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Medial Discoid Meniscus in a Pediatric Patient: A Case Report

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Abstract

The discoid meniscus is a congenital morphological variant characterized by an abnormally thickened, enlarged, and abnormally shaped meniscal structure. Although this condition predominantly involves the lateral meniscus, medial discoid meniscus represents a much less common presentation. The abnormal meniscal morphology may alter normal knee biomechanics and predispose the affected meniscus to instability, degeneration, and tearing. Clinical presentation is variable, as some patients remain asymptomatic, whereas others may develop pain, swelling, mechanical symptoms, or functional limitations, particularly in the presence of an associated meniscal tear.

We present the case of a nine-year-old male with right knee pain, swelling, mechanical locking, and limited range of motion. Magnetic resonance imaging (MRI) demonstrated a complete medial discoid meniscus with a horizontal tear involving the body and posterior horn. The patient underwent knee arthroscopy that revealed a longitudinal meniscocapsular tear extending from the posterior third of the meniscal body to the posterior horn, with peripheral instability. Meniscocapsular repair was performed without initial remodeling. Although pain and function improved, a persistent flexion deformity subsequently required a second arthroscopy and meniscal remodeling. Following meniscal remodeling, the patient achieved full range of motion and remained pain-free and free of meniscal symptoms at six-month follow-up, with unrestricted return to sports activities. This case highlights the importance of recognizing meniscal variants and associated tears in pediatric patients with mechanical knee symptoms and supports addressing the abnormal discoid morphology during the initial surgical procedure, regardless of whether concomitant meniscal repair is required, to restore a more anatomical meniscal shape and potentially reduce the need for subsequent surgical intervention.

Categories: Orthopedics
Keywords: case report, discoid meniscus, medial discoid meniscus, meniscus reshaping, pediatric meniscus tear

Introduction

The meniscus is a fibrocartilaginous structure that plays an essential role in knee biomechanics through load distribution, shock absorption, joint stability, lubrication, and proprioception, thereby contributing to the protection of articular cartilage and long-term joint function [1,2].

A discoid meniscus is a congenital morphological variant characterized by a thickened, disk-shaped meniscus that covers a larger portion of the tibial plateau than the normal semilunar meniscus [3]. It most commonly affects the lateral meniscus, whereas medial involvement is considerably less frequent [1]. Although it may remain asymptomatic, a discoid meniscus can present with pain, swelling, and mechanical symptoms such as clicking, locking, or snapping, particularly when associated with instability or meniscal tearing [4,5]. It is most commonly diagnosed in children and adolescents, although it may also be identified later in life, particularly when symptoms develop [1].

The medial discoid meniscus is an exceptionally rare congenital anomaly, with a reported prevalence of approximately 0.06%-0.3% [6]. Its rarity and nonspecific clinical presentation make diagnosis particularly challenging, as symptoms may resemble those of other meniscal disorders [4,5]. Patients typically exhibit symptoms including pain, swelling, and mechanical signs such as locking or snapping, frequently in the absence of a clear traumatic event [4]. Identification is usually achieved through a combination of clinical examination and imaging studies, with magnetic resonance imaging (MRI) serving as a key diagnostic tool, although definitive diagnosis is often confirmed during arthroscopic evaluation [3].

Given the limited number of reported cases, the clinical presentation, optimal management, and long-term outcomes of medial discoid meniscus remain incompletely understood [7]. Current evidence is largely derived from small case series and extrapolation from studies of the discoid lateral meniscus [8]. Therefore, this report describes a pediatric patient with a symptomatic medial discoid meniscus, focusing on the diagnostic and therapeutic challenges encountered during clinical management and contributing additional evidence regarding this rare meniscal variant.

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Case Presentation

Medical history and clinical description

A nine-year-old male patient presented with a four-month history of right knee pain following sports activity. Symptoms were associated with joint swelling, a mechanical locking sensation, and a flexion deformity of the right knee. The patient reported regular participation in sports activities. No relevant past medical, family, or psychosocial history was reported.

Physical examination

On physical examination of the right knee, the patient demonstrated an antalgic gait and a 15° extension deficit due to a mechanical block. There was marked intra-articular swelling and pain during mobilization. The range of motion was limited from 15° to 90°.

Additional Examination

Magnetic resonance imaging of the right knee demonstrated a complete medial discoid meniscus with increased thickness and a horizontal tear involving the meniscal body and posterior horn (Figure *1*). No displaced or luxated meniscal fragments were identified on MRI.

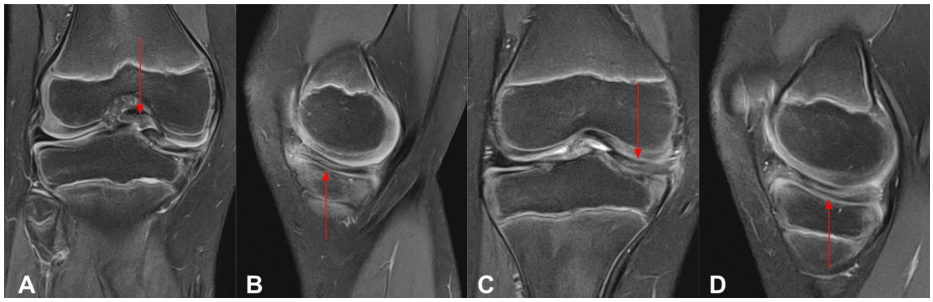


FIGURE 1: Magnetic resonance imaging of the right knee.

(A, B) Coronal views demonstrating a thickened medial meniscus with complete discoid morphology. (C, D) Sagittal views demonstrating a horizontal tear involving the body and posterior horn. No displaced or luxated meniscal fragments are identified.

Diagnosis

The patient was diagnosed with symptomatic complete medial discoid meniscus with an associated meniscal tear involving the posterior horn and body of the meniscus.

Intervention

Diagnostic arthroscopy of the right knee demonstrated a complete medial discoid meniscus (Watanabe type I). Although MRI suggested a horizontal tear, direct arthroscopic assessment identified a longitudinal meniscocapsular tear in the peripheral vascular zone extending from the posterior third of the meniscal body to the posterior horn, without injury or tear of the posterior meniscal root. The peripheral posterior rim was unstable on probing and could be displaced centrally, corresponding to posterior instability; using the PRiSM/Wisconsin descriptors, the lesion was classified as W2-H1-SP-T0. The lateral meniscus and cruciate ligaments were intact. Meniscocapsular repair was performed with two all-inside sutures, restoring stability of the peripheral rim and full knee extension intraoperatively (Figure *2*). Because repair alone restored full extension and the patient was nine years old, the initial strategy prioritized preservation of the greatest possible amount of meniscal tissue; therefore, no saucerization or remodeling of the discoid morphology was performed during the first procedure.

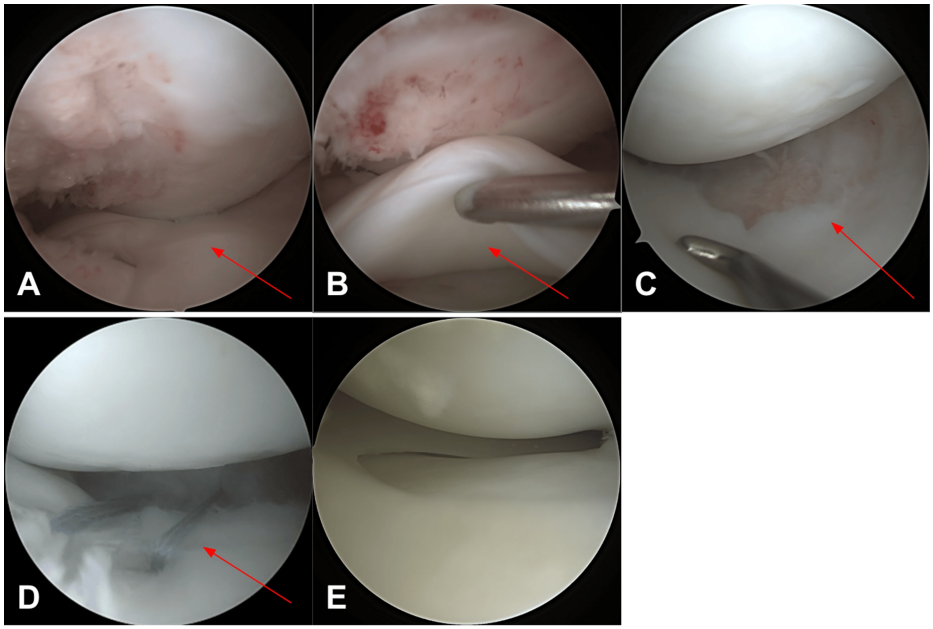


FIGURE 2: Intraoperative arthroscopic images (first surgery).

(A, B) Medial compartment demonstrating a complete discoid medial meniscus. (C) Longitudinal meniscocapsular tear extending from the posterior third of the meniscal body to the posterior horn, with peripheral instability on probing and an intact posterior root. (D) Repaired and stable medial meniscus after two all-inside meniscocapsular sutures. (E) Lateral compartment demonstrating an intact lateral meniscus, with no chondral lesions of the femoral condyle or tibial plateau.

Outcomes

Immediate intraoperative assessment demonstrated restoration of full knee extension and stability of the repaired meniscus. No intraoperative complications were reported. Postoperatively, the patient followed a rehabilitation protocol with partial weight-bearing for the first four weeks, progressive advancement to full weight-bearing between weeks 4 and 6, gradual recovery of range of motion, and isometric lower-extremity strengthening. At the six-month follow-up, the patient had complete resolution of pain and no limitations in activities of daily living. Although he had returned to sports, he reported limping and discomfort after sports activity, and a residual 10° flexion deformity persisted. Given the persistent flexion deformity, young age, and sports expectations, revision arthroscopy with remodeling of the persistent discoid morphology was indicated. At revision arthroscopy, the previous longitudinal meniscocapsular lesion was healed and stable, with loose remnants of the sutures from the first procedure. No new or recurrent meniscal tear was identified and no additional meniscal repair was required. The persistent complete discoid morphology was remodeled to restore a more anatomical meniscal shape, achieving complete intraoperative restoration of flexion and extension (Figure *3*).

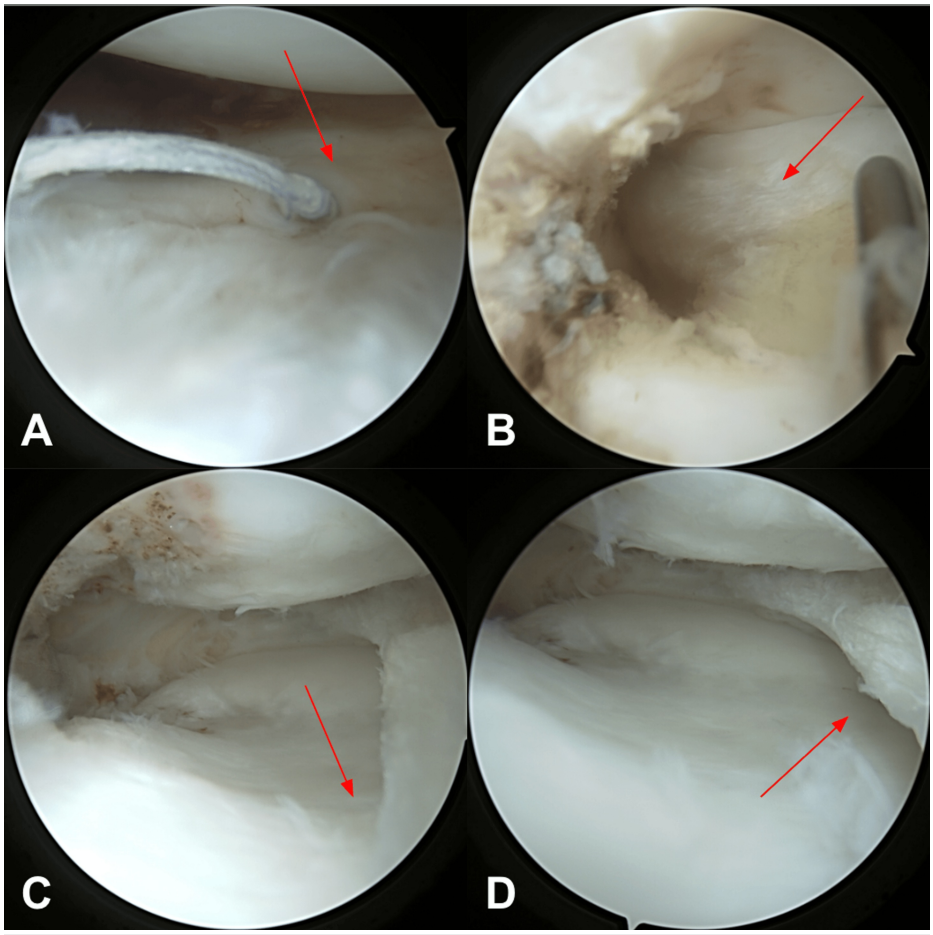


FIGURE 3: Intraoperative arthroscopic images (second surgery).

(A) Medial compartment demonstrating loose remnants of the sutures from the first procedure with a healed meniscocapsular lesion. (B) Stable medial meniscus with persistent complete discoid morphology and no new or recurrent tear. (C, D) Remodeled medial meniscus after saucerization, restoring a more anatomical contour.

The postoperative rehabilitation program focused on progressive recovery of full range of motion, followed by isometric strengthening of the lower extremity and gradual return to sports activities. At one-month follow-up after the second procedure, the patient had a full range of motion from 0° to 130°, no pain, negative meniscal provocation tests, and complete return to physical activity without limitations. At six-month follow-up after the second procedure, the patient maintained full range of motion (0°-130°), remained pain-free without meniscal symptoms, and had returned to sports activities without limitations.

A summary of the clinical course can be visualized in Figure *4*.

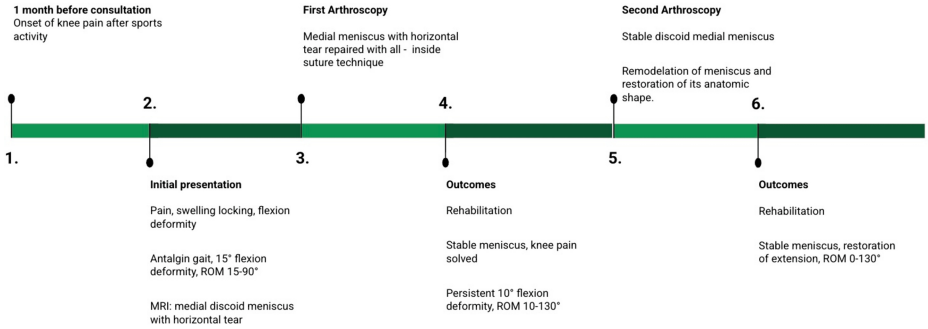


FIGURE 4: Timetable of clinical course.

Clinical timeline of the patient. The patient initially presented with pain, swelling, locking, and a 15° flexion deformity. MRI demonstrated a complete discoid medial meniscus with a horizontal tear of the body and posterior horn, without displaced fragments. During the first arthroscopy, a longitudinal meniscocapsular tear with posterior peripheral instability was identified and repaired with two all-inside meniscocapsular sutures; no saucerization or remodeling was performed because repair restored full extension and maximal meniscal preservation was prioritized. At six months, pain and daily function had improved, but a 10° flexion deformity, limping, and discomfort after sports activity persisted. Revision arthroscopy demonstrated a healed and stable meniscocapsular lesion, loose suture remnants, no new or recurrent tear, and persistent discoid morphology. Meniscal remodeling was subsequently performed. Following rehabilitation, at six-month follow-up, the patient maintained full range of motion, remained asymptomatic, and had returned to sports without limitations.

Discussion

The present case highlights a rare presentation of a medial discoid meniscus with an associated tear and peripheral instability, an uncommon congenital variant that remains poorly described in the literature. While discoid meniscus is recognized as the most frequent congenital anomaly of the knee, it predominantly affects the lateral meniscus, with medial involvement reported only in a very small percentage of cases, ranging from approximately 0.06% to 0.3% [6]. Due to its low prevalence, most available evidence is derived from isolated case reports and small case series, limiting understanding of its natural history and optimal management [9]. In the present patient, the mechanical symptoms were attributed primarily to the meniscocapsular tear and peripheral instability occurring in the setting of discoid morphology, rather than to the discoid shape alone. Importantly, such tears and symptomatic instability may occur even without a clear traumatic event, with the abnormal discoid morphology acting as a predisposing factor.

The clinical presentation observed in this case is consistent with previous reports describing the variable and often nonspecific manifestations of discoid meniscus. Although many discoid menisci remain asymptomatic, symptoms typically arise in the presence of instability or associated meniscal tears, which are more common due to the abnormal morphology and structural characteristics of the discoid tissue. Patients frequently present with insidious onset of knee pain, swelling, and mechanical symptoms such as clicking, locking, or snapping, often without a clear history of trauma [10]. This pattern is particularly relevant in medial discoid meniscus, where diagnosis may be delayed due to its rarity [9] and the overlap with more common meniscal pathologies [11]. Additionally, the higher susceptibility to degeneration and tearing, even at an early age, has been attributed to decreased collagen organization and altered vascularity, further explaining the symptomatic presentation observed in these patients [12].

The diagnostic approach in this case is consistent with previous reports described in the literature. In previously reported cases, MRI has played a central role in diagnosis, allowing identification of increased meniscal thickness, abnormal morphology, and continuity between the anterior and posterior horns across multiple sagittal slices [13]. MRI is also useful for detecting associated meniscal tears and assessing features suggestive of instability [9]. Despite its high diagnostic value, definitive assessment of meniscal morphology and stability is often achieved through arthroscopic evaluation, which allows direct assessment of meniscal morphology and stability, confirming the findings observed on MRI and characterizing associated lesions. This case demonstrated a discrepancy between imaging and arthroscopic findings: MRI suggested a horizontal tear of the body and posterior horn with no displaced or luxated meniscal fragments, whereas direct arthroscopic assessment revealed a longitudinal meniscocapsular tear extending from the posterior third of the body to the posterior horn with peripheral instability on probing. A limitation of this case is the absence of plain radiographs, as the patient presented with previously obtained MRI images, and additional radiographs were not considered necessary.

The management of discoid meniscus has progressively evolved toward preservation of functional meniscal tissue while restoring normal meniscal morphology. Historically, total meniscectomy was commonly performed; however, it has been associated with poor long-term outcomes and accelerated degenerative changes [12]. Consequently, recent reports have described arthroscopic saucerization combined with meniscal repair in patients with peripheral instability or repairable tears, aiming to preserve meniscal tissue

while restoring meniscal morphology [12-14]. In this nine-year-old patient, the initial surgical strategy prioritized maximal meniscal preservation. Because meniscocapsular repair alone restored meniscal stability and full knee extension intraoperatively, the complete discoid morphology was initially preserved rather than remodeled in the same procedure. This approach resulted in resolution of pain and recovery of daily and sports function; however, the flexion deformity subsequently recurred and was accompanied by limping and discomfort after sports activity. Revision arthroscopy at six months demonstrated that the longitudinal meniscocapsular lesion had healed and was stable. The remnants of the original sutures were loose, but there was no new or recurrent tear, no repair failure, and no indication for additional suturing. The principal persistent finding was the complete discoid morphology. Saucerization was therefore performed to restore a more anatomical shape. Following saucerization, full range of motion and symptom resolution were maintained at six-month follow-up, with unrestricted return to sports activities. Thus, in this patient, repair addressed the tear-related pain and functional limitation, whereas correction of the persistent flexion deformity ultimately required remodeling of the discoid morphology. Although a single case cannot establish a treatment recommendation, the staged course illustrates that preserving the complete discoid morphology at the initial procedure may result in the need for an additional operation when mechanical restriction persists or recurs.

This case illustrates that medial discoid meniscus may represent an uncommon cause of knee symptoms. Its atypical presentation and low prevalence may contribute to delayed diagnosis, as has been reported previously, underscoring the need for a high index of suspicion among clinicians [9,11]. This case contributes to the limited literature describing the clinical presentation and management of this uncommon condition.

Conclusions

In conclusion, this case highlights a medial discoid meniscus with an associated tear as a rare cause of mechanical knee symptoms in a pediatric patient. Initial meniscocapsular repair achieved healing and stability of the tear and improved pain and function; however, a flexion deformity persisted in association with the unresected discoid morphology. Revision surgery including saucerization was followed by restoration of full range of motion, absence of pain or meniscal symptoms, and unrestricted return to sports activities, which were maintained at six-month follow-up. This clinical course illustrates the potential limitation of meniscal repair alone when the underlying discoid morphology is not addressed. Although conclusions regarding treatment strategy cannot be drawn from a single case, this staged course suggests that persistent discoid morphology may contribute to ongoing mechanical restriction despite successful repair and may necessitate subsequent remodeling in selected symptomatic patients. This case adds to the limited evidence on medial discoid meniscus and underscores the importance of integrating clinical presentation, imaging, and arthroscopic findings when evaluating and managing this rare meniscal variant.

Further studies with larger cohorts are needed to better define optimal treatment strategies and long-term prognosis for this uncommon entity.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Sofia Macario, Manuel Gutierrez

Acquisition, analysis, or interpretation of data: Sofia Macario, Manuel Gutierrez, Juan Lizarazo

Drafting of the manuscript: Sofia Macario, Manuel Gutierrez, Juan Lizarazo

Critical review of the manuscript for important intellectual content: Sofia Macario, Manuel Gutierrez

Supervision: Manuel Gutierrez

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. Comité Corporativo de ética en investigación Fundación Santa Fe de Bogotá issued approval CCEI-19782-2026. Written informed consent for the publication of the clinical information and related material was obtained from the parents/legal guardians of the minor patient. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other

relationships or activities that could appear to have influenced the submitted work.

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