

The Anterolateral Ligament Does Exist

An Anatomic Description

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KEYWORDS

- Anterior cruciate ligament • Anterolateral ligament • ACL • ALL
- Anterolateral capsule • Knee anatomy

KEY POINTS

- The existence, precise anatomy, and role of the anterolateral ligament (ALL) represent the principal sources of recent controversy among orthopedic surgeons.
- The present article investigates the historical, phylogenetic, anatomic, arthroscopic and radiological evidence regarding the ALL.
- Caused by/because of the confusing terminology, different dissection technique and specimen's characteristics, an agreement still cannot be reached among the experts regarding the ALL existence, anatomy and function.

INTRODUCTION

The debate around the existence, anatomy, and role of the so-called anterolateral ligament" (ALL) represents one of the principal sources of controversy among the orthopedic community. Since the landmark study by Claes and colleagues,¹ in 2013, which renewed interest in the anterolateral anatomy of the knee, many efforts have been made to try to reconcile historical theories with modern anatomic and biomechanical findings. The burden of this topic is made evident by the more than 130 studies

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available on PubMed at the time of the current article's preparation, under the term "knee anterolateral ligament."

Despite these extensive research efforts, there is still no consensus on whether or not the ALL exists and which functions it serves. A consensus meeting among the ALL experts took place in Lyon, France, in November 2015 to exchange clinical and research experiences in order to clarify the main aspects related to the topic of the ALL, which have been summarized in a consensus paper.² The investigators concluded that "the ALL is a distinct ligament of the anterolateral side of the human knee."² However, other investigators still refute this statement, denying the presence of a true ligament and citing the importance of other anatomic structures such as the anterolateral capsule and the deep portion of the iliotibial band (ITB).³⁻⁵ Whether this disagreement is matter of terminology or dissection techniques has yet to be determined. Nevertheless, given the large volume of evidence, the presence of an anatomic structure at the anterolateral aspect of the knee, with an oblique course from the lateral epicondyle to the proximal tibia, should be acknowledged. This structure, which tightens in internal rotation, has been repeatedly described and investigated by several investigators over the last 2 centuries.⁶⁻¹³

This article presents and discusses the historical and anatomic evidence that supports the presence of a real and well-defined ALL.

HISTORICAL PROOF

Despite the development of the modern concept of ALL being universally considered to have occurred, with much media attention, in October 2013 after the report of Claes and colleagues,¹ the term ALL had already been used 1 year earlier by Vincent and colleagues^{14,15} to describe a ligamentous structure of the anterolateral part of the knee isolated during total knee arthroplasty. Despite this, Claes and colleagues¹ claimed to be the first to systematically describe, in both a qualitative and quantitative manner, a "well defined ligamentous structure, clearly distinguishable from the anterolateral joint capsule"¹ with an "origin situated at the prominence of lateral femoral epicondyle, [...] an oblique course [...], firm attachments to the lateral meniscus"¹ and an "insertion on the anterolateral tibia [...] grossly located midway between Gerdy's tubercle and the tip of fibular head, definitely separated from the iliotibial band."¹ Despite this breakthrough, the first reports of the structure date back more than a century.

The main and, at times, inappropriately cited reference of the ALL is the 1879 study by the French Gynecologist Paul Ferdinand Segond.¹⁰ Segond¹⁰ described an intra-articular crack, fissure, or bone wound of the anterolateral portion of the tibia's lateral condylar surface during autopsy observations of knees that were forcefully rotated. He also described a "pearly, resistant, fibrous band that is placed under extreme tension when the knee is forcefully internally rotated",¹⁰ which is now advocated to be the ALL. An accurate description of the structure's origin, insertion, or dimensions along with dissection technique was not provided. Similarly, the German anatomist Josias Weitbrecht¹³ in 1752, more than a century before Segond, described "fibrous bunches that reinforce the capsule and bands that supplement the fixation of semicircular cartilage (meniscus)."¹³ However, as in the case of Segond,¹⁰ no precise description was provided.

Cavaignac and colleagues,¹⁶ in a recent historical essay on the ALL, reported that several works from the late 1800s and early 1900s, consistently described a "lateral epicondilo-meniscal ligament." The German Anatomist Friedrich Henle, in 1871, noted that "the most anterior fibers of the lateral collateral ligament curve forward at nearly

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