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Review Article

Review: Medial collateral ligament injuries

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ABSTRACT

The medial collateral ligament (MCL) is a major stabilizer of the knee joint. It is the most common ligament injured in the knee, particularly in athletes, and has been reported to be torn in 7.9% of all knee injuries.² The MCL has a complex, layered anatomy with multiple insertions and functions. Minor trauma can cause tearing of the superficial portion whereas higher energy mechanisms can disrupt both the deep and superficial layers. History and physical are often adequate, but the gold standard for diagnosis is MRI. Lesser injuries to the MCL can often be treated conservatively with early rehabilitation, but more significant tears often necessitate surgery. A thorough understanding of the MCL and associated injuries is essential for proper diagnosis and treatment.

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1. Introduction

The medial collateral ligament is one of four major ligaments that support the knee. The MCL is the prime static stabilizer of the medial side of the knee joint, and is important for providing support against valgus stress, rotational forces, and anterior translational forces on the tibia. A discussion on the topic of knee injuries, specifically MCL injuries, is important because medial collateral ligament injuries are the most common ligamentous injury to the knee, with ligament injuries accounting for up to 40% of all knee injuries.¹ It is also likely that many low grade MCL injuries go unreported. In a 10-year observational study in athletes, it was found that MCL tears accounted for 7.9% of all the knee injuries.² MCL injuries occur commonly in athletes, either through trauma or sudden changes in direction or speed. The valgus stress or rotational forces associated with these events can either strain or tear the ligament, as well as affect other structures of the knee such as the ACL, PCL, and menisci.

2. Anatomy

The medial collateral ligament is part of the capsuloligamentous complex of the medial knee. This region of the knee is divided

into three layers: the superficial layer, middle layer, and deep layer. The superficial layer is comprised sartorius and the investing fascia which forms part of the patellar retinaculum. The middle layer includes semimembranosus, the superficial MCL, the medial patellofemoral ligament, and the posterior oblique ligament. The deep layer includes the deep MCL, the posterior medial capsule, and the meniscotibial ligament.³

The MCL, an 8 to 10 cm ligament in length, is the largest structure found on the medial aspect of the knee joint (Fig. 1). It is comprised of both a superficial and deep component. The superficial MCL, also known as the tibial collateral ligament, is composed of fibers that originate proximally from the posterior aspect of the medial femoral epicondyle and attach distally to the medial condyle of the tibia 5–7 cm below the joint line near the level of, but posterior to, the pes anserinus insertion (Figs. 2 and 3).^{3,4} It is considered the primary static stabilizer to valgus stress of the knee. There is some controversy as to whether the posterior oblique ligament, which is a portion of the semimembranosus that has capsular attachments to the medial knee, is a part of the superficial medial collateral ligament, or if it is a distinct structure. This ligament resides on the posterior aspect of the superficial portion of the MCL and provides additional static and dynamic stabilization for the medial aspect of the knee.⁵ The deep portion of the MCL, also known as the mid-third capsular ligament, is a major secondary restraint to anterior translation of the tibia, and also provides minor static stabilization against valgus stress. It can be thought of as a thickening of the medial joint capsule, and is divided into meniscofemoral (ligaments of Humphrey and Wrisberg) and meniscotibial (coronary ligament) components.⁴ The

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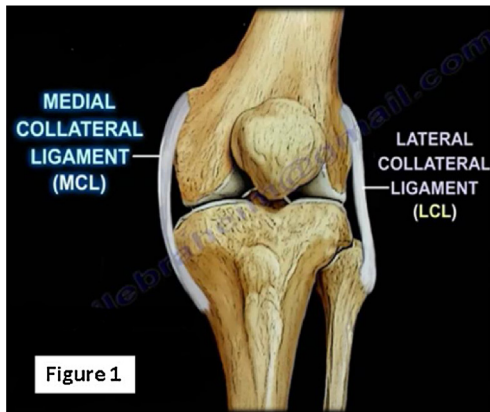


Fig. 1. Anterior view of the left knee with the medial collateral ligament (MCL) and Lateral Collateral ligament (LCL) highlighted to demonstrate their relationship to the osseous structures of the knee.

meniscotibial ligament is longer than the meniscotibial ligament, with its origin being just distal to that of the superficial portion of the MCL, and inserting into the medial meniscus. The shorter and thicker meniscotibial ligament originates from the medial meniscus and attaches to the medial tibial plateau.

3. Clinical presentation/grades/classification/associated conditions

Injury to the MCL usually presents as an acute trauma with a high number of injuries acquired as a result of trauma during sport. MCL injuries are often the result of a valgus stress applied to a stationary knee, which puts enormous strain on the ligament. The lateral aspect of the knee is usually the most exposed during sport, for this reason, MCL injuries are the most common ligamentous injury of the knee. Minor trauma may result in tearing of the

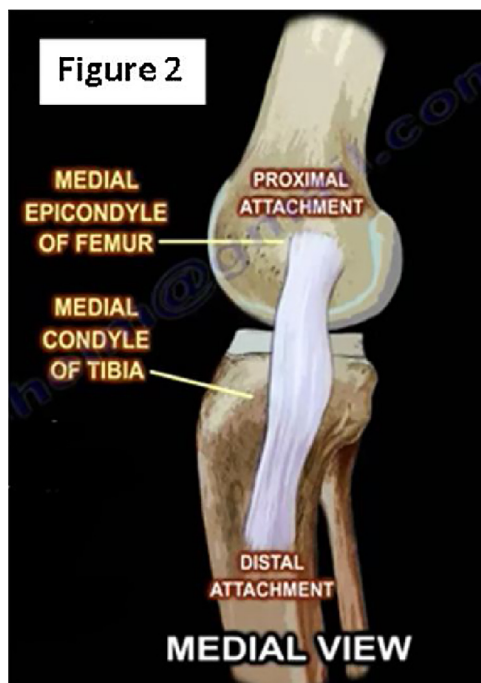


Fig. 2. Represents a medial view of the right knee highlighting the proximal and distal attachments of the MCL on the femur and tibia respectively.



Fig. 3. Medial view of the right knee displaying the muscular attachments of several muscles in relation to the insertion of the distal MCL.

superficial portion (Fig. 5) of the MCL, while more severe injuries can result in complete tears of both the deep and superficial portions (Fig. 4). The patient often describes a sensation of the knee “giving out” at the moment of injury, followed by a rapid filling of the joint with blood, which becomes acutely painful.⁶ Pain to palpation is usually worse over the course of the MCL and most often near its proximal insertion site. When complete tear is suspected, sedation may be needed to fully examine the injured knee.

Clinical exam of the knee in patients suspected of having an MCL tear should be done within 20–30 min if possible to avoid complications related to the injury such as pain, swelling, and muscle spasm, using the contralateral leg as a control. In order to isolate the MCL, the knee should be flexed to 30°. This can be accomplished by raising the leg manually, or in larger patients, the thigh can rest on the table while the lower leg hangs over the side of table with the foot and ankle supported. The examiner will then apply a valgus force to the knee and even a small 5–8 mm medial joint opening is indicative of MCL injury.⁷ In addition to testing the MCL, it is important to test for associated injuries including: ACL, PCL, or medial meniscus (Figs. 6 and 7). Combined injuries to the ACL and MCL are the most common multi-ligament knee injuries in the general population and are usually associated with grade 3 MCL tears.⁸ Partial or complete tears in the ligament increases the load on the ACL with 30° of flexion, valgus load, or internal rotational torque.⁹

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