ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8–11

# Medial Meniscus Dynamics In Degenerative Meniscus Tears: Analyzing Extrusion And Horn Position Shift In Early Knee Osteoarthritis


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# Faculty Disclosure Information

- There is nothing to disclosure

# Introduction

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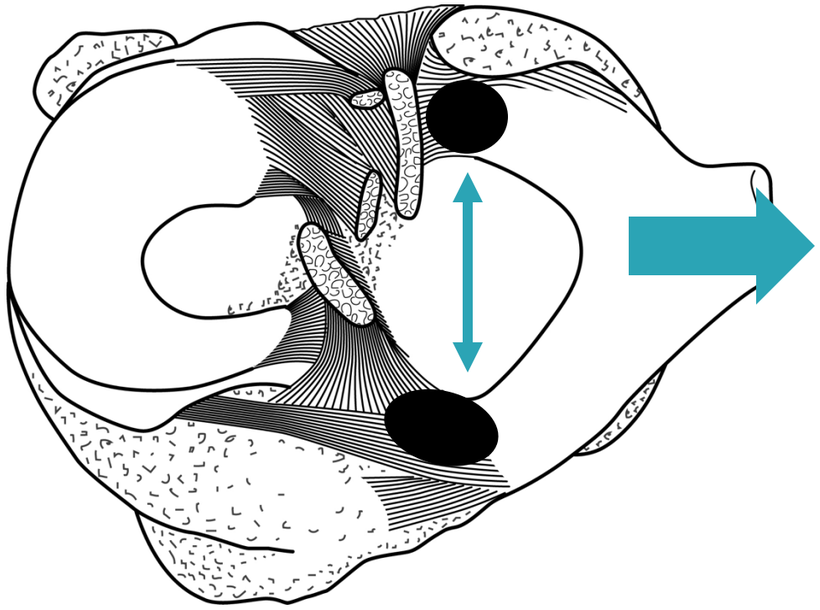
- Medial meniscus extrusion (**MME**) has recently gained attention as a factor associated with the **progression of knee OA**[1)]



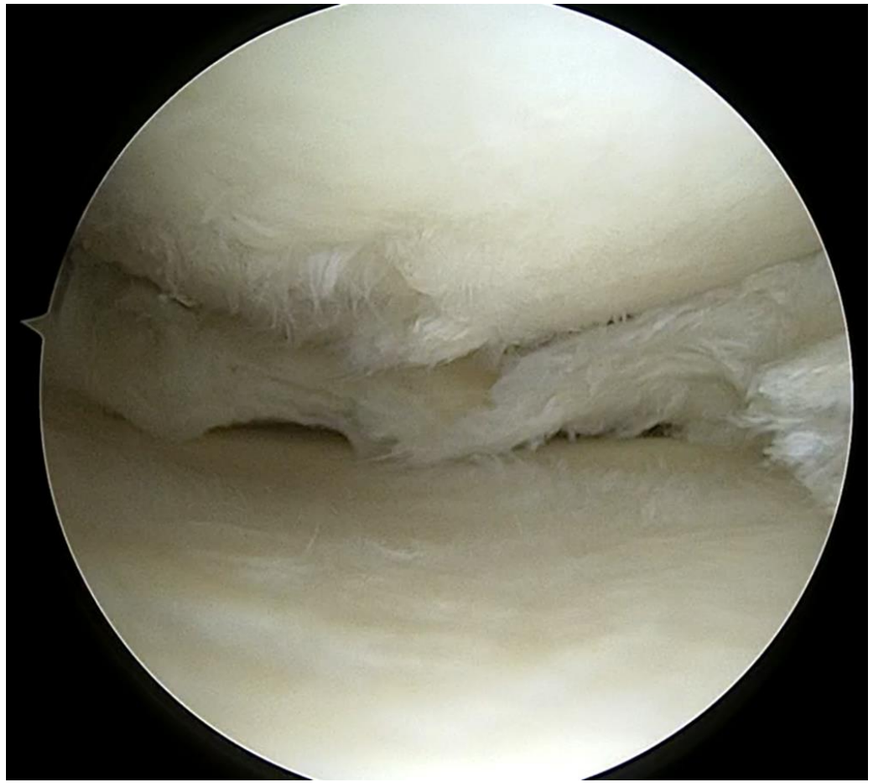
## Hypothesis

**With MME, the anterior and posterior horns of the medial meniscus also shift in the anteroposterior direction.**

# Introduction



- In cases of degenerative tears of the posterior horn of the MM, the position of the posterior horn is often depicted **anteriorly** on arthroscopy



## Purpose

**To clarify positional changes in the medial meniscus with and without a posterior horn horizontal tear**

# Participants

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## Medial knee joint pain

## K–L grade ≤ 1

## no history of ipsilateral lower extremity surgery

2020/4 — 2024/3

# 181 knees

## Exclusion

Medial meniscus posterior root tear

**MMPRT**

| Age (years) | Sex (knees) | |
|---|---|---|
| 61.7 (±12.1) | male | 97 |
| | female | 84 |

## Participants

**181** knees

### Radiography evaluation

K-L grade

Weight bearing line ratio (WBLR)

### MRI evaluation

- The position of anterior and posterior horn
- Horizontal tears in the posterior segment (Mink grade 3)
- MME

### Group C

No degenerative tear group

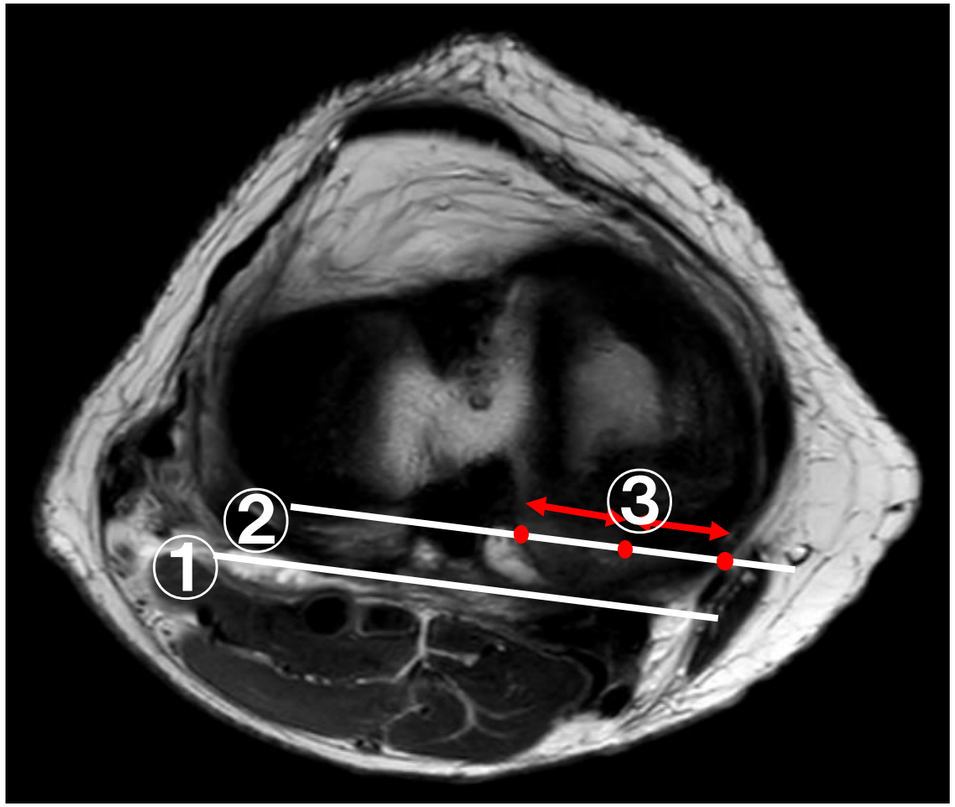
### Group T

Degenerative tear group

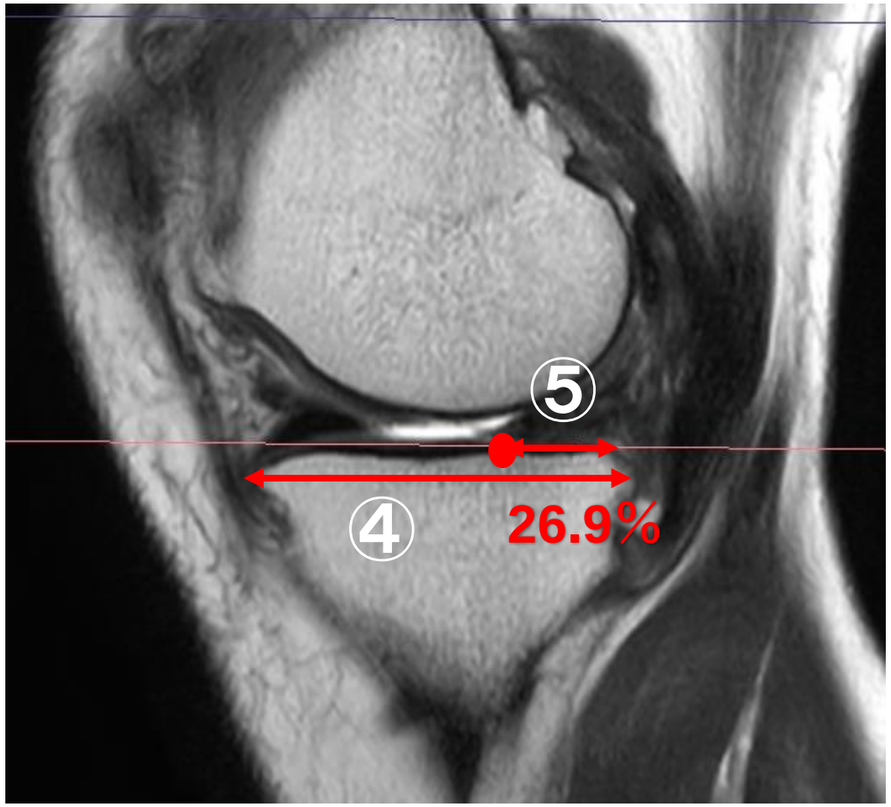
# Evaluation of the position of anterior and posterior horn



A.




B.




i A line (①) that was drawn along the posterior condyle

ii A parallel line (②) was drawn through the posterior root attachment of the MM

iii On this line, the midpoint of the tibial width (③) was taken, and a sagittal image (B.) through this point was used for measurement. The tibial width (④) and the distance from the posterior point of the MM were measured in this slice ⑤.

iv The ratio was calculated as (⑤ / ④) × 100 (%)

v Similarly, the position of the anterior horn was measured.

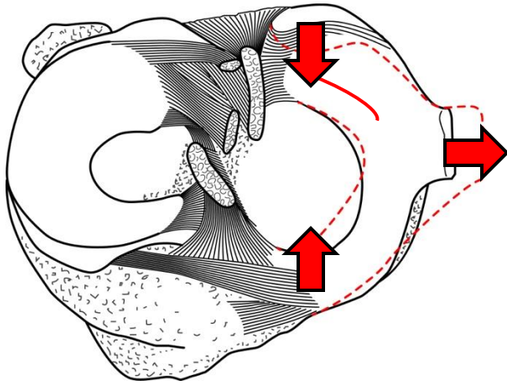
# No significant differences were observed in patient backgrounds

| | Group C n=76 | Group T n=105 | P -value |
|---|---|---|---|
| age (year) | 61.6±13.0 | 61.8±11.7 | 0.459 |
| male / female | 42 / 34 | 55 / 50 | 0.309 |
| height (cm) | 163.0±8.4 | 163.2±8.9 | 0.437 |
| weight (kg) | 62.9±11.9 | 65.0±13.2 | 0.189 |
| BMI (kg/m²) | 23.6±3.4 | 24.3±3.6 | 0.134 |
| KL grade 0/1 | 43 / 33 | 56 / 49 | 0.491 |

# Result



**The middle body of the medial meniscus deviates medially, the anterior horn shifts posteriorly, and the posterior horn moves anteriorly**



| | Group C n=76 | Group T n=105 | P-value |
|---|---|---|---|
| WBLR (%) | 21.1±12.0 | 32.4 ±12.1 | 0.269 |
| MME (mm) | 1.9±1.2 | 2.7±1.4 | <0.001 |
| Anterior horn (%) | 14.3±3.8 | 16.3±5.0 | 0.004 |
| Posterior horn (%) | 26.9±5.9 | 36.4±7.1 | <0.001 |

# Discussion

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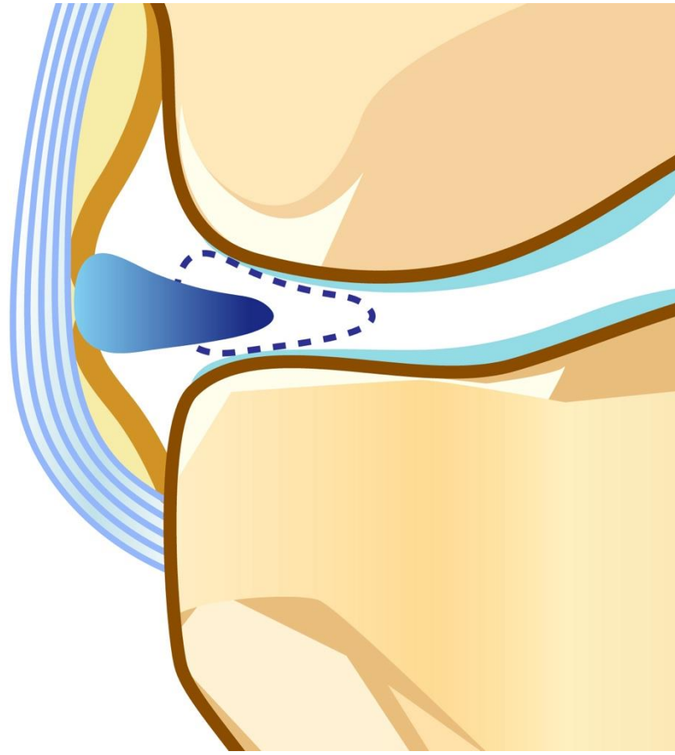
- Relationships between lower varus alignment, knee OA[2)] and meniscal injury[3)] have been reported



**In this study, patient with K-L grade ≦ 1**

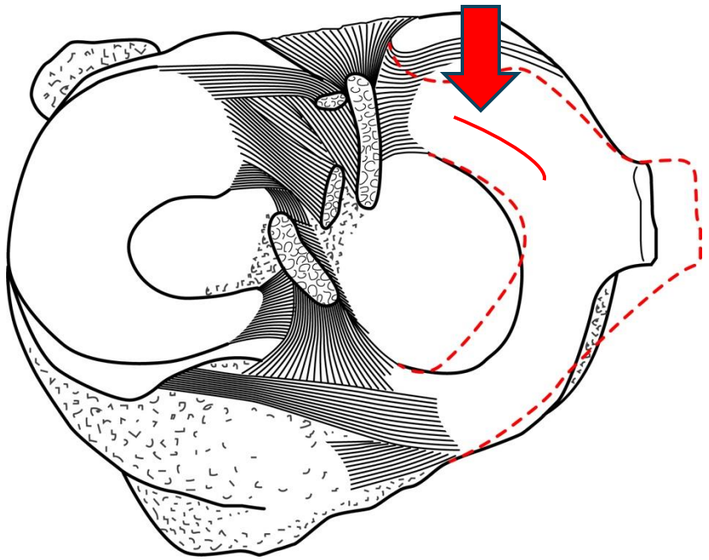
No significant differences in WBLR with or without MM degenerative tears

→ **Alignment abnormalities do not necessarily precede meniscal injury**

# MME promote deformation stress on the meniscus and accelerate the degeneration[4)]

When repairing a horizontal tear in the posterior horn of the MM

**Restoring the meniscus to its normal position during repair is essential**



# Conclusion



**MME was larger in degenerative meniscal tears than in cases without tears, with the anterior and posterior horns shifting posteriorly and anteriorly, respectively**

# references


1) Berthiaume MJ, et al. Meniscal tear and extrusion are strongly associated with progression of symptomatic knee osteoarthritis as assessed by quantitative magnetic resonance imaging. Ann Rheum Dis. 2005 64(4):556–563.

2) Palmer JS, et al. Varus alignment of the proximal tibia is associated with structural progression in early to moderate varus osteoarthritis of the knee. Knee Surg Sports Traumatol Arthrosc. 2020 Oct;28(10):3279-3286.

3) Willinger L, et al. Effect of Lower Limb Alignment in Medial Meniscus-Deficient Knees on Tibiofemoral Contact Pressure. Orthop J Sports Med. 2019 Feb 6;7(2):232596711882461 1.

4) Arita H, et al. Medial meniscus extrusion is a determinant factor for the gait speed among MRI-detected structural alterations of knee osteoarthritis. Osteoarthr Cartil Open. 2021 May 25;3(3):100176.