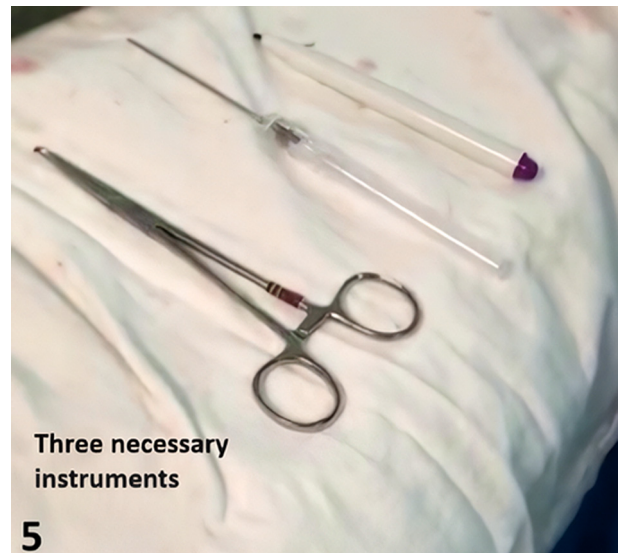


Fig 5. The three necessary instruments, Jelco no. 14, straight Kelly clamp, surgical pen.

If the creation of the posteromedial portal is necessary, we recommend the following steps to create it: (1) Select a 14g Jelco needle (Fig 5). (2) Position the needle above the skin at the level of the distal femur, with it parallel to the posteromedial edge of the tibial plateau (Fig 6A). (3) Hold it like a Kelly-type forceps, which will serve as a needle stopper. In this way, we limit the size of the needle that will enter the skin, preventing it from reaching the midline and thus avoiding possible iatrogenic injuries in the neurovascular bundle (Fig 6 A and B). (4) Mark the exact position of the medial epicondyle by palpation (Fig 7 A and B). (5) Measure with your thumb a distal size distance in the direction of the longitudinal axis of the tibia and mark this new point (Fig 7 C and D). (6) Measure again with a thumb a new distance proximally in the direction of the longitudinal axis of the femur. In this way, we define the needle insertion point (Fig 7 D and E). (7) We introduce the needle by imagining the posterior edge of the medial tibial plateau, with the needle being introduced, parallel, proximal, and posterior to the posterior border of the medial tibial plateau. In these steps, the Kelly clamp is used as a limiter (Fig 8 A and B). (8) At this time, with the arthroscope positioned in the intranotch view using the modified Gillquist technique, we visualize the needle penetrating the posteromedial capsule (Fig 8C). If the positioning of the portal is adequate, we performed the same with a no. 13 scalpel blade, creating a posteromedial portal.

Discussion

The Recife maneuver is a safe and easy-to-apply technique. Palpation of the popliteal region and digital pressure on the joint interline allow the identification of

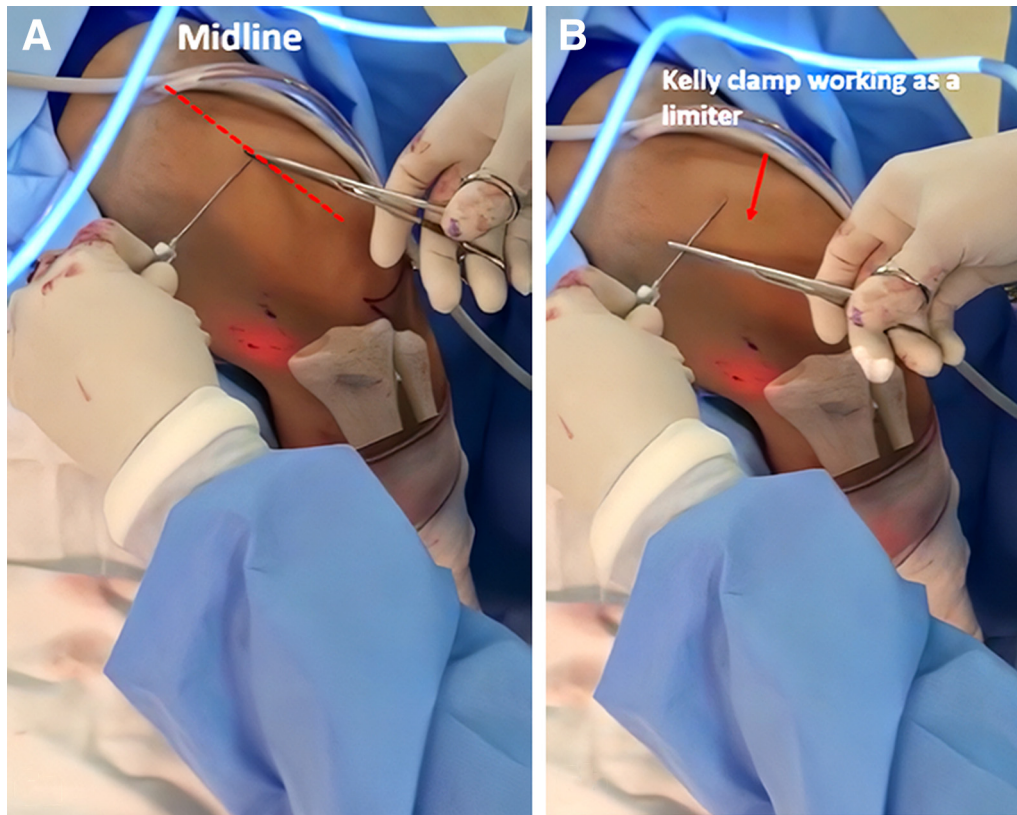


Fig 6. (A) On the left knee, position the Jelco above the skin at the level of the distal femur, with it parallel to the posteromedial edge of the tibial plateau. (B) Hold it like a Kelly-type forceps, which will serve as a needle stopper, at a slightly smaller distance between the midline and the skin.

a ramp tear under direct visualization without the need to make a posteromedial portal ([Video 1](#)). This technique possibly reduces surgical time and trauma to surrounding structures because a posteromedial portal is associated with an increased surgical time and increased risk for damage to adjacent neurovascular structures.² The lack of visualization of lesions with this

maneuver, associated with meniscal stability by palpation with a probe via the anteromedial portal, allows for a better greater confidence to evaluate whether a posteromedial portal is necessary to thoroughly evaluate for a medial meniscus ramp tear.

Biomechanical studies have shown that meniscus ramp tears increase anterior translation, internal and

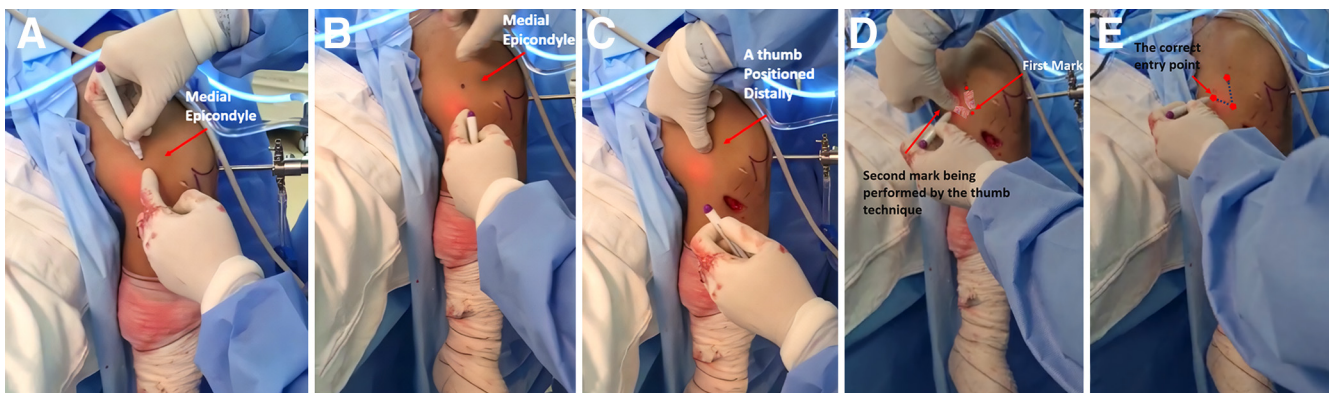


Fig 7. (A and B) With the left knee flexed, we identify the exact position of the medial femoral epicondyle by palpation (red arrow, C) Measure with a thumb a distal size distance in the direction of the longitudinal axis of the tibia and mark this new point. (D and E) Measure again with a thumb a new distance proximally in the direction of the longitudinal axis of the femur. In this way, we define the needle insertion point.

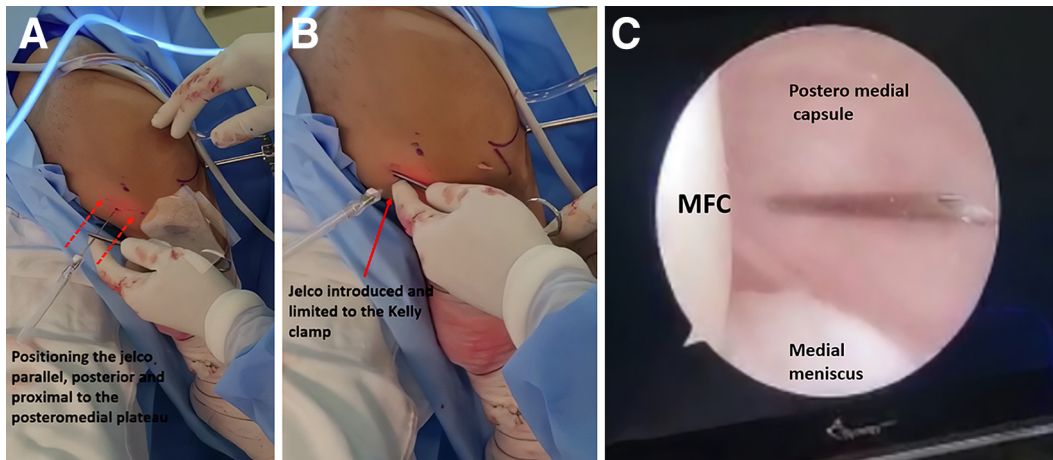


Fig 8. (A-C) With the left knee flexed, we introduced the needle by imagining the posterior edge of the medial tibial plateau. With the needle being introduced, parallel, proximal and posterior to the posterior border of the medial tibial plateau. In these steps, the Kelly clamp is used as a limiter, avoiding neurovascular injuries. (MFC, medial femoral condyle.)

external rotation, and pivot shift in models with ACL injuries. The same study also observed that ACL reconstruction associated with meniscal repair restored anterior tibial translation and the pivot shift (at angles of flexion up to 30°), demonstrating the importance of repairing ramp tears in patients with ACL injuries.⁸

Currently, it is routinely recommended to use the modified Gillquist view to assess the integrity of the posterior meniscocapsular junction, especially if any meniscal instability is identified.⁹ However, it is recognized that the arthroscopic approach via the anterolateral portal results in approximately 47% of the meniscal border not being visualized.¹⁰

DePhillipo et al.¹¹ evaluated the incidence of the lesion on a ramp diagnosed arthroscopically correlated with the preoperative diagnosis of MRI. The authors retrospectively evaluated a series of cases of 301 patients who underwent ACL reconstruction between 2010 and 2016; 17% of them had this lesion and, of these, MRI diagnosed the tear in only 46% of the cases. However, an MRI finding that was prevalent in 76% of these patients was a posteromedial tibial bone bruise.¹¹ Recently, Beel et al.¹² performed a similar study, observing a high correlation

with a posteromedial tibial bone bruise in ACL-injured patients. A ramp lesion was 6.1 times more likely to be found when this bone bruise was observed on MRI.¹²

Despite the imminent risk of injuries to the meniscocapsular junction and peripheral posterior horn resulting in increased stress on the reconstructed ACL, the peripheral meniscocapsular junction is a highly vascularized region, which should result in a high healing capacity.² Therefore, a few authors have suggested that not all ramp lesions require treatment. Recent studies demonstrate that stable ramp tears have the same clinical results as repaired unstable injuries.¹³ Liu et al.¹⁴ performed a prospective, randomized controlled study in which the authors compared patients with stable (n = 33) versus unstable (n = 40) ramp lesions. The authors analyzed the stability of the lesion through probe palpation of the medial meniscus via the anteromedial portal and observed whether there was mobility of the meniscus; if there was no mobility and the lesion was smaller than 1.5 cm, the authors performed microperforations on the meniscal edge to stimulate healing in place. In the group in which the lesion was unstable, the authors repaired the tear with

Table 1. Advantages and Disadvantages of the Recife Maneuver

Advantages	Disadvantages
Use of conventional portals for arthroscope entry	Failure to identify partial tear of the inferior meniscus associated with tears of the meniscotibial ligament (type 3 by Thauat et al.) ³
Procedure performed in just one step, without changing portals	Failure to approach a ramp tear can result in changes in knee biomechanics
No need to create the posteromedial portal	Failure to diagnose a ramp lesion may result in continued symptoms and reoperation
Good visualization of the posteromedial compartment to diagnose ramp injuries	
A low-cost technique, easy to perform, with possibly shorter surgical times	

2 to 3 sutures. The authors found similar clinical and functional results between the 2 groups analyzed, extending the debate between the need for surgical versus conservative treatment in ramp lesions.¹⁴

Despite the aforementioned evidence showing that stable ramp tears, without the association of repair, can evolve with good clinical results in the short term,^{13,14} a recent study published at the end of 2022 showed that 25% of the considerable stable ramp lesions that were not repaired evolved into bucket-handle injuries in an average follow-up of 20 years of evolution.¹⁵ With these even appearing to be stable tears, the repair of ramp lesions also seems beneficial in the scenario of considerable stable injuries.

Although diagnosing ramp lesions can be challenging, especially using traditional diagnostic tools, risk factors such as the presence of posteromedial tibial bone bruises on MRI, age younger than 30 years, and complete ACL tears provide strong evidence for the presence of medial meniscal ramp tears.¹⁶ In view of this, if necessary to augment arthroscopic confirmation, the authors of this Technical Note recommend the additional management of the Recife maneuver to visualize the posteromedial compartment. The advantages and disadvantages of the Recife maneuver are shown in [Table 1](#).

Probing the posterior horn of the medial meniscus using the Recife maneuver makes it possible to identify a greater number of ramp lesions that could potentially go undiagnosed with the use of classic maneuvers alone. This additional maneuver allows for better arthroscopic visualization, and it is easier and safer to perform after a sufficient debridement before repair. In conclusion, we recommend that the Recife maneuver should be performed to identify a ramp tear in routine ACL reconstruction.

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