Bilateral discoid medial meniscus: 
MR evaluation

A 12-year-old male patient presented with a history of right knee injury. Magnetic resonance imaging (MRI) was performed. After two years, the same patient again visited our department with a history of left knee injury. The MRI followed, demonstrating that the medial meniscus of the left knee had exactly the same shape as the right one.

Imaging Findings:
MRI findings of both knees were exactly the same (Fig.1). Sagittal plane images showed the "bow tie" sign, which refers to the continuity of the anterior and the posterior horn, in more than three consecutive images, which is highly suggestive of descoid meniscus (Fig. 2). They also depicted high signal intensity along the meniscus due to the meniscal contusion and flattening of the medial femoral condyle (Fig. 3). On coronal plane images the ratio of the minimal meniscal width to the maximal tibial width exceeded 20%, which is also one of the criteria for the diagnosis of discoid meniscus (Fig. 4). On the coronal view, the extension of the medial meniscus in the intercondylar notch was also visible (Fig. 5).

Discussion:
A discoid meniscus is a dyslastic meniscus with a disc-like shape usually occurring in the lateral side of the knee. The presence of medial discoid meniscus is extremely rare with an incidence of 0.06%-0.3%, compared to the reported rate of lateral discoid meniscus, which ranges from 1.4% to 15.5% [1, 2, 3]. Medial discoid meniscus was first reported by Watson Jones in 1930 [4] and then by Cave and Staples in 1941 [5]. The occurrence of bilateral discoid meniscus is even rarer [2, 6, 7].
The aetiopathogenesis of discoid meniscus is not certain yet. Smillie suggested that this shape of meniscus is due to failure of absorption of the central part during fetal development [8]. Kaplan stated that the meniscofemoral ligament of Humphreys leads to the discoid meniscus formation, as the meniscus becomes hypermobile due to changes in the attachment of the posterior coronary ligament [9].
Watanabe et al classified the discoid meniscus in three types. The first type is the complete type where the meniscus covers entirely the tibial plateau. The second type is the incomplete type which has a semilunar shape
and covers less than 80% of the tibial plateau. The third type/Wrisberg type resembles the normal meniscus in shape but it lacks the posterior coronary ligament and consequently only Wrisberg ligament connects the posterior horn of the meniscus [10].

A discoid meniscus is usually an incidental finding. Because of its different histology, the increased thickness and also the abnormal vascularity, discoid meniscus is more susceptible to tears, cysts and intrameniscal mucoid degeneration [1, 11]. Pain, clicking or snapping, and locking are the most common symptoms in children [1]. Effusion, quadriceps atrophy and limited range of motion can also be found [11].

Plain-film radiographs are often normal. However sometimes they can reveal widening of the involved joint space, a squared-off femoral condyle, cupping of the tibial plateau, tibial eminence flattening and elevation of the fibular head [1, 11]. MRI is the recommended imaging method for the diagnosis.

The most accurate criteria on MRI are:
- presence of a “bow tie” sign in more than 3 consecutive 4-5 mm sagittal slices
- the ratio of the minimal meniscal width to the maximal tibial width exceeds 20% on coronal images
- coronal images show the extension of the discoid meniscus apex toward or into the intercondylar notch

Asymptomatic discoid menisci do not require treatment. Arthroscopic partial meniscectomy/meniscoplasty with preservation of a stable peripheral rim is the treatment of choice in symptomatic patients [3, 11].

Written informed patient consent for publication has been obtained.

**Differential Diagnosis List:** Bilateral medial discoid meniscus, A displaced flap tear or bucket-handle tear

**Final Diagnosis:** Bilateral medial discoid meniscus

**References:**


Figure 1

Description: Coronal plane images showing bilateral discoid medial menisci. Origin: Papageorgiou General Hospital, Department of Radiology, Thessaloniki, Greece
Figure 2

Description: Sagittal plane image showing intrameniscal high signal intensity along the medial meniscus suggestive of meniscal contusion. Also note the flattening of the medial femoral condyle (arrows). **Origin:** Papageorgiou General Hospital, Department of Radiology, Thessaloniki, Greece
Description: Coronal plane image of the knee showing that the ratio of the minimal meniscal width to the maximal tibial width exceeds 20%. Origin: Papageorgiou General Hospital, Department of Radiology, Thessaloniki, Greece.
**Description:** Coronal plane image showing the extension of the medial meniscus in the intercondylar notch. **Origin:** Papageorgiou General Hospital, Department of Radiology, Thessaloniki, Greece
Description: Presence of a "bow tie" sign (continuity of the anterior and the posterior horn) in more than three consecutive images in the sagittal plane. Origin: Papageorgiou General Hospital, Department of Radiology, Thessaloniki, Greece
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