

Technical Note

The Surgical Approach to Lateral Meniscal Repair

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Summary: Peripheral lateral meniscal tears are amenable to meniscal repair. Rasp abrasion and fibrin clot deposition along with vascular access channels are advances that, one hopes will increase healing rates of meniscal repairs. A basic principle that is not emphasized in the literature is how to perform the surgical approach to the lateral meniscus for safe placement of a meniscal repair retractor. This article reviews the anatomical planes of which the surgeon must be cognizant to facilitate retractor placement. **Key Words:** Lateral meniscal repair—Surgery.

Meniscal repair is an acceptable, attractive alternative to subtotal or complete meniscectomy. Increasingly, authors are reporting longterm successful results of meniscal repair (1-25). Nevertheless, neurovascular injury has been a reported complication of meniscal repair, resulting in the popularization of accessory posteromedial or posterolateral incisions for placement of protective retractors and suture retrieval (26). A variety of commercial available retractors are currently available, although sterile spoons and disassembled vaginal speculums have also been employed (27). This article reviews posterolateral knee anatomy and describes the author's technique for placement of a meniscal repair retractor when repairing the lateral meniscus.

ANATOMY

The anatomy of the posterolateral corner of the knee (Fig. 1) has been reviewed by Seebacher et al. (28). They identified, in 35 cadaveric dissections, three discrete layers. Layer I, the most superficial

layer, comprises two parts: the ITB band and its anterior expansion and the superficial portion of the biceps with its posterior expansion. The common peroneal nerve lying posteriorly to the biceps tendon is deep to Layer I. Layer II is an incomplete layer posteriorly with fiber attachments to the lateral intermuscular septum, fabella (when present), insertions of the posterolateral capsular reinforcements, the lateral head of the gastrocnemius on the femoral condyle, and the patellomeniscal ligament. The deepest layer, Layer III, comprises the joint capsule as well as the arcuate and fabellofibular ligaments. Seebacher et al. (28) noted three anatomical variations: reinforcement of the capsule by the arcuate ligament (13%), reinforcement of the capsule by the fabellofibular ligament (20%), and combined reinforcement of the capsule by both the arcuate and fabellofibular ligaments. These authors noted that if a fabella was present, the fabellofibular ligament was large and no arcuate ligament was present. If a fabella was not noted, only the arcuate ligament was present.

The anatomical relationship between the popliteal artery and tibial nerve within the popliteal space must always be kept in mind when performing meniscal repairs of the posterior one third of either meniscus (Fig. 1). The neurovascular bundle courses between the popliteus muscle and the heads of the gastrocnemius. The common peroneal nerve lies posterior to the common tendon of the biceps

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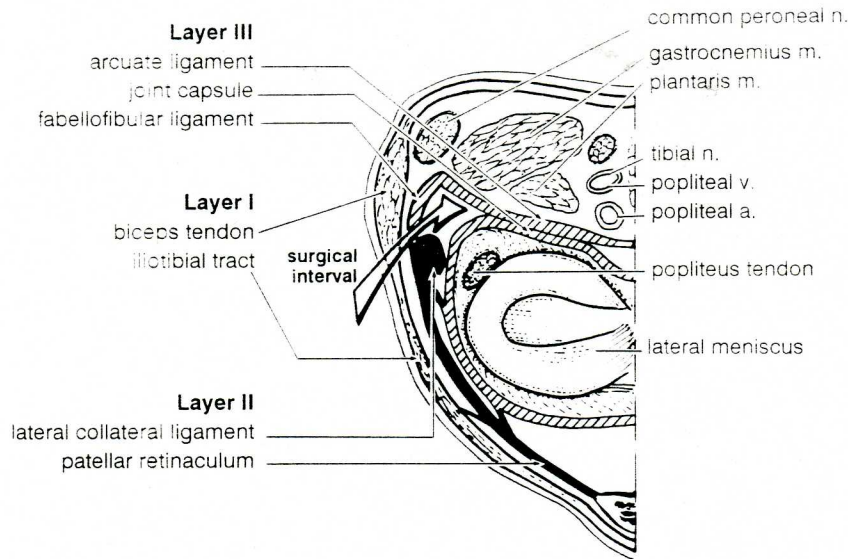


FIG. 1. The three-layered concept of the posterolateral corner of the knee is depicted in this diagram. Laterally, Layer I is comprised of the iliotibial band and the enveloping superficial fascia of the biceps. Layer II laterally includes the vastus lateralis and its expansions, and the patellofemoral and patellomeniscal ligaments. Layer III is comprised of superficial and deep laminae, and includes the posterior capsule, envelopes the lateral collateral ligament, and ends at the variably sized fabellofibular ligament. The inferior geniculate artery courses within the interval between the superficial and deep laminae of Layer III. This diagram depicts the cross-sectional anatomy of the knee with reference to the neurovascular structures. Note the relationship between the neurovascular bundle, the popliteus, and the heads of the gastrocnemius. Posterolaterally, the common peroneal nerve is enveloped within Layer I posterior to the biceps tendon. © Pat Thomas and Bernard Bach.

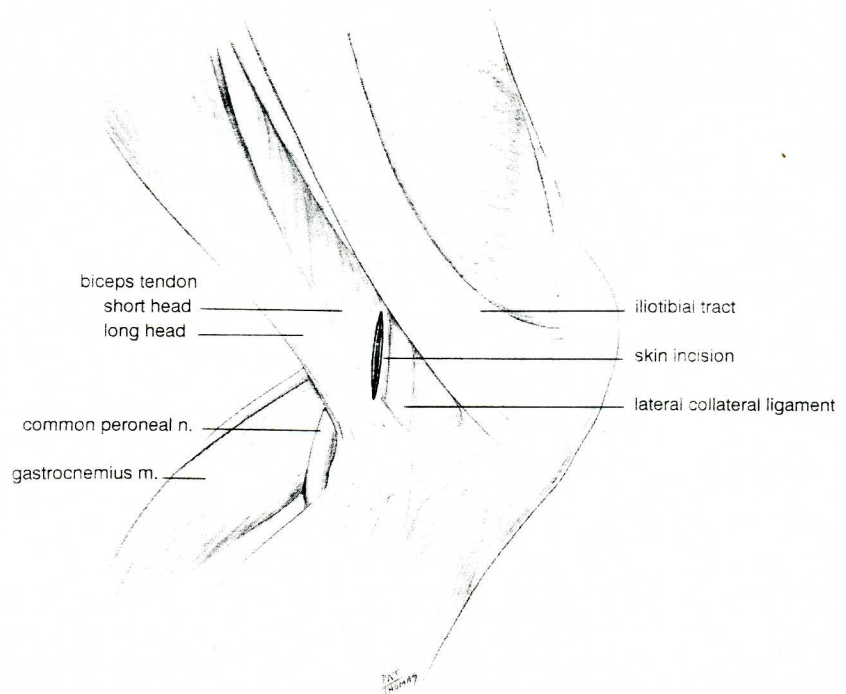
femoris and distally winds around the head of the fibula. A retractor placed anterior to the short head of the biceps will protect the common peroneal nerve, but does not necessarily protect the neurovascular bundle. When placed anterior to the lateral head of the gastrocnemius, both the neurovascular bundle and common peroneal nerve are protected. These observations must be recollected when ap-

proaching the posterolateral corner surgically for lateral meniscal repair.

POSTEROLATERAL SURGICAL APPROACH

After arthroscopic verification of a repairable lateral meniscal tear has been confirmed, the arthroscope is transferred to the inferomedial portal and

FIG. 2. A 1.5 in incision is used to expose the anterior edge of the biceps femoris tendon. The incision is placed posterior and parallel to the lateral collateral ligament at the level of the joint line. © Pat Thomas and Bernard Bach.



an arthroscopic probe is inserted into the inferolateral portal. The blunt end of the probe is placed along the lateral joint line and palpated through the subcutaneous tissues posterolaterally in the 10:00 region. This assists the surgeon in placement of the posterolateral incision for repair. It reduces the possibility of misplacement of the surgical incision, as the tendency is to err proximally. If this incision is properly placed, all meniscal repair needles should exit within the confines of the meniscal repair retractor. A 1.5 in vertically-oriented incision is made parallel and posterior to the lateral collateral ligament with the knee flexed 30–45° (Fig. 2). The dermis is infiltrated with 1:300,000 epinephrine for hemostatic purposes while the tourniquet is deflated. Sharp dissection is extended down to the fascia with exposure further facilitated by the use of small retractors (Senn or Ragnell). At this point, the fibular head is palpated for orientation, and the most anterior edge of the biceps femoris tendon inserting onto the fibular head is noted. The fascia directly anterior to the edge of the biceps femoris is incised in the direction of the tendon (Fig. 3). The muscular fibers of the short head of the biceps are thus exposed and retracted posteriorly (Fig. 4). The tendinous fibers of the lateral head of gastrocnemius may be visualized. The thin fascia lateral to the tendon is incised creating an entrance that allows placement of the surgeon's finger around the posterolateral corner of the knee in the interval between the lateral

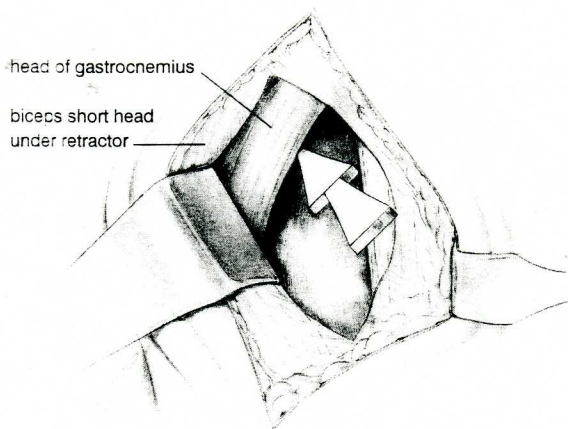


FIG. 4. The short head of the biceps is retracted posteriorly by exposing the lateral head of the gastrocnemius. The tendinous portion of the lateral head is identified and palpated. The surgical interval is anterior to the lateral head of the gastrocnemius (arrow). © Pat Thomas and Bernard Bach.

head of the gastrocnemius and the capsule (Fig. 5). Dorsiflexion of the foot with the leg in extension will result in a discernible tightening of this space, and confirmation of this sensation will reassure the surgeon of appropriate surgical exposure. At this point, a meniscal repair retractor may be placed (Fig. 6), the arthroscope reinserted, and the meniscal repair cannulas positioned. Placement of sutures (via an inside-out or outside-in suture placement

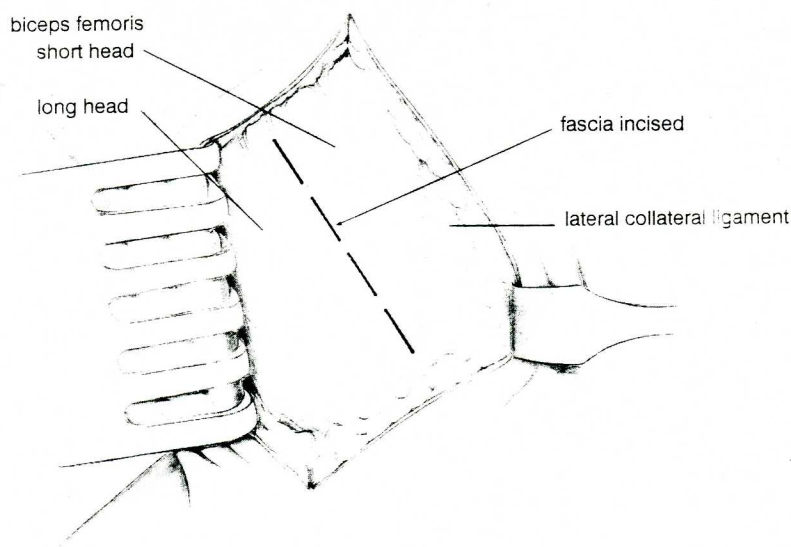


FIG. 3. This magnified schematic diagram depicts that the fascial incision is made obliquely to the skin incision and anterior to the biceps femoris tendon. © Pat Thomas and Bernard Bach.

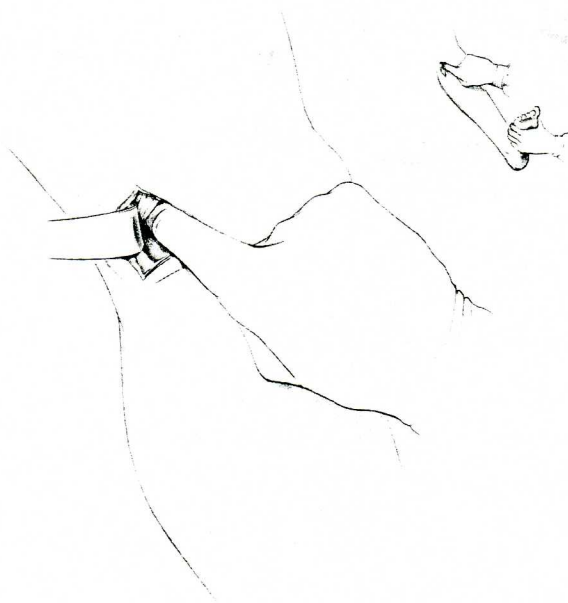


FIG. 5. A finger is placed in the interval between the lateral head of the gastrocnemius and capsule. Dorsiflexion of the foot with the leg in extension will result in tightening of this interval, thus confirming appropriate surgical placement of a retractor. © Pat Thomas and Bernard Bach.

technique) is then performed. If these steps as outlined are followed, it is unlikely that the needles will exit inadvertently above or below the retractor.

DISCUSSION

Several studies have demonstrated the vascularity and healing potential of the peripheral one-third

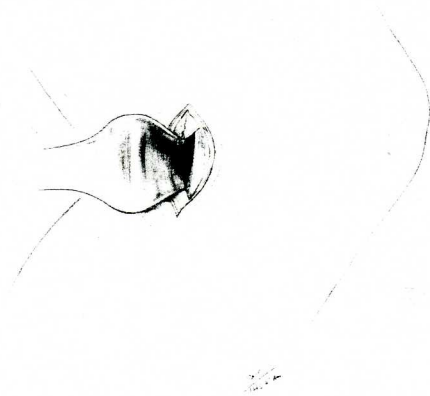


FIG. 6. A meniscal repair retractor, spoon, or disassembled vaginal retractor is placed in the interval between the lateral head of the gastrocnemius and capsule, and the meniscal repair is then initiated. © Pat Thomas and Bernard Bach.

of the lateral and medial menisci (29-34). Inside-out and outside-in meniscal repair techniques have been used to surgically repair menisci. Clinical follow-up reports have noted excellent healing rates by subjective evaluation, "second-look" arthroscopy, and imaging studies. Synovial fringe preparation, placement of vascular access channels, and fibrin clot insertion are important components of these procedures. Interestingly, little attention is directed toward the surgical approach. Improper surgical exposure will result in the possibility of misplaced needles or below the retractor and potential

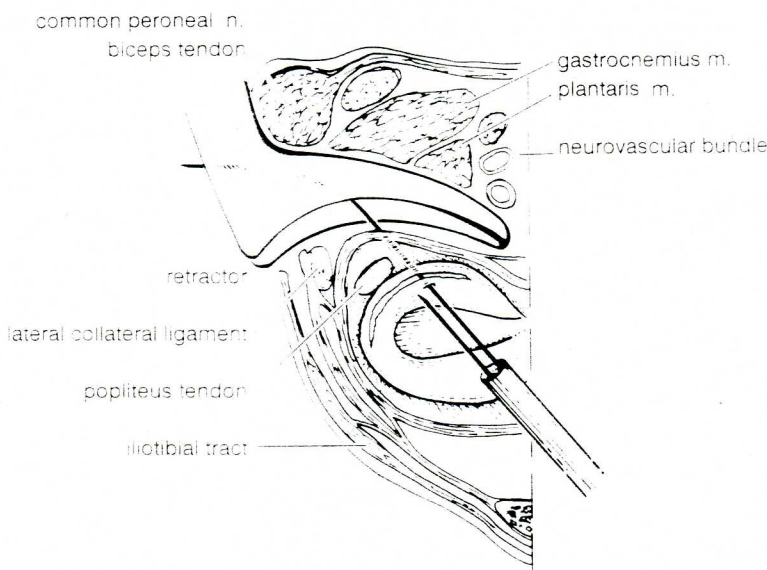


FIG. 7. Cross-sectional diagram depicts placement of a meniscal repair retractor in the interval anterior to the lateral head of the gastrocnemius, thus protecting the common peroneal nerve and neurovascular bundle.

