Research

Medial Discoid Meniscus Tear Treated with Platelet-Rich Plasma: A Case Report

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Abstract:
Discoid medial meniscus is a rare developmental variant associated with structural abnormalities that increase susceptibility to injury. The case of a 12-year-old boy with left knee pain following a direct blow is presented. Initial magnetic resonance imaging revealed a discoid medial meniscus without a clear tear, accompanied by oedema at the meniscocapsular junction. Despite conservative management, including physiotherapy, symptoms persisted, and a platelet-rich plasma injection was administered. The patient experienced temporary pain relief; however, symptoms recurred after eight months, and follow-up magnetic resonance imaging demonstrated progression of the lesion. Due to clinical deterioration, arthroscopic intervention was performed, revealing peripheral instability, which was treated with meniscocapsular stabilization. This case highlights that platelet-rich plasma may provide short-term symptomatic relief in discoid medial meniscus but does not prevent progression of underlying structural pathology. Its anti-inflammatory and analgesic effects may mask mechanical instability, potentially delaying definitive treatment. Careful clinical and imaging follow-up is therefore essential. The role of platelet-rich plasma in meniscal injuries, particularly as a stand-alone conservative treatment, remains uncertain. Further studies are needed to determine optimal treatment protocols and long-term outcomes.

Keywords: Discoid medial meniscus; Platelet-rich plasma; Meniscal injury; Pediatric patient; Conservative treatment

1. Introduction

The meniscus plays a crucial role in the biomechanics of the knee joint (Saavedra et al., 2020). Discoid meniscus (DM) is a rare developmental variant of meniscal growth and development. The tissue of a DM is hypertrophic, with a reduced content of collagen fibers and a more disorganized fiber orientation compared to a normal meniscus. Instead of the typical crescent form, a DM is thicker and wider, and in some cases may cover an entire half of the tibial plateau. These structural differences increase the susceptibility of the DM to tears due to shear forces. Even in the absence of tears, its size and shape alone may restrict joint motion. When symptomatic, it can cause pain and limit mobility in otherwise healthy and active children (Anderson et al., 2023). Prolonged pain (> 6 months) due to a tear doubles the risk of associated chondral lesions (Saavedra et al., 2020). The clinical presentation of DM is highly variable and depends on several factors, including the shape and stability of the meniscus, concomitant intra-articular pathologies, as well as the patient's age and level of physical activity (Saavedra et al., 2020; Albishi et al., 2024). The most common symptoms include episodic pain, swelling, joint snapping, and mechanical locking; additionally, a characteristic "click" may be heard during terminal knee extension (Albishi et al., 2024).

The pathogenesis of DM remains a matter of debate (Chen et al., 2013). Its prevalence is notably higher in Asian populations (Saavedra et al., 2020). Most of the current knowledge is based on studies of the more common discoid lateral meniscus, with a reported prevalence ranging from approximately 0.4% to 20% (Anderson et al., 2023) or 1.5% to 15% (Chen et al., 2013), depending on the population and sampling method. In contrast, the discoid medial meniscus (DmM) is exceedingly rare, with an estimated prevalence between 0.06% and 0.3%, depending on the studied population. The literature regarding its clinical presentation, surgical treatment, and outcomes is limited (Anderson et al., 2023).

Initial diagnostic evaluation includes standard radiography and magnetic resonance imaging (MRI) (Accadbled et al., 2025; Saavedra et al., 2020), while arthroscopy provides definitive confirmation of meniscal morphology and stability (Saavedra et al., 2020). Current recommendations classify DM based on morphology (complete/incomplete), peripheral stability (stable/unstable), and the presence of a tear. The goal of treatment is to restore typical anatomy through saucerization, management of tears, stable meniscal fixation, and repair of unstable peripheral rims (Anderson et al., 2023; Saavedra et al., 2020).

1.1 Platelet-rich plasma

Platelet-rich plasma (PRP) is blood plasma with a platelet concentration higher than baseline levels. In addition to platelets, it contains coagulation factors and is enriched with growth factors, chemokines, cytokines, and other plasma proteins (Alves & Grimalt, 2018, Troha et al., 2023). The role of platelets in tissue healing processes has stimulated extensive research and led to their therapeutic application in musculoskeletal disorders, particularly in cartilage pathologies and degenerative meniscal injuries (El Zouhbi et al., 2024; Mitev & Longurov, 2019; Xie et al., 2014). Due to its autologous origin, PRP reduces the risk of adverse effects and represents a simple, effective, and cost-accessible therapeutic approach (El Zouhbi et al., 2024).

The aim of this case study is to present a rare case of DmM and to examine the role of PRP in its treatment, particularly considering the potential discrepancy between subjective symptom improvement and the actual morphological progression of the lesion.

2. Case presentation

A 12-year-old boy was referred to a traumatologist for evaluation of pain in the left knee. He reported a direct blow to the knee that resulted in swelling and pain. The condition improved after a few days; however, three months later, pain recurred in the medial aspect of the knee, primarily during increased physical load and prolonged standing. The patient denied any prior knee injuries. Written informed consent for the publication of this case report and any accompanying clinical data or images was obtained from the patient's parents. Every effort has been made to ensure the anonymity of the patient. A copy of the written consent is available for review by the authors.

Plain radiography demonstrated a skeletally immature knee with open growth plates, without evidence of fractures or dislocations. MRI revealed a DmM with centrally increased signal intensity without evidence of a tear, along with mild edema at the meniscocapsular junction and in the posteromedial portion of the tibial epiphysis (**Figure 1A**). On clinical examination, there was tenderness to palpation over the medial joint line, corresponding to the area of meniscocapsular oedema observed on MRI. The range of motion of the left knee was preserved. Ligamentous structures were stable and comparable to the contralateral side. The Ballottement and McMurray tests were negative.

3. Treatment

Following the initial clinical and imaging evaluations, rest was recommended, along with avoiding excessive strain on the knee joint and activities that provoked pain. Participation in sports activities was also discouraged while the pain persisted. Since the condition did not improve significantly within a month, the patient was referred to physical therapy. He underwent an individually tailored exercise program, with an emphasis on muscle strength training and analgesic electrostimulation. He also received instructions on the proper execution of the exercises at home. After completing physiotherapy, the patient reported partial pain relief, along with improved muscle strength.

As the pain persisted, a decision was made during a follow-up examination to perform an ultrasound-guided PRP injection (using the double centrifugation method, i.e., "leucocyte-poor" PRP using the Arthrex ACP Max method). It was applied at the site of greatest tenderness in the meniscocapsular junction of the medial meniscus, with the purpose of locally stimulating tissue regeneration. Following the application, the patient was advised to adjust physical activity according to pain levels and gradually return to sports activities as symptoms improved. No physical therapy was performed in the period following the PRP application, as this could have masked its therapeutic effect.

Immediately after the PRP application, the patient reported intense pain (VAS = 8/10), which subsided within one week. The temporary increase in symptoms immediately after injecting PRP can be attributed to the method of administration; specifically, following application to the periphery of the meniscus (extra-articular), more intense pain may be present compared to intra-articular application, similar to what can be observed in intra-meniscal application. In intra-meniscal application, pain lasts an average of 2–3 days and may result from increased pressure that develops in the tissue during infiltration (Sánchez et al., 2023).

4. Outcomes

Three months after the PRP injection, the patient reported a reduction in pain. The pain was present only during high impact activities. The patient and his parents were satisfied with the results, so the therapy was deemed successful. At this point, the treatment was concluded. Eight months later, knee pain recurred, so the patient was referred for second MRI (**Figure 1B**). A horizontal fissure was identified, seemingly extending across the entire surface of the meniscus and most likely disrupting the inferior articular surface in the posterior portion. A small parameniscal cyst in the body region and a slightly dysplastic medial femoral condyle were also detected. Initially, conservative treatment was pursued; however, due to the aggravation of symptoms and progression of structural changes visible on the imaging, the decision to proceed with operative treatment was made. Knee arthroscopy was indicated.

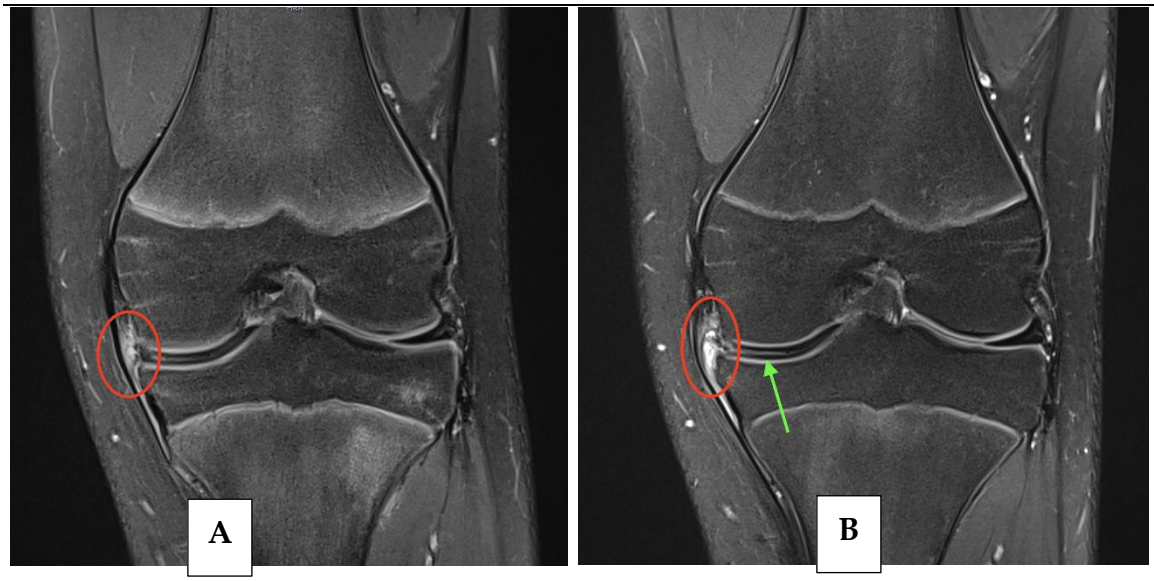

Figure 1. A: The red ellipse indicates the site of the edema and a suspected injury to the ligamentous structures at the peripheral aspect of the discoid medial meniscus (7. 9. 2024). B: The red ellipse indicates the site of the progression of edema at the periphery of the medial meniscus. The green arrow indicates the progression of horizontal separation of the meniscus into the upper (femoral) and lower (tibial) surfaces (2. 2. 2026).

During the arthroscopic procedure, no visible signs of meniscal degeneration or tear were observed. Given the preserved meniscal tissue and the absence of significant degenerative changes in the articular surfaces, saucerization was not performed. A site of relative weakness with increased meniscal mobility was palpated at the periphery of the meniscus. At this site, a suture was placed using the "all-inside" technique (Arthrex FiberStitch) to reinforce the meniscocapsular junction. Postoperatively, relative rest and avoiding knee flexion beyond 90° were recommended. At the follow-up examination two weeks later, the knee was not swollen, and passive knee range of motion was adequate. Palpation of the medial aspect of the knee did not elicit significant pain. The patient was advised to walk normally and was also referred to physiotherapy.

5. Discussion

Most cases of DM are asymptomatic and do not require treatment, as the knee joint likely adapts to the altered anatomy and maintains adequate function (Kim et al., 2016). Due to the rarity of DmM cases, treatment recommendations are limited (Accadbled et al., 2025). Yang and colleagues (2022) cite three indications for a conservative approach: if the lesion is asymptomatic and discovered incidentally; if clinical signs are mild and do not affect daily activities or regular sports activities; and if symptoms are present due to another comorbid condition (e.g., osteoarthritis, rheumatoid arthritis). Physiotherapy is also recommended as a conservative approach, although there is no evidence that exercise maintains DM in an asymptomatic state (Albishi et al., 2024). Conservative treatment of symptomatic DM has a high failure rate in the literature (Logan et al., 2021). Logan and colleagues (2021) found that, out of 83 cases of conservatively treated DM, 39% required additional surgical treatment.

Surgical treatment is indicated in cases of symptomatic ruptures, instability, or chronic pain (Accadbled et al., 2025; Saavedra et al., 2020). DmM is generally considered a congenital anomaly (Flouzat-Lachaniette et al., 2011), characterized by structural changes such as a disorganized collagen network, mucinous degeneration, and reduced vascularization, which increases its susceptibility to injury even without significant trauma (Saavedra et al., 2020). In our case, the patient reported a direct blow to the knee, which likely triggered symptoms in a previously asymptomatic meniscus, raising the possibility of a traumatic etiology. In our interpretation this most likely represents a lesion of the DmM periphery, that would not typically occur in a normally structured meniscus suggesting a mixed traumatic-degenerative etiology, to which the discoid nature of the meniscus very likely contributed. Given the subtle changes on MRI, a conservative

treatment regimen was initially prescribed, but it did not yield satisfactory improvement. PRP therapy was subsequently indicated with the aim of stimulating regenerative processes in the menisco-capsular junction, where pain was clinically most evident alongside concomitant MRI-visible changes (oedema).

Although PRP is increasingly used for various musculoskeletal conditions, its role in meniscal injuries is largely limited to adjunctive therapy during surgical procedures and is less commonly used as a primary conservative treatment (Sánchez et al., 2023). In the present case, when PRP was indicated, the clinician believed that the lesion was not mechanically unstable and that stimulating local healing processes could help alleviate symptoms. However, it turned out that the meniscal lesion assessed as mechanically unstable could not be treated exclusively with PRP.

Ishida et al. (2007) found that PRP enhances the healing capacity of the inner, avascular portion of meniscal cells, likely due to growth factors that enhance the biological activity of meniscal cells and promote tissue regeneration. In an in vivo model of meniscal injuries in rabbits, the newly formed reparative fibrocartilaginous tissue was structurally similar to the inner parts of the normal meniscus, although histologically, boundaries between the regenerated and healthy tissue were still visible (Ishida et al., 2007).

Despite improved functional outcomes in patients with degenerative meniscal tears who received PRP, no evidence of lesion healing was visible on MRI, which could be explained by its isolated anti-inflammatory effect, the differing MRI signal characteristics of scar tissue, or the relatively short follow-up period (Guenoun et al., 2020). Similarly, in our case the temporary efficacy of PRP therapy could be attributed to its anti-inflammatory effect, while the mechanical lesion at the periphery of the DmM progressed and was more pronounced on the follow-up MRI. The situation could therefore be interpreted as PRP masking the symptoms of otherwise progressive mechanical lesion at the periphery of the DmM.

In adolescents with meniscal injuries, intra-articular PRP injection has been shown to be effective in reducing pain (Popescu et al., 2020). However, a study on discoid lateral meniscus injuries showed no difference in clinical outcomes between the PRP group and the non-PRP group (Dai et al., 2019). In the described case, PRP administration successfully provided temporary pain relief but was unable to stimulate reparative processes to the extent required for healing of the meniscal lesion. Furthermore, once the anti-inflammatory effect of PRP therapy wore off, symptoms recurred after nearly one year.

The presented case demonstrates that conservative treatment of DmM with PRP can lead to temporary improvement in symptoms but does not prevent or reverse the underlying structural changes in the meniscus. The PRP injection resulted in a temporary reduction in pain, which allowed the patient to engage in a higher level of activity. Nevertheless, a single PRP application could not induce significant morphological healing, which was later reflected in the progression of the lesion and the need for arthroscopic surgical intervention. Despite promising results from experimental models suggesting the regenerative potential of PRP (Ishida et al., 2007), the findings of clinical studies are inconsistent. Dai et al. (2019) found that the addition of PRP during arthroscopic suturing of the discoid lateral meniscus does not reduce pain or contribute to improved function compared to standard surgical treatment without added PRP. Sánchez and colleagues (2023), however, report that the combination of intrameniscal and intra-articular PRP applications represents an effective conservative treatment method for meniscal injuries that may reduce the need for surgical intervention.

In the case described, physiotherapy was not included following PRP administration to isolate the effect of PRP; however, this may represent a limitation from the perspective of comprehensive DM management. In literature, PRP is often used in combination with physiotherapy treatment. Kaminski et al. (2019) demonstrated that the combination of percutaneous trepanation, PRP and targeted physiotherapy improves clinical outcomes and reduces the need for subsequent surgical treatment. The lack of concomitant physiotherapy may have limited the extent of functional improvement observed in this case. The synergistic effect of the combined approach remains unclear and warrants further investigation.

At the same time, questions remain regarding the optimal protocol for PRP use, including the potential need for repeated applications and the duration of the follow-up after PRP administration, as most studies are based on the short-term outcomes. In our case, PRP did

not provide lasting improvement. Symptoms worsened, necessitating surgical intervention with arthroscopic meniscal stabilization.

6. Conclusions

DmM is a rare, often asymptomatic anatomical condition that can pose a significant diagnostic and therapeutic challenge. The presented case confirms the ambivalent effect of PRP in clinical practice—on the one hand, it can serve as an effective symptomatic therapy and potentially delay surgical treatment; on the other hand, due to the absence of a structural effect, it may contribute to underestimating the underlying pathology. As demonstrated in this case, symptomatic improvement may mask progression of an underlying mechanical lesion, emphasizing the importance of careful clinical and imaging follow-up. Given the variability in application protocols and inconsistent evidence regarding long-term outcomes, PRP should be used selectively and on an individual basis, with consideration of its cost-effectiveness. Since this is a presentation of a single case report, the findings cannot be generalized; however, they may contribute to a better understanding of the role of PRP in the treatment of meniscal injuries.

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