



Anterior-medial collateral ligament portal : easy access to the torn posteromedial horn of the medial meniscus

Guman DUAN¹, Yingzhen NIU², Jinghui NIU², Fei WANG², Yao LI², Pengkai CAO²

From the Department of Joint Surgery, Third Hospital of Hebei Medical University, Shijiazhuang, China

The posteromedial horn of the medial meniscus is prone to injury, and repair of a tear in this portion of the medial meniscus is especially challenging for the arthroscopist. We present a novel technique that allows good management of the posterior horn of the medial meniscus, even in patients with tight medial compartments. This technique uses two standard portals (the anterolateral portal and the anteromedial portal) to conduct arthroscopic examination, and uses a third portal as the workhorse portal to manage the posterior region so that the posterior horn tear can be easily removed. This new third portal is named the anterior-medial collateral ligament portal, and is positioned anterior to the anterior rim of the medial collateral ligament. This three-portal technique decreases the difficulty associated with management of the posteromedial region in knees with tight medial compartments.

Keywords : anterior-MCL portal ; meniscal tear ; meniscectomy ; portal ; arthroscopy

INTRODUCTION

The menisci play an important role in maintaining the normal function of the human knee, and the incidence of meniscal tears is high (4). Compared with other meniscal regions, tears are most frequently located in the posteromedial horn of the medial meniscus ;this area is also

more likely to become degenerative or injured (8). Access to the posteromedial horn region can be challenging, especially in patients with tight medial compartments (1,6,8). Surgical repair of a posterior horn tear in a tight medial compartment is difficult, and resection of the lesion can be challenging even for an experienced arthroscopist. Thick arthroscopic instruments are unsuitable in such knees, as they cannot be inserted in a tight medial compartment.

We present a technique using a novel accessory portal placed anterior to the anterior rim of the medial collateral ligament (MCL), which we have named the anterior-MCL portal. Use of the anterior-MCL portal enables good management of the posterior horn of the medial meniscus in patients

- Guman Duan,
- Yingzhen Niu,
- Jinghui Niu,
- Fei Wang,
- Yao Li,
- Pengkai Cao

¹Department of Orthopaedics, Beijing Tsinghua Changgung Hospital, School of Clinical Medicine, Tsinghua University, Beijing, China.

²Department of Joint Surgery, Third Hospital of Hebei Medical University, Shijiazhuang, China

Correspondence: Fei Wang, Department of Joint Surgery, Third Hospital of Hebei Medical University, Shijiazhuang, China.

E-mail : doctorwf@yeah.net

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Competing interests : the authors declare that they have no competing interests.

with tight medial compartments, and enables easier debridement of a torn posteromedial horn compared with the standard technique.

Surgical technique

Once a tear in the posterior horn of the medial meniscus is confirmed with preoperative MRI and routine knee arthroscopic examination, the knee is placed into a flexed position of 90°. The longitudinal axis of the medial femoral condyle and the joint line are then located. The intersection point of these two lines is the surface location of the anterior-MCL portal (Fig 1, Fig 3).

A lumbar puncture needle is prepared for later use if pathology of the posterior horn of the medial meniscus is found in patients with a narrow medial joint space. If it is still difficult for arthroscopic instruments to reach the targeted area after exerting strong valgus force, the anterior-MCL portal may be needed.

The stylet from an 18-gauge spinal needle is inserted into the joint capsule at an optimum orientation under arthroscopic visualisation. The entry point should approach the upper surface of the medial meniscus as closely as possible. The hand-held stylet is used to orient the incision so that the direction of the portal allows resection of the posteromedial horn tear under minimal tension and makes the tear more easily reachable.

A 4-mm vertical skin incision is made along the direction of the stylet, and is then enlarged using a straight clamp. This new anterior-MCL portal can be used as a manipulating portal while minimising iatrogenic chondral damage to the knee.

PATIENTS

Between January 2015 and May 2015, we used this anterior-MCL portal technique to treat 28 patients with posteromedial horn tear (28 knees, 12 males, 16 females; mean age 44 years, range 39-61 years). Four of these patients had severe joint space narrowing. In these four patients, sufficient working space was created by moving the entry (the accessory portal) several millimetres posteriorly through the creation of a special anterior-MCL portal (sA-

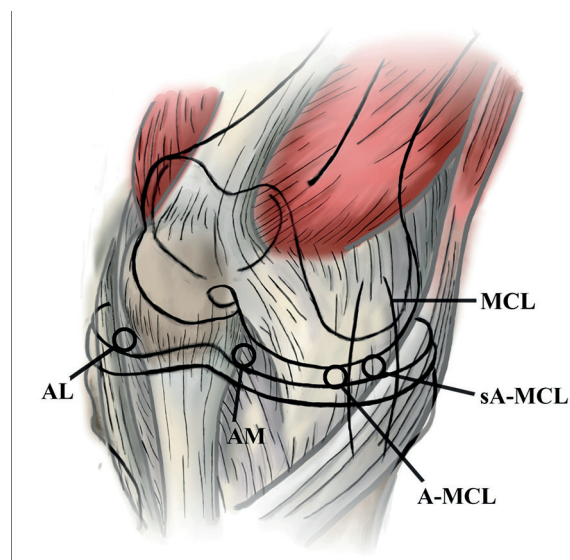


Figure 1. — Illustration of the surface projection of the three portals. Three portals are indicated on the illustration, including the anterolateral (AL) portal, the anteromedial (AM) portal, and the anterior-medial collateral ligament (A-MCL) portal. The A-MCL portal is close to the anterior rim, and the special A-MCL (sA-MCL) portal is in the middle of the MCL.

MCL) located in the middle of the MCL (Fig 1, Fig 3). Although there are some potential complications associated with the sA-MCL, including injury and laxity of the MCL, they appear to be effectively reduced by the creation of a longitudinal incision. In our experience, the longitudinal incision caused minimal disruption to the supporting ligaments of the knee joint. No surgically-related complications occurred in any of the 28 cases.

DISCUSSION

Accessing the posterior horn of the medial meniscus in patients with tight medial compartments can be very difficult, and attempts to treat these pathologies using the standard technique can cause iatrogenic chondral damage (10) or other damage to supporting structures while applying excessive valgus force to the knee intraoperatively. In patients with a narrow medial joint space, resection of the medial posterior horn tear often requires great effort to introduce the instruments. The tighter the knee is, the greater the degree of difficulty, as the femoral condyle can obstruct the instruments from reaching the target area (1,2,6).

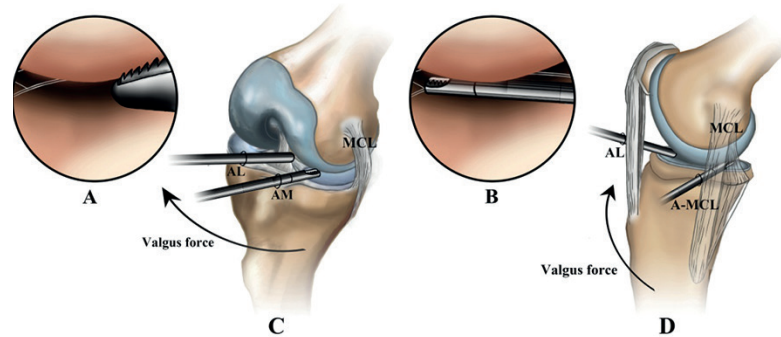


Figure 2. — Schematic drawings showing the relationship between the three portals and the posteromedial horn tear. While exerting valgus force, an arthroscopic instrument is introduced through the anteromedial (AM) portal or the anterior-medial collateral ligament (A-MCL) portal. An instrument introduced through the AM portal seen A) via arthroscopic view, and C) via the anteromedial aspect of the knee joint. An instrument introduced through the A-MCL portal seen B) via arthroscopic view, and D) via the medial aspect of the knee joint. Use of the A-MCL portal avoids obstruction by the femoral condyle.

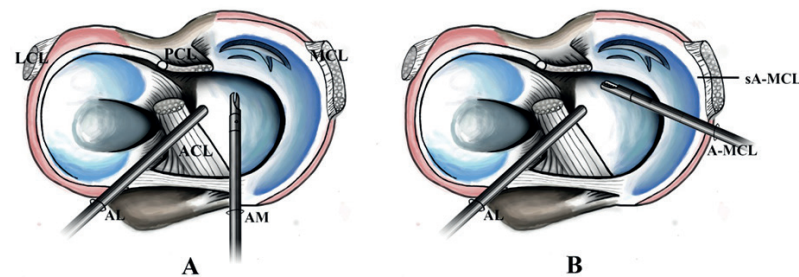


Figure 3. — Schematic axial drawing showing visualisation from the top of the meniscus. Illustration shows the arthroscopic treatment of posterior horn tear in the posteromedial area. Debridement using A) the anteromedial (AM) portal is more difficult than using B) the new anterior-medial collateral ligament (A-MCL) portal as the manipulating portal. It is easier to achieve a smooth sloped contour with the A-MCL portal than with the standard technique. In cases with a severely narrowed medial joint space, the special A-MCL (sA-MCL) portal is a better choice. ACL : anterior cruciate ligament, PCL : posterior cruciate ligament, LCL : lateral collateral ligament.

We have presented a novel technique for managing tear of the posteromedial horn that ensures an adequate approach to the posterior horn of the medial meniscus and obtains sufficient working space. We have successfully used this technique without significant complications in more than 100 patients with tight medial compartments. The advantages of this novel technique are discussed below.

This novel arthroscopic technique enables easier access to the posteromedial region of the medial meniscus, as the accessory anterior-MCL portal is

located near the target area (Fig 3B). In addition, this technique provides better surgical accuracy, as the anterior-MCL portal decreases obstruction caused by the femoral condyle. The chondral surfaces and/or soft tissues are rarely injured, as the arthroscopic shaver or other instruments are not likely to contact them (Fig 2C, 2D). Hence, using this technique for arthroscopic partial meniscectomy may reduce the likelihood of damaging the articular surface of the medial femoral condyle during the operative period.

The standard technique introduces the arthroscopic shaver into the joint capsule perpendicular to the

contour of the meniscus when approaching the posteromedial horn (Fig 3A). In contrast, our technique allows the arthroscopic shaver to be introduced in a tangential direction through the anterior-MCL portal (Fig 3B). Hence, the anterior-MCL portal is more suitable for obtaining a smooth contour than the standard technique; removal of the meniscus and its thickness are easier to control, and a smooth sloped contour is more easily obtained. Introducing instruments in a tangential direction can also decrease the possibility of neurovascular complications, especially around the popliteal area.

The anterior-MCL technique avoids the need for application of a large degree of valgus force, which prevents injury of the periarticular ligament. MCL pie-crusting release (2,10) and under-meniscal portal (6) have been proposed to improve access to tight medial compartments; although these previous techniques are also helpful in tight knees, we consider that our anterior-MCL technique causes less disruption to the supporting ligaments. We consider that the normal anterior-MCL portal (not including the sA-MCL portal) decreases the risk of injury to the periarticular ligament compared with the MCL pie-crusting (PC) release technique, although the MCL PC technique is reportedly safe and does not affect knee stability (2,3,10). When the patients' condition necessitates disruption of the periarticular ligament, the anterior-MCL portal (including the sA-MCL portal) and the PC technique should be considered, either separately or together. In future, we plan to investigate suture repair of the meniscus with the anterior-MCL portal alone or in combination with the PC technique. Posterior root tear of the medial meniscus requires suture repair, as the medial meniscus is crucial for many aspects of knee function and has great clinical importance (7,9).

The purpose of this article was to describe a technique that uses a readily available spinal needle and an accessory portal to resect posteromedial horn tears quickly and easily. In particular, this

technique decreases the difficulty associated with management of the posteromedial region in knees with tight medial compartments. Introducing the anterior-MCL portal when necessary is a convenient technique for arthroscopic meniscectomy of the posteromedial horn of the medial meniscus.

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