

The Association Between Medial Meniscus Extrusion and Lesion Location of Osteochondritis Dissecans of the Knee



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OBJECTIVES

- Osteochondritis dissecans (OCD) of the knee joint occurs at specific locations of the femoral condyle [1]. However, its etiology of each lesion is still not elucidated clearly.
- We hypothesized that infero-central type OCD in the medial femoral condyle (MFC) is associated with medial meniscus extrusion (MME) (Figure 1).

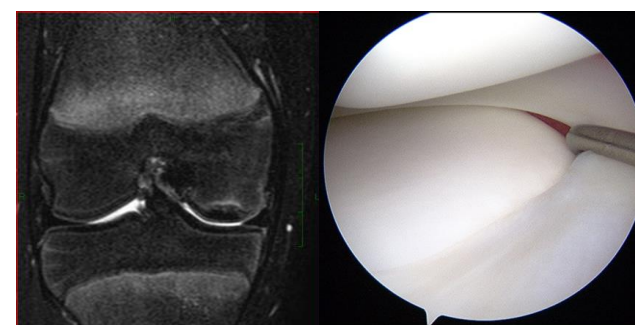


Figure 1. 13yo Girl, MFC inferior-central type, stable lesion. On MRI, high signal rim can be seen at the inferior-central part of MFC. Arthroscopically medial meniscus is easily sifted medially by probing.

Extrusion of medial meniscus X?
MFC inferior-central lesion

- The purpose of this study was to evaluate the MME in the patient with knee OCDs from the MR images and to investigate the association between MME and lesion location.

METHODS

- Patient population:** 38 consecutive patients with 47 knees with OCD in the femoral condyle who underwent surgeries from 2010 to 2017.
- Research groups:** Patients are divided into 3 groups according to Aichroth's classification [1]
 - MFC-C/EC group:** MFC classical/extended classical lesion
 - MFC-IC group:** MFC inferior-central lesion
 - LFC group:** Lateral femoral condyle lesion
- Evaluation indices:** Age, body mass index (BMI), lateral distal femoral angle (LDFA), medial proximal tibial angle (MPTA), and MME
- Evaluation of MME:** Relative percentage of extrusion (RPE) of medial meniscus in coronal section of was measured (Figure 2)[2].
- Statistics:** The Kruskal-Wallis test was used for comparison of RPE among 3 groups. Statistical significance was set at $P < .05$.



Figure 2. Coronal slice of MRI
A: the width of the extruded meniscus.
B: the width of the whole meniscus.
RPE = (A/B) x 100.

RESULTS

Table 1. Demographics

	MFC-C/EC (n = 18)	MFC-IC (n = 12)	LFC (n = 17)	
Gender (M/F)	14/2	6/2	10/4	
Age	15.3±6.5	14.8±3.8	12.8±3.8	n.s.
BMI	22.3±5.2	19.8±3.3	20.1±4.5	n.s.
LDFA (°)	83.0±1.7	81.7±2.0	80.9±2.7	$P < .05$
MPTA (°)	84.3±2.2	84.8±3.2	86.2±2.8	n.s.

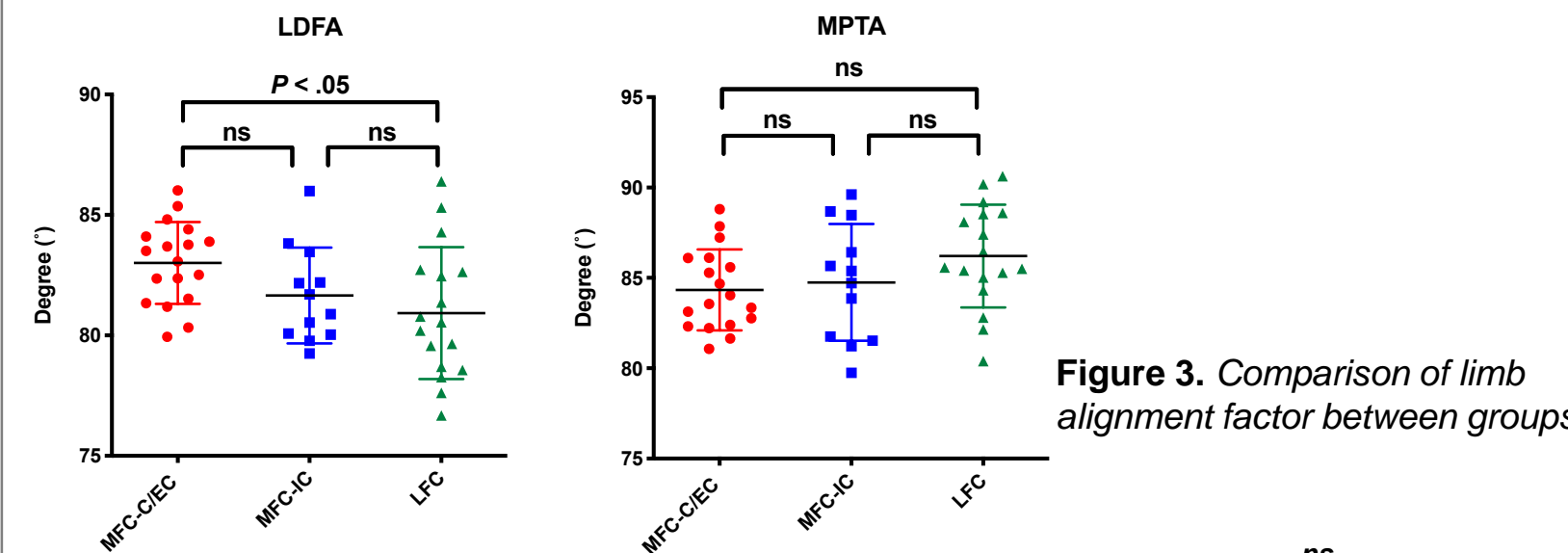


Figure 3. Comparison of limb alignment factor between groups

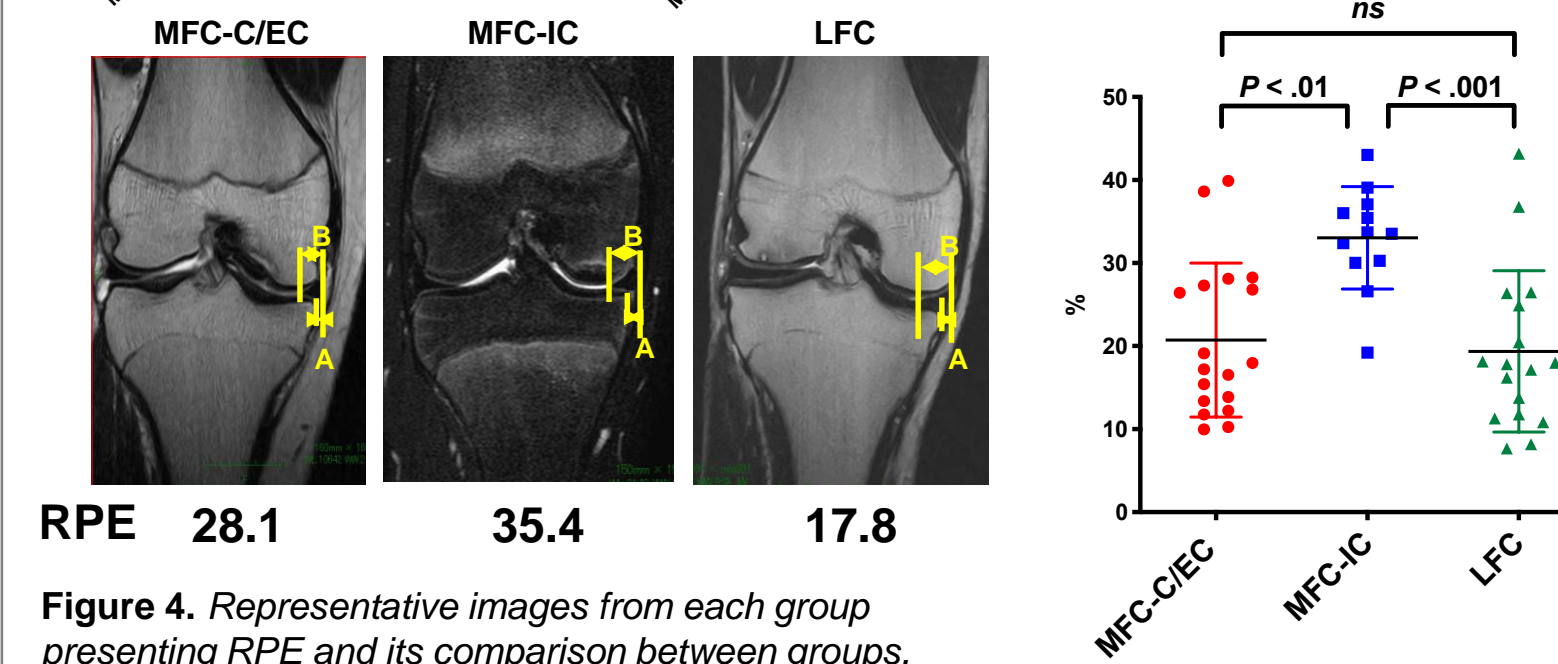


Figure 4. Representative images from each group presenting RPE and its comparison between groups.

There was no significant difference in age and BMI among groups. LDFA demonstrates significant lower degree in LFC group compared with MFC-C/EC group ($P < .05$), although there is no significant difference among groups in MPTA (Table 1 and Figure 3). It was revealed that the value of RPE was significantly higher in the MFC-IC group among 3 groups (Table 1 and Figure 4).

DISCUSSIONS

- Our study shows that the patients with MFC inferior-central OCD lesion present significantly extruded medial meniscus compared with the patients with OCD lesion in other locations.
- In young athletes, it was demonstrated that meniscal extrusion is associated with joint effusion [3]. However, as far as we know, there is no study that investigated the association between MME and OCD lesions.
- The association between MME and osteonecrosis of MFC has been widely accepted and it was reported that lesion size correlates with the severity of MME [4,5].
- Although further study will be needed with biomechanical approach, alteration of load distribution on MFC due to MME might have a potential to induce insufficient fracture, initiating OCD lesion, of the MFC in juvenile/adolescent

CONCLUSIONS

It was demonstrated that medial meniscus was more extruded in the patients with inferior-central type of OCD lesion in the MFC compared with other OCD lesions.

Extrusion of medial meniscus X
MFC inferior-central lesion

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