© J ORTHOP TRAUMA SURG REL RES
16(12) 2021
Commentary

Brief study on posterior cruciate ligament

JOSEPH GRIGARD
Editorial Office, Orthopaedics Trauma Surgery and Related Research

Address for correspondence:
Joseph Grigard, Editorial Office, Orthopaedics Trauma Surgery and Related Research
orthotraumasurg@journalres.com

Statistics

Figures	00
Tables	00
References	00

Received: 25.12.2021
Accepted: 30.12.2021
Published: 10.01.2022

Abstract

The knee is made up of a complicated arrangement of osseous and soft tissue components that work together to provide three planes of motion. The knee is stabilized by both dynamic and static stabilizers. The knee ligaments, which are static stabilizers, play an important role in maintaining knee stability across the complete range of motion. The Posterior Cruciate Ligament (PCL), like the Anterior Cruciate Ligament (ACL), is one of two cruciate ligaments in the knee. The PCL has a significant role in limiting posterior tibial translation in relation to the femur. In addition, the PCL functions as a supplementary constraint around the knee, preventing varus, valgus, and external rotation. Injury to the PCL can develop from a posterior force placed on the tibia, most commonly with the knee in a flexed posture, albeit it is less common than ACL injuries. In order to correctly evaluate, diagnose, and treat PCL injuries, clinicians must have a thorough understanding of the anatomy and biomechanics of the PCL.

INTRODUCTION

The PCL is an intraarticular structure because it is found within the knee joint, yet it is classified as extra-synovial because it is covered by synovium, similar to the ACL. The PCL is generally 32 mm to 38 mm long, with an average cross-sectional size of 11 mm2 to 13 mm2 [1]. The PCL is roughly twice the thickness of the ACL. The PCL originates within the notch on the anterolateral side of the medial femoral condyle and inserts along the posterior part of the tibial plateau, about 1 cm distal to the joint line.

There are two bundles in the PCL the larger Anterolateral Bundle (ALB) and the smaller Posteromedial Bundle (PMB). The PCL's two bundles attach to the tibia as a conjoined structure on a facet of the posterior tibia, approximately 1.0 cm to 1.5 cm distal to the joint line. The anterior border of this PCL facet is formed by the posterior horn of the medial meniscus. The PCL is supplied vascularly by the middle geniculate artery and is innervated by branches of the tibial nerve [2,3].

Overall, knowledge of the anatomy of the PCL, as determined by the cadaveric, imaging, and arthroscopic research mentioned above, is critical for proper restoration of native anatomy during surgical reconstruction. It's crucial to remember where the PCL is in relation to other critical structures in the knee, especially those in the popliteal fossa, such as the tibial nerve, popliteal artery, and popliteal vein [4].

The PCL is one of the main stabilizers of the knee joint, and its primary role is to prevent excessive tibia posterior translation relative to the femur. The PCL also serves as a secondary knee stabilizer, preventing excessive rotation between 90º and 120º of knee flexion [5]. The long-held belief in PCL biomechanics was that the two bundles worked independently, with the ALB controlling knee flexion and the PMB controlling knee extension. Recent study, on the other hand, reveals that the two bundles work together.

The PCL is made up of two functional bundles that play a vital role in knee stability. Surgeons can repair the PCL anatomically and with the proper tension if they know the specific anatomy and kinematics of the ligament. The anterolateral and posteromedial bundles have varied patterns of tensioning across knee range of motion. At varying angles of knee flexion, the two bundles work together to prevent posterior tibial translation and rotation [6]. While much is known about the PCL, more research into the biomechanics of the ligament is required.

References:

1. *Girgis F.G., Marshall J.L., Monajem A.: The cruciate ligaments of the knee joint: Anatomical, functional and experimental analysis. Clin Orthop Relat Res. 1975;106:216-231.*
2. *Harner C.D., et al.: Quantitative analysis of human cruciate ligament insertions. Arthroscopy. 1999;15:741-749.*
3. *Edwards A., Bull A.M., Amis A.A.: The attachments of the fiber bundles of the posterior cruciate ligament: an anatomic study. Arthroscopy. 2007;23:284-290.*
4. *Matava M.J., Ellis E., Gruber B.: Surgical treatment of posterior cruciate ligament tears: an evolving technique. J Am Acad Orthop Surg. 2009;17:435-446.*
5. *Kramer D.E., et al.: Proximity of the popliteal artery to the PCL during simulated knee arthroscopy. J Knee Surg. 2006;19:181-185.*
6. *Van Dommelen B.A., Fowler P.J.: Anatomy of the posterior cruciate ligament: a review. Am J Sports Med. 1989;17:24-29.*