

# Variant attachments of the anterior horn of the medial meniscus

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*The purpose of this study was to analyse the occurrence of variants of anomalous insertions of the anterior horn of the medial meniscus in human knee joints. The study was carried out on 78 human lower limbs of both sexes (42 males and 36 females). Out of 78 knee joints, 10 knee joints (12.82%) presented atypical attachments of the anterior horn of the medial meniscus. In 9 cases we found that the anterior horn of the medial meniscus was attached to the transverse ligament of the knee and in 1 case it was attached to the coronary ligament. In the remaining cases the anterior horn of the medial meniscus was attached to the anterior intercondylar area of the tibia.*

**key words: knee joint, transverse ligament, coronary ligament**

## INTRODUCTION

The anterior horn of the medial meniscus (AHMM) is attached, through the meniscal insertional ligaments, to the anterior intercondylar area of the tibia anteriorly to the attachment of the anterior cruciate ligament (ACL). However, in several arthroscopic and anatomical studies it has been reported that the anterior horn may have an extratibial insertion [1–9]. For instance, Ikeuchi [2] in his arthroscopic study observed that 22.6% of all knees showed variants. He considered variants in knees in which the AHMM was not attached to the tibia. These variants were divided into four categories, where the AHMM was attached to the transverse ligament of the knee, to the transverse ligament and the infrapatellar plica, to the coronary ligament, or to the infrapatellar plica.

The purpose of this study was to evaluate the occurrence of variants of extratibial attachments of the AHMM.

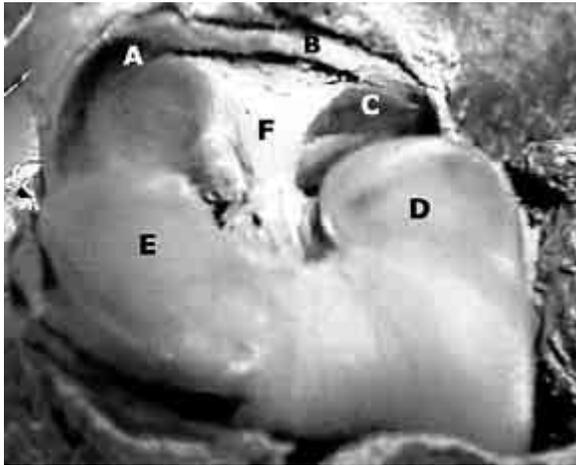
## MATERIAL AND METHODS

78 human lower limbs were investigated (42 males; 20 right, 22 left and 36 females; 18 right, 18

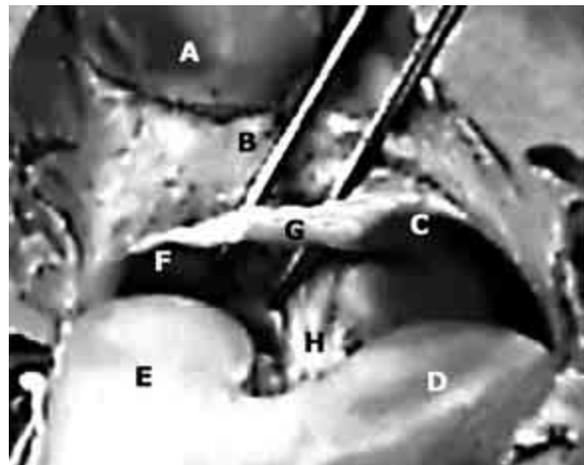
left). Our anatomical findings were classified into the following categories, with reference to the criteria described by Ikeuchi [2]: the transverse ligament type, where the AHMM was attached to the transverse ligament of the knee, and the coronary ligament type, where the AHMM was attached to the coronary ligament.

## RESULTS

The study revealed 10 cases of atypical attachments of the AHMM out of 78 knee joints (12.82%). Classification of the knees using the above criteria showed 9 cases of the transverse ligament type and 1 case of the coronary ligament type knees. Such variations were found in 7 females (2 left, 5 right) and 3 males (2 left, 1 right). The coronary ligament insertion type was observed in a female knee. In the remaining cases the AHMM was attached mainly to the tibia. In the transverse ligament type (Fig. 1, 2), the AHMM was attached directly to the transverse ligament of the knee and was thick and more flexible than normal. In addition, it tended to pass upward and toward the ACL when the knee was flexed. In the coronary ligament type the entire medial me-



**Figure 1.** Right knee joint; A — anterior horn of medial meniscus, B — transverse ligament, C — lateral meniscus, D — lateral femoral condyle, E — medial femoral condyle, F — anterior cruciate ligament.



**Figure 2.** Left knee joint; A — patella, B — infrapatellar fat pad, C — anterior horn of medial meniscus, D — medial femoral condyle, E — lateral femoral condyle, F — lateral meniscus, G — transverse ligament, H — anterior cruciate ligament.

niscus was hypoplastic. Its anterior horn was connected directly to the coronary ligament. In this case, it was noted that the AHMM shifted anteriorly to the infrapatellar fat pad in the flexed knee.

### DISCUSSION

The present study of 78 knee joints showed that the anomalous attachments of the AHMM were present in 10 knee joints (12.82%). The transverse ligament type was the most common variant of the attachment of the AHMM. Only in 1 out of 10 cases was the coronary ligament type observed. Variants in female knees were more frequent (70% vs. 30%). Some investigators have distinguished more types of variant [2–9]. Ikeuchi [2] and Ohkoshi et al. [7] reported the existence of the infrapatellar synovial fold type, where the AHMM was attached to the infrapatellar synovial fold. Ohkoshi et al. [7], Kim et al. [4, 5] and Rainio et al. [8] found that the so-called ACL-type is also possible, where the AHMM was attached to the anterior surface of the ACL. Recent studies have reported 3 cases, where the AHMM was inserted into the posterolateral wall of the femoral intercondylar fossa forming the anteromedial meniscofemoral ligament [9] and 2 cases in which the anterior horn was separately attached to the lateral femoral condyle [3]. The vast majority of these variants may cause anterior knee pain syndrome and make the knee vulnerable to injury during sports activity [1, 7].

However, some authors have stated that the ACL-variant was, in most cases, not related to the clinical symptoms [4, 5, 9].

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