



# Steep posterior slope and shallow concave shape of the medial tibial plateau are risk factors for medial meniscus posterior root tears

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## Abstract

**Purpose** Bone morphological factors are important for menisci. Their association with medial meniscus posterior root tears, however, has not yet been studied. This study aimed to compare sagittal medial tibial slope and medial tibial plateau depth between knees with and without medial meniscus posterior root tears.

**Methods** Nine healthy volunteers, 24 patients who underwent anterior cruciate ligament reconstruction, and 36 patients who underwent medial meniscus posterior root pullout repair were included. Magnetic resonance imaging examinations were performed in the 10°-knee-flexed position. The medial tibial slope and medial tibial plateau depth were compared among the groups.

**Results** In healthy volunteers, the anterior cruciate ligament reconstruction group, and the medial meniscus posterior root tear group, the medial tibial slopes were  $3.5^\circ \pm 1.4^\circ$ ,  $4.0^\circ \pm 1.9^\circ$ , and  $7.2^\circ \pm 1.9^\circ$ , respectively, and the medial tibial plateau depths were  $2.1 \pm 0.7$  mm,  $2.2 \pm 0.6$  mm, and  $1.2 \pm 0.5$  mm, respectively. Patients with medial meniscus posterior root tears had a significantly steep medial tibial slope and shallow medial tibial plateau concavity compared to those of healthy volunteers ( $P < 0.01$ ) and the anterior cruciate ligament group ( $P < 0.01$ ). In the multivariate logistic regression analysis, body mass index, medial tibial slope, and medial tibial plateau depth were significantly associated with medial meniscus posterior root tears.

**Conclusions** A steep posterior slope and a shallow concave shape of the medial tibial plateau are risk factors for medial meniscus posterior root tear.

**Level of evidence** Level III: Case–control study.

**Keywords** Medial meniscus · Posterior root tear · Magnetic resonance imaging · Medial tibial slope · Medial tibial plateau depth

## Abbreviations

ACL	Anterior cruciate ligament
BMI	Body mass index
ICC	Intra-class correlation coefficient
LTS	Lateral tibial slope
MMPRT	Medial meniscus posterior root tear
MRI	Magnetic resonance imaging
MTPD	Medial tibial plateau depth

MTS	Medial tibial slope
PRT	Posterior root tear

## Introduction

The interest in medial meniscus posterior root tears (MMPRT) has been increasing, and they have been widely studied. Knee motions associated with descending stairs and downhill slopes are the most common injury patterns of MMPRTs [9]. MMPRT pullout repair is recommended to prevent subsequent cartilage degeneration or meniscus extrusion [4], and favourable clinical outcomes have been reported after transtibial pullout repair of MMPRT [16, 22]. Severe chondral lesions, varus alignment, and older age have been reported to predict a poor prognosis after MMPRT

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