Posterior dislocation of a discoid meniscus in a child: a case report

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Discoid meniscus of the knee is a well-known anatomic and congenital variant of the lateral meniscus. It is often asymptomatic, but can be associated with knee pain and other symptoms. Posterior dislocation of the discoid meniscus is an extremely rare finding; to the best of our knowledge, only one case has been reported in the literature. Here, we report a case of 10-year-old girl who presented with right knee pain with no history of trauma. The radiograph of her right knee was negative but MRI showed bilateral lateral discoid menisci with posterior dislocation in the right knee and some subluxation in the left. She underwent right knee arthroscopic lateral meniscoplasty with excellent outcome. This case demonstrates the possibility of torn and dislocated discoid lateral menisci management through arthroscopic reduction and repair. *J Pediatr Orthop B* **23:354–357 © 2014 Wolters Kluwer Health | Lippincott Williams & Wilkins.**

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Introduction

Discoid meniscus of the knee is a well-known anatomic and congenital variant of the lateral meniscus first reported by Young [1]. Its reported prevalence rate varies between 0.4 and 17% [2–4]. It is often asymptomatic but can be associated with knee pain, snapping or popping sensation, limited knee flexion or extension, and episodes of knee locking [5].

The discoid meniscus is thickened and has a fuller crescent shape and significantly lower blood supply than the normal meniscus, making it vulnerable to tears, degeneration, peripheral detachment, and disruption [6,7].

Here, we present a 10-year-old girl with a symptomatic right knee who was found to have bilateral lateral discoid menisci with posterior dislocation of the meniscus in the right knee and posterior subluxation in the left, and discuss the imaging findings and surgical management. The patient underwent right knee arthroscopic lateral meniscoplasty with excellent results at 18 months follow-up. Review of the medical literature revealed only one similar case of posterior subluxation of discoid meniscus in a 14-year-old girl [8].

Case report

A 10-year-old girl, previously healthy, presented with a history of right knee pain of 1 month duration, exacerbated with activity and alleviated with rest. On physical examination, the child had moderate swelling of the right knee with full range of motion, as well as a popping sensation in the lateral compartment on flexion, with lateral joint line tenderness. The physical examination of the left knee was completely negative.

Radiographs of the right knee were negative. MRI revealed a discoid lateral meniscus with posterior dislocation of the anterior horn and folding of the posterior horn indicative of laxity of the anterior attachments of the lateral meniscus (Fig. 1a and b); thus, it was difficult to evaluate whether or not a true meniscal tear was additionally present. However, heterogeneous signal intensity consistent with degeneration was seen mainly in its anterior horn, as well as moderate joint effusion with edema involving the infrapatellar Hoffa's fat pad. MRI of the left knee revealed a discoid lateral meniscus that appeared slightly subluxed posteriorly with heterogeneous signal intensity consistent with degeneration and tear in its posterior horn (Fig. 2).

Surgical approach

The patient underwent arthroscopic repair of the dislocated discoid lateral meniscus of the right knee. At the time of surgery, a diagnostic arthroscopy was first carried out that revealed gross instability of the anterior horn of the lateral discoid meniscus, which was retracted posteriorly. Moreover, there was a tear involving the central aspect of the body and anterior horn. A probe was used to reduce the anterior horn. Subsequently, saucerization of the torn part of the lateral discoid meniscus was performed using a shaver. The dislocated anterior horn was reduced and fixed to the anterior capsule using the outside-in meniscus suturing technique. An 18-G spinal needle was introduced laterally into the anterior horn of the meniscus, through which a polydioxanone (PDS)

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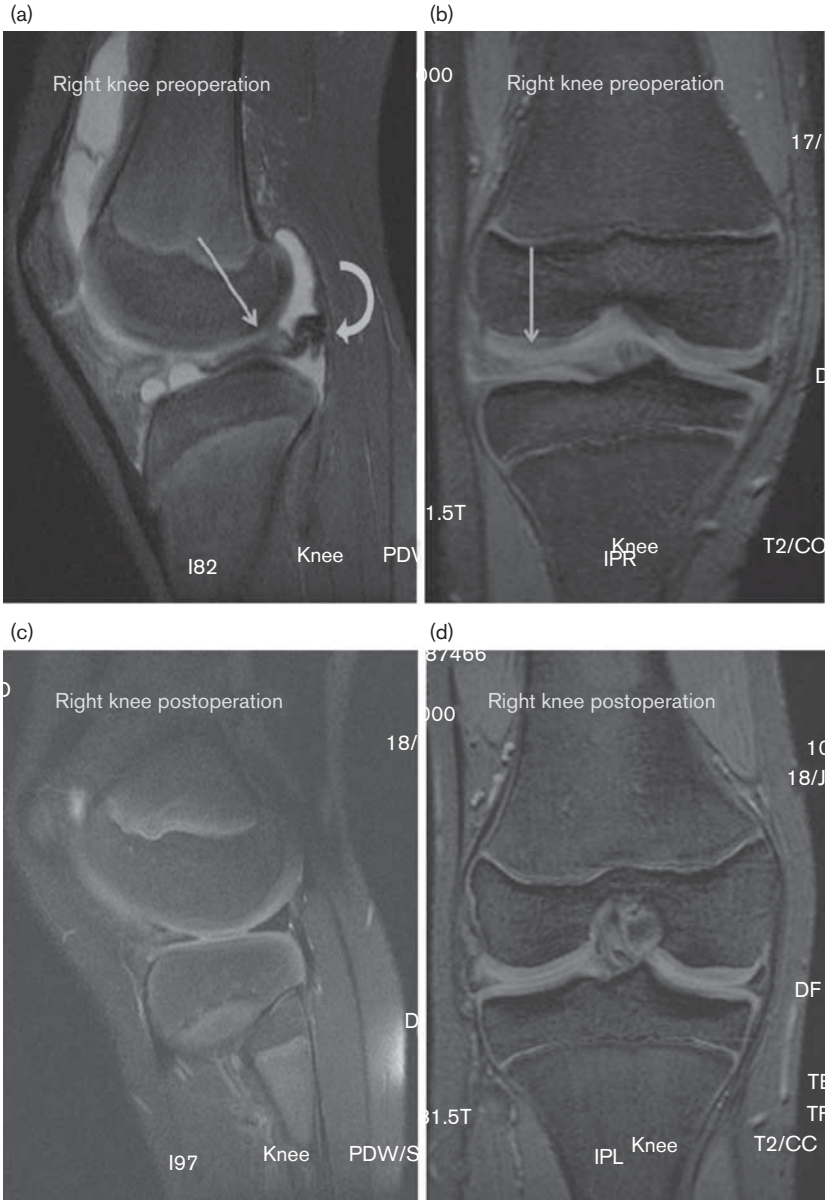
Fig. 1



MRI of the right knee. (a) Preoperative sagittal SPIR images show absence of the anterior horn of the lateral meniscus in its normal position, with complete posterior dislocation and folding of the meniscus (curved arrow). Increased signal is seen (straight arrow), suggesting mucoid degeneration and tear. (b) Preoperative coronal SPIR images showing discoid configuration and absence of the anterior horn in the anterior aspect of the lateral compartment (straight arrow). (c) Postoperative sagittal SPIR image shows reduction of the meniscus that is no longer showing the discoid morphology after it was saucerized and sutured arthroscopically. (d) Postoperative coronal image showing the reduced normally located meniscus. SPIR, spectral presaturation with inversion recovery.

suture was passed. The PDS suture line was retrieved out through the medial portal. Another PDS suture was passed in the same way. A nonabsorbable heavy suture was then tied to each end of the PDS suture and pulled out from the lateral aspect of the joint. This left us with the free ends of the heavy suture extending through the skin on the lateral aspect of the knee. A small vertical skin incision was made between the points where the heavy suture exited the skin. The heavy suture limbs were subsequently retrieved through the vertical incision and tied using a free-hand knot technique with the aid of a knot pusher. The knot was made just under the skin and over the lateral joint capsule. Another nonabsorbable heavy suture was passed through the anterior horn in the same way to fix the meniscus more centrally. A second small vertical incision was made to tie the latter suture limbs. Finally, probing revealed a stable anterior horn. The shaver was again used along with 'basket forceps' to

Fig. 2

MRI of the left knee. Sagittal SPIR image showing the continuity between the anterior and posterior horns, with increased signal in the meniscus suggestive of mucoid degeneration and tear. There is posterior subluxation of the whole meniscus with some folding of the posterior horn. SPIR, spectral presaturation with inversion recovery.

saucerize the edges of the discoid meniscus, leaving a well-preserved posterior body and anterior horn.

Postoperative outcome

After surgery, the patient had a smooth 1-day stay in the hospital. She was fitted with a knee brace and was allowed 0–30° of flexion for the first 2 weeks and 0–90° of flexion for the subsequent 2 weeks. She was advised touch-weight bearing with the aid of crutches for 4 weeks. Quadriceps and hamstring exercises were started on the first postoperative day for a total of 6 weeks.

The patient was followed up at 2, 6, and 12 weeks postoperatively. She was also seen at the 6-month and 18-month mark. The knee effusion resolved within 4 weeks postoperatively. At the 6-week visit, the patient was asymptomatic with no pain and no clicking or locking, and had full range of movement. She remained so throughout her postoperative course. An MRI performed 6 months postoperatively revealed a healed and reduced lateral meniscus (Fig. 1c and d).

Discussion

Discoid meniscus of the knee is usually regarded as an anatomic variant in which the meniscus is thickened and disc shaped in contrast to the normal semilunar shape [6,9].

There is no consensus yet on the origin of discoid meniscus. At one point, it was thought to be a failure of resorption of the central part of the developing meniscus [10], but later Kaplan [11] could not find a discoid meniscus at any stage in normal human fetal life. Consequently, abnormal menisci in children have been attributed to events before the eighth week *in utero* [12,14].

Discoid meniscus is far more prevalent on the lateral side. However, symptomatic discoid medial menisci have been reported and treated in childhood [15,16].

MRI is the gold standard for diagnosing discoid meniscus in a child. It is seen as continuity between the anterior and posterior horns on three or more consecutive 5 mm sections on the sagittal views [17]. Additional meniscal findings such as tears, degeneration, and subluxation can also be identified when present [8]. Moreover, the use of MRI classification of discoid lateral meniscus based on peripheral attachment, as proposed by Ahn *et al.* [18], provides additional information to surgeons when choosing the appropriate treatment procedure. Under this classification, our patient was found to have bilateral posterocentral shift that was much more severe on the right side.

The risk of tears in discoid lateral meniscus is increased compared with nondiscoid menisci with incidences of 71 and 54%, respectively, in a pool of 1250 patients undergoing knee MRI [19]. The most commonly used classification for lateral discoid menisci is that described by Watanabe and Ikeuchi [20]. According to the latter, discoid lateral menisci may be classified into one of three types. Type 1 is a complete discoid meniscus that covers the entire tibial plateau; type 2 is incomplete and does not cover the entire tibial plateau; and type 3 (Wrisberg ligament type) results from lack of posterior tibial attachment, which causes posterior rim instability. Type 3 may be either complete or incomplete, and is associated with a higher incidence of symptomatic meniscal tears. In our case, there was complete posterior dislocation of the discoid lateral meniscus related to insufficiency in anterior meniscocapsular attachment. A similar case of a 14-year-old girl with subluxation of discoid lateral menisci bilaterally was reported by Lacout *et al.* [8].

In addition to discoid menisci, which are well-known anatomical aberrations of the knee joint, other rarer cases have been reported such as bilateral separated lateral menisci [13], accessory lateral meniscus [12], partial

deficiency of the lateral meniscus [4], double-layered lateral meniscus [21], and ring menisci [22,23].

This report describes the finding of posterior dislocation of discoid menisci in one knee and subluxation in the other knee of a child in the absence of a recalled significant trauma. A similar case was reported by Lacout *et al.* [8]. The Watanabe classification as noted before has three classical types of discoid meniscus: complete, incomplete and Wrisberg-ligament variant that is noted for the instability and detachment of the posterior horn. Here, the aforementioned presentations support the hypothesis of a fourth type characterized by congenital detachment and hypermobility of the anterior horn. Moreover, the microtrauma secondary to exercise or activity with axial loading and torque forces over the knee can render this variant of discoid meniscus unstable and lead to complete posterior dislocation with the subsequent development of symptoms that necessitate surgical intervention and repair.

In our case, the anterior horn and body of the discoid lateral meniscus of the right knee were completely retracted posteriorly with folding of the posterior horn in the posterior aspect of the joint. Repairing the meniscus with reattachment to the capsule is the only way to restore normal meniscal function. Simple meniscectomy was shown to lead to the subsequent development of osteoarthritis of the knee, and this is correlated with the volume of the meniscus removed [24,25]. It is known that complete meniscectomy of a potentially repairable torn meniscus is not acceptable in view of the promising early to midterm results of saucerization and repair of discoid lateral meniscus in children [6,25–27]. Our case demonstrates that reduction and repair of torn and dislocated discoid lateral meniscus performed arthroscopically is possible with promising results.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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