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Posterior Cruciate Ligament and Posterolateral Corner Injuries

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Posterior Cruciate Ligament and Posterolateral Corner Injuries

Daniel C. Wascher, MD, and Andrew J. Veitch, MD

INTRODUCTION

Injuries of the posterior cruciate ligament (PCL) and the ligaments of the posterolateral corner of the knee are less common and historically have been less successfully treated than injuries of the anterior cruciate ligament (ACL). Adequate treatment of these injuries requires a thorough understanding of anatomy and biomechanical properties, the ability to accurately diagnose and determine extent of injury, and knowledge of the available treatment options. Failure to recognize and treat posterolateral corner injuries can jeopardize the success of cruciate ligament reconstructions.

Although the true incidence of PCL and posterolateral corner injuries is unclear, it is known that some of these injuries go unrecognized. A recent review found that PCL tears occur in 1% to 44% of all acute knee injuries.^{1,2} The overall incidence of PCL injuries and the frequency of associated ligamentous injuries are higher in series from level I trauma centers.³ The PCL appears to be injured less frequently than the ACL or medial collateral ligament (MCL), although improved awareness about PCL tears has resulted in these injuries being diagnosed more frequently. Injuries of the posterolateral corner ligaments are even less common but are being recognized more frequently due to recent advances in clinical examination and imaging techniques. Most posterolateral corner injuries occur in combination with tears of one or both cruciate ligaments; isolated injuries are uncommon. Although isolated PCL injuries do occur, it is imperative to assess the knee for combined ligamentous injuries. Failure to identify and address all injuries at the time of surgical intervention may lead to failure of the reconstructed ligaments.

The classic mechanism of an isolated PCL tear is a posteriorly directed force on the proximal tibia with the knee flexed. This is the so-called *dashboard injury*, which may occur as a result of the knee striking the dashboard during a car accident. Another mechanism of isolated PCL injury is landing directly on a flexed knee with the foot in plantar flexion, as may occur during athletic

competition or with a fall. PCL ruptures associated with other ligamentous injuries can occur with forced hyperextension or high varus/valgus or rotational loads. In these injuries, the PCL tears only after failure of the other ligaments. Most posterolateral corner injuries result from a contact or noncontact hyperextension injury, a severe varus load, or a posteriorly directed force to the anteromedial aspect of the knee.⁴ Common causes include car accidents, athletic injuries, and falls.

ANATOMY AND BIOMECHANICAL PROPERTIES

The past decade has seen significant growth in the understanding of the structure and function of the PCL and the ligaments of the posterolateral corner, and the biomechanical properties of these ligaments have been well described by several authors.

ANATOMY PCL

The PCL has a comma-shaped origin located on the lateral border of the medial femoral condyle at the junction of the wall and the roof of the intercondylar notch. The insertion of the PCL is approximately 1.0 to 1.5 cm distal to the posterior rim of the tibia, in a depression between the posterior medial and lateral tibial plateaus (the so-called *PCL fovea* or *facet*). The tibial attachment of the PCL is in close proximity to the neurovascular structures in the popliteal fossa, separated only by the posterior capsule. The average width of the PCL is 13 mm, and the average length is 38 mm.⁵

The PCL consists of 2 distinct bundles of fibers. The anterolateral fibers attach anteriorly within the femoral footprint and laterally on the posterior tibia. The posteromedial fibers attach posteriorly within the femoral footprint and medially on the posterior tibia (**Figure 1**). The 2 components function in a reciprocal fashion as the knee moves through the flexion-extension cycle.⁴ With increasing knee flexion, the anterolateral fibers become taut and play a greater role in posterior knee stability. The posteromedial fibers tighten as the knee is