NCPD
1.5 ANCC Contact Hours

Medial Collateral Ligament Tear

Patrick Graham

Introduction

One of the primary ligamentous structures of the knee, the medial collateral ligament (MCL), which extends from the distal femur to proximal tibia, comprises superficial (sMCL) and deep (dMCL) bundles. Anatomy of this complex ligament, as well as sites of bony attachment, has been detailed extensively in the literature. Commonly described in conjunction with the posterior oblique ligament (POL), the MCL's primary function is stabilizing for valgus stress as well as external tibial rotation throughout the arc of motion. It is the most frequently injured of the knee ligaments, accounting for approximately 0.24 per 1,000 cases a year, comprising a majority of high school athletic knee injuries (Athwal et al., 2020; Encinas-Ullán & Rodríguez-Merchán, 2018; LaPrade et al., 2007; Ren et al., 2017; Wijdicks et al., 2010).

Initial evaluation for injury to the MCL includes inspection, palpation of bony landmarks, and testing valgus stress in extension and 20–30° of flexion along with tibial rotation in 80–90° of flexion. Tenderness and laxity are clinically significant findings for the diagnosis of MCL injuries. The majority of MCL tears, including complete/Grade III injuries, can be treated successfully with conservative management. However, some patients experience significant symptoms of joint laxity, resultant valgus thrust and deformity, pain, and swelling, which may require operative intervention for stabilization and prevention of secondary damage to intra-articular structures such as the anterior cruciate ligament (ACL) and lateral compartment cartilage (Athwal et al., 2020; Encinas-Ullán & Rodríguez-Merchán, 2018; LaPrade et al., 2007; Laprade & Wijdicks, 2012; Ren et al., 2017; Wijdicks et al., 2010).

Case Presentation

A 64-year-old woman presented to the outpatient orthopaedic clinic 4 days following injury to the right knee. She was standing stationary in midst of a dog park when a couple of large dogs ran into her. She noted a "pop" of the knee, which buckled underneath her. There was an immediate onset of medial sided knee pain. She was able to weight-bear after but with a notable limp. She went home and remarked her knee was "ballooning up" and so took the rest of the evening to rest and ice frequently. The next day, her knee was moderately swollen and still with painful weight-bearing. She had a knee sleeve on hand and so wore this most of the day. Except for three-and-a-half-mile walks with her dog each day, she was trying to rest and ice her knee throughout the day. There had been an interval of improvement in pain and swelling.

Upon presentation was an obese, affect-appropriate female in no apparent distress. She ambulated with an antalgic gait, wearing said knee sleeve. Her stance was in neutral alignment. There was a faint area of ecchymosis about the superomedial knee, moderate swelling, and mild warmth without fluctuance. She noted focal tenderness about the medial aspect of the medial femoral condyle extending to the joint line. Her range of motion was pain limited to 10–110°. She was quite guarded with ligamentous testing and noted significant pain, correlating with laxity, in valgus stress in full extension, worsening at 20° of flexion. The remainder of ligamentous testing was stable. Strength was 5/5, and she was found to be distally neurovascularly intact. The examination was otherwise remarkable for a positive dial test, bounce home, and patellar apprehension.

Management

Given the focal tenderness and described mechanism of the patient's injury, radiographs were obtained at the time of consultation (see Figure 1). These radiographs were without evident acute osseous abnormality, fracture, or dislocation. The patient was fitted with a hinged knee brace with ACE wrap and instructed to continue with rest, icing, and elevation as able. Range-of-motion exercises were also provided (Encinas-Ullán & Rodríguez-Merchán, 2018; LaPrade et al., 2007; Laprade & Wijdicks, 2012).

In considering the high-energy mechanism of injury, negative radiographs with focal examination findings, and impact on treatment options and outcomes, it was also recommended the patient proceed with magnetic resonance imaging (MRI). MRI is the most sensitive and specific study, considered the gold standard, in assessing soft tissue pathology of the knee. The patient was able to complete the MRI the following week, which

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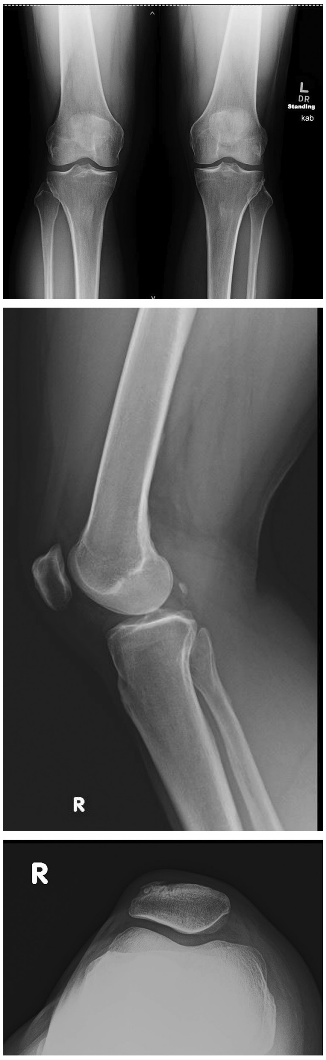

Figure 1. Anteroposterior, lateral, and sunrise radiographs of right knee—neutral alignment without evident acute fracture or dislocation.

revealed a proximal high Grade II–III MCL tear (see Figure 2) (Encinas-Ullán & Rodríguez-Merchán, 2018; LaPrade et al., 2007; Laprade & Wijdicks, 2012).

At 3-week follow-up, the patient noted improved pain and ambulatory status. She was still icing in the evenings but was no longer taking pain medication. The examination was that of improved tenderness, swelling, and ecchymosis. Her range of motion was also improved to full extension. The patient was counseled on continued range-of-motion exercises and given referral to physical therapy. With complaints of poor fit owing to body habitus, she was also given referral to an orthotist for a custom knee brace, with instructions to continue wearing this for all weight-bearing activity outside of physical therapy (Encinas-Ullán & Rodríguez-Merchán, 2018; LaPrade et al., 2007; Laprade & Wijdicks, 2012).

At 7-week follow-up, she noted resolution of pain and swelling and continued making good gains with stability exercises with physical therapy. The physical examination demonstrated improved laxity and firm end feel, resolution of focal tenderness, and painless full active range of motion. She ambulated in the clinic with steady gait, lacking any significant valgus thrust. She was instructed to continue with physical therapy and progression of activities as tolerated (Encinas-Ullán & Rodríguez-Merchán, 2018; LaPrade et al., 2007; Laprade & Wijdicks, 2012).

Just over 3 months from injury, the patient contacted this provider to inform she was doing well and set to return to her primary residence out of state. She had weaned the knee brace for day-to-day activities but still wore it for more strenuous activities such as hiking. She did not note any feelings of instability or laxity in the knee. She was pleased with the outcome of treatment and, even more enthusiastically, that she was able to avoid knee surgery.

Discussion

The majority of isolated MCL tears, including Grade III without gait-altering functional laxity, can be treated conservatively. There are, however, patients who, presenting with functional instability, significant ongoing pain related to excessive joint laxity, or valgus malalignment, are appropriate candidates for surgical intervention. When necessary, the goal of surgery is to restore the anatomic stability for valgus and rotational stress. This can be performed as a primary repair in the acute phase (typically within 7–10 days of injury), augmentation for ligaments whose quality and integrity is not sufficient for primary repair, or reconstruction for those who suffer from chronic instability. Although several methods exist, the three primary types of medical collateral ligament reconstruction are single-bundle anatomic, double-bundle nonanatomic, and double-bundle anatomic. For those patients who present with significant valgus malalignment, a two-stage procedure

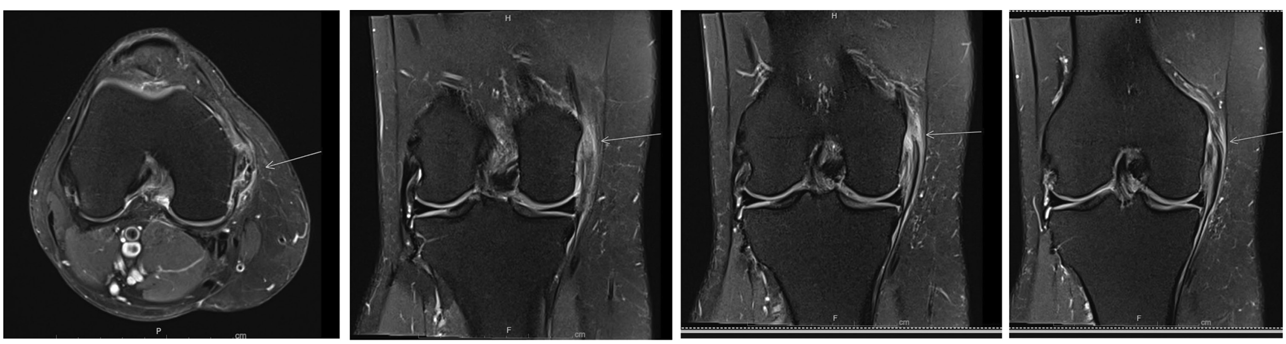

Figure 2. Magnetic resonance imaging. Images are labeled for series.

with distal femur osteotomy, followed by reconstruction, is likely most appropriate (Athwal et al., 2020; Encinas-Ullán & Rodríguez-Merchán, 2018; Helal et al., 2022; LaPrade et al., 2007; Laprade & Wijdicks, 2012; Miyaji et al., 2022; Ohliger et al., 2022; Ren et al., 2017; Wijdicks et al., 2010).

A comprehensive understanding of anatomy will increase comfort in performing proper physical examination, in this case including focal areas of tenderness associated with ligamentous attachment, any palpable defects, and testing for joint laxity in appropriate anatomic positions. As with most orthopaedic injuries, ascertaining the mechanism of injury helps guide a thorough and accurate physical examination, which is paramount in determining affected structures, indications for further diagnostic imaging, and determination of appropriate treatment options. In diagnosing and treating MCL injuries, the advanced practice provider can have confidence in achieving good outcomes for the majority of patients with conservative management (Athwal et al., 2020; Encinas-Ullán & Rodríguez-Merchán, 2018; LaPrade et al., 2007; Laprade & Wijdicks, 2012; Ren et al., 2017; Wijdicks et al., 2010).

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