

Transverse ligament of the knee in humans

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The purpose of this study was to trace the histological structure of the transverse ligament of the knee and its relation to the inferior lateral genicular artery. Investigations were carried out on 20 lower limbs (10 males, and 10 females) from the Department of Anatomy.

It was found that close to the attachment of the transverse ligament to the menisci, bundles of fibres pass in vertical, oblique and horizontal directions, occupying a wide area on the anterior margin of the menisci. These fibres intermingle with bundles of the fibrocartilage of the menisci. In the area of the lateral attachment the inferior lateral genicular artery passes anteriorly to the transverse ligament, giving off numerous branches to the ligament. The medial part of the transverse ligament presents a thick rounded structure, surrounded by loose connective tissue. The fibres are arranged irregularly in bundles running horizontally on a tortuous course and with single spindle-like cells with darkly stained nuclei. The cells are not found at the ends of the ligament. Numerous blood vessels are observed between the bundles of fibres and on the periphery of the ligament.

key words: knee joint, transverse ligament

INTRODUCTION

The transverse ligament of the knee (transverse geniculate ligament, anterior intermeniscal ligament) connects the anterior horns or the most protruding parts of the menisci, and is not present in all individuals. It plays an important role in the stability of the menisci during movement and in the prevention of hyperrotation [2]. It appears at the 7th week of the human embryonic period [7]. It has a restricting effect on the anterior-posterior excursion of the anterior horn of the medial meniscus at lower degrees of knee flexion [3]. In a study by Nelson and La Prade [4], three types of transverse ligament were found. Another classification of the transverse ligament of the knee was given by Aydmgöz et al. [1] in their MR imaging study.

The aim of this study was to trace the histological structure of the transverse ligament of the knee and its relation to the inferior lateral genicular artery.

MATERIAL AND METHODS

Investigations were carried out on 20 lower limbs of both sexes (10 males, and 10 females). The material was from the Department of Anatomy in Poznań. All the transverse ligaments were embedded in paraffin and serially sectioned in the frontal and horizontal planes. Serial sections 10 μ m thick were stained by routine histological methods.

RESULTS

During dissection of the knee joint, the transverse ligament of the knee appears as a thick band of connective tissue from the infrapatellar adipous body (Hoffa's body) surrounded by fatty tissue. On histological sectioning, differences were observed in the arrangement of the fibres close to the attachments of the transverse ligament of the knee to the menisci and in its middle part. Close to the menisci attachments bundles of fibres pass in ver-

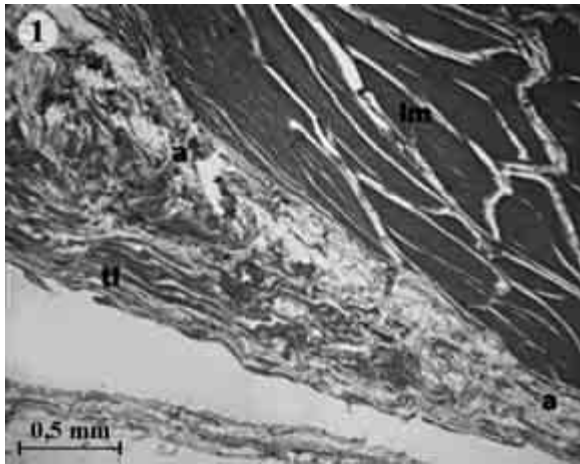


Figure 1. Attachment of the transverse ligament to the lateral meniscus of the left knee joint. Transverse section. Mallory's staining; a — attachment of the transverse ligament to the meniscus, lm — lateral meniscus, tl — transverse ligament of the knee.

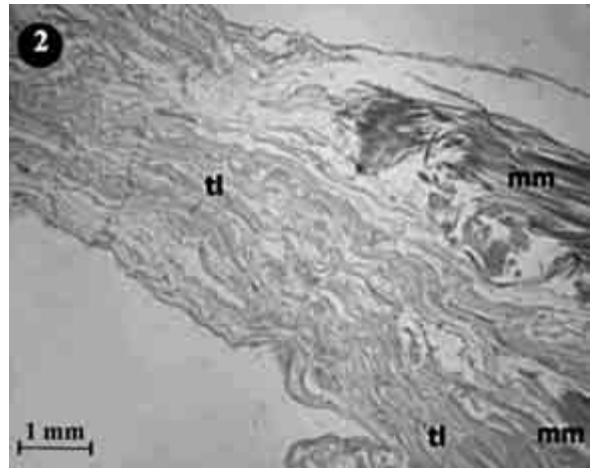


Figure 2. Attachment of the transverse ligament of the knee to the anterior horn of the medial meniscus of the left knee joint. Frontal section. H+E; mm — medial meniscus, tl — transverse ligament of the knee.

tial, oblique and horizontal directions, occupying a wide area on the anterior margin of the menisci (Fig. 1). These fibres intermingle with the bundles of fibrocartilage of the menisci (Fig. 2). In the area of the lateral attachment of the transverse ligament, anteriorly to it, passes the inferior lateral genicular artery, giving off numerous branches to the ligament (Fig. 1, 3). The medial part of the transverse ligament of the knee presents a thick rounded structure, surrounded by loose connective tissue (Fig. 3, 4). The fibres are arranged irregularly in bundles running horizontally on a tortuous course and with single spindle-like cells with darkly stained nuclei (Fig. 4). The cells are not found at the ends of the ligament (Fig. 1, 2). Numerous blood vessels are observed between the bundles of fibres, and on the periphery of the ligament.

DISCUSSION

Histologically, the ligaments of joints present a regular arrangement of compact fibres of two types of collagen [9] with the cellular chains of the fibrocytes between bundles of fibres [5]. The transverse ligament appears during the 7th week of the intrauterine development, and it remains cellular in structure until the end of the embryonic period [7]. Distinct fibres appear in foetuses aged 11 weeks, and numerous cells are found in the ligament even at the 25th week of the foetal period [8]. Many publications have focused on the appearance of the ligament in NMR studies or radiographs [1, 3] and on the types of attachment of the transverse ligament [1, 4]. Only a few papers have dealt with anatomi-

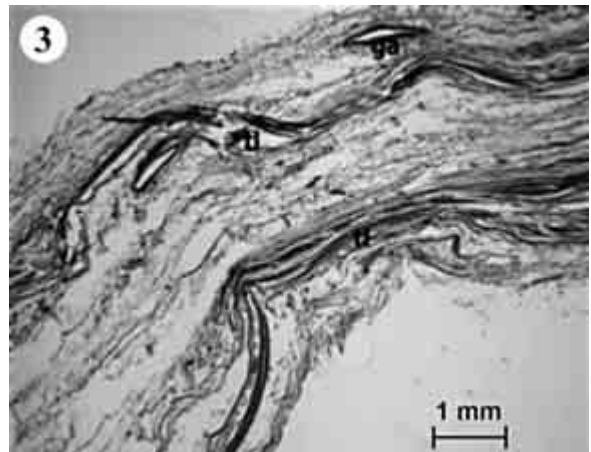


Figure 3. Medial part of the right transverse ligament. Transverse section. H+E; ga — inferior lateral genicular artery, tl — transverse ligament of the knee.

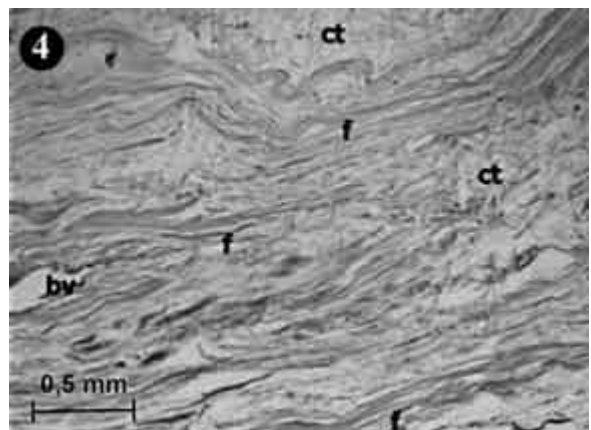


Figure 4. Medial part of the right transverse ligament of the knee. Frontal section. H+E; bv — blood vessel, ct — connective tissue, f — fibres of the transverse ligament of the knee.

cal studies, and the structure of the transverse ligament of the knee has not been described in detail [4]. Our histological description of the transverse ligament of the knee differs from that of the ligaments of the knee joint presented by other investigators.

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