Cureus
Part of SPRINGER NATURE

Open Access Case Report

Bilateral Displaced Lateral Meniscal Tears With Suspected Underlying Discoid Morphology: An MRI Case Series

Review began 10/17/2026
Review ended 11/11/2026
Published 11/17/2026

© **Copyright** 2026
Bahauddin et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

DOI: 10.7759/cureus.119805

Rabia Bahauddin [1], Alaa Al-Taie [2], Syed Alam [2], Renan Ibrahem Adam [3, 4]

1. Radiology, Hamad Medical Corporation, Doha, QAT 2. Radiology, Hamad General Hospital, Doha, QAT 3. Medicine, Qatar University, Doha, QAT 4. Musculoskeletal Radiology, Hamad Medical Corporation, Doha, QAT

Corresponding author: Rabia Bahauddin, rabia.rabia70@gmail.com

Abstract

An MRI interpretation of discoid lateral meniscus should be thought of in patients demonstrating bilateral bucket-handle tears. The typical lateral meniscus is more anatomically varying than the medial meniscus, with the forms comprising multiple entities that differ in outline, size, and insertion. The most prevalent lateral meniscus subtype is discoid meniscus. Discoid lateral meniscus has a diverse and intricate morphology that can be difficult to evaluate and intervene. Relative to the typical semilunar meniscus, the discoid lateral meniscus is more prone to meniscal tears.

Categories: Radiology, Sports Medicine, Anatomy
Keywords: bucket-handle tear, discoid meniscus, knee mri, lateral meniscus tear, msk radiology

Introduction

The typical lateral meniscus is more anatomically diverse than the medial meniscus [1]. Discoid lateral meniscus has a heterogeneous and complex morphology that can be difficult to evaluate and manage [2]. It is a developmental variant of the knee joint that encompasses anatomical and architectural distortion, with possible meniscal instability [3]. MRI has been demonstrated to be a sensitive and specific modality for minimally invasive identification of meniscal tears. However, as far as we are aware, its reproducibility has not been importantly studied. Because of regional morphologic features, the MRI characteristics of discoid meniscus tears may be unusual [4].

Case Presentation

The clinical records and imaging studies of 50 patients identified with bucket-handle tears at a tertiary hospital between January 2020 and December 2025 were retrospectively analyzed. Only bilateral lateral meniscal abnormalities with suspected discoid morphology were included. Forty-seven patients were excluded for not meeting these criteria. Repeat scans were reviewed under the same patient record. Data gathered included age at the time of diagnosis, laterality, presence of meniscal tear, and anterior cruciate ligament (ACL) status. After omitting patients with ACL tears and unilateral bucket-handle tears, only cases with bilateral bucket-handle tears were analyzed. Prior imaging studies were retrospectively evaluated to establish whether discoid meniscal morphology had been previously identified.

Case 1

A 17-year-old patient presented with bilateral knee pain and left knee clicking. He was alert and oriented. On physical examination, there was normal activity with no restrictions. MRI of the bilateral knees was done for him. The MRI showed a large displaced meniscal flap fragment in the intercondylar groove consistent with a bucket-handle tear variant bilaterally. The presence of a mega root, intra-meniscal cyst, and meniscal flap fragment was confirmed bilaterally with a para-meniscal cyst only seen on the right side. The patient's imaging results are shown in Figures *1*-*4*.

How to cite this article
Bahauddin R, Al-Taie A, Alam S, et al. (November 17, 2026) Bilateral Displaced Lateral Meniscal Tears With Suspected Underlying Discoid Morphology: An MRI Case Series. Cureus 18(11): e119805. DOI 10.7759/cureus.119805

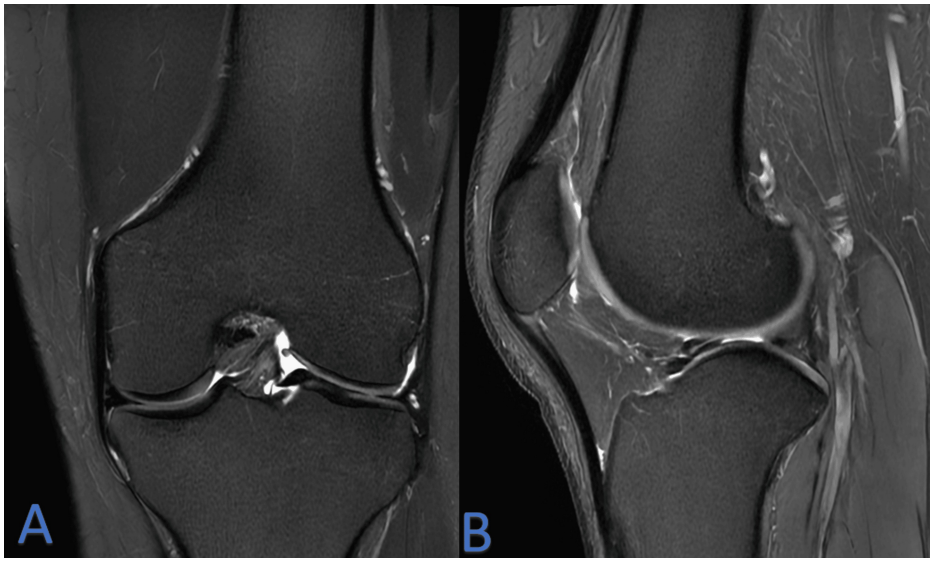


FIGURE 1: Left knee MRI of Patient 1 during follow-up after one year showing the redemonstration of the bucket-handle tear variant: (A) coronal T2 FS and (B) sagittal PD FS

PD: proton density; FS: fat suppression

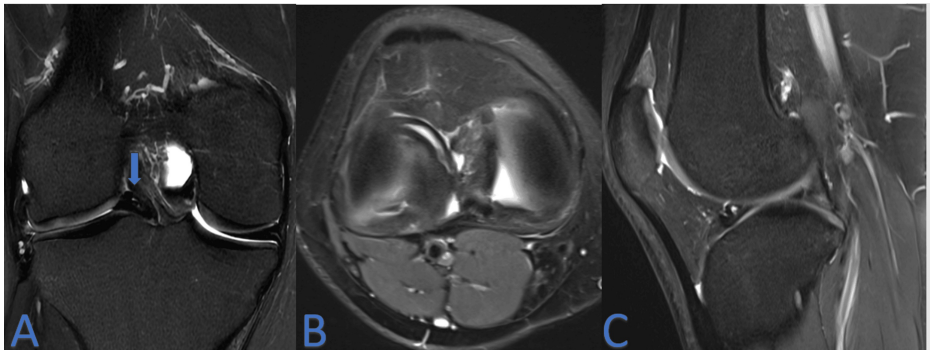


FIGURE 2: Right knee MRI of Patient 1 during follow-up after one year showing the redemonstration of the bucket-handle tear variant: (A) coronal T2 FS, (B) axial PD FS, and (C) sagittal PD FS

The arrow depicts the large displaced meniscal flap fragment in the intercondylar groove.

PD: proton density; FS: fat suppression

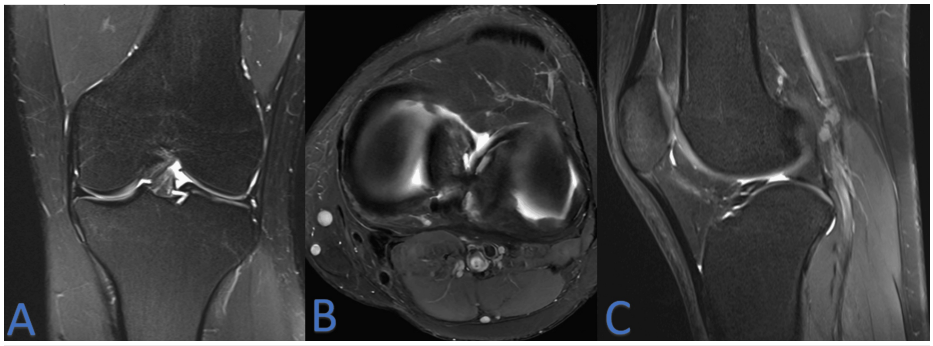


FIGURE 3: Left knee MRI of Patient 1 showing the bucket-handle tear variant: (A) coronal T2 FS, (B) axial PD FS, and (C) sagittal PD FS

PD: proton density; FS: fat suppression

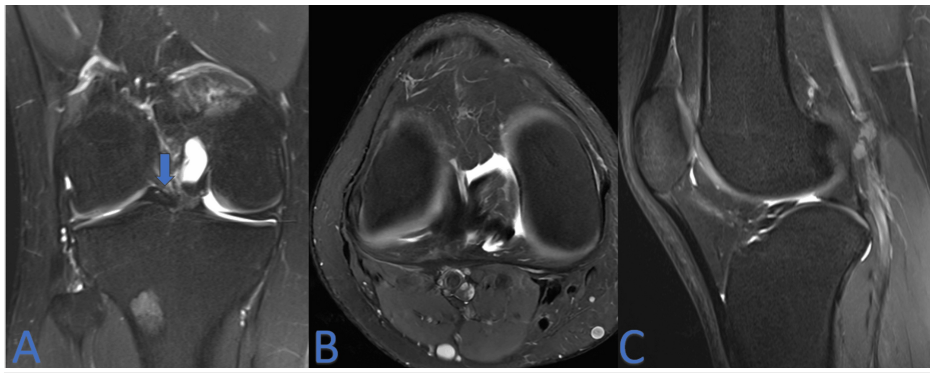


FIGURE 4: Right knee MRI of Patient 1 showing the bucket-handle tear variant of the lateral meniscus with a large meniscal fragment in the intercondylar region: (A) coronal T2 FS, (B) axial PD FS, and (C) sagittal PD FS

The arrow depicts the large displaced meniscal flap fragment in the intercondylar groove. An incidental non-ossifying fibroma is noted in the proximal tibia.

PD: proton density; FS: fat suppression

The patient was referred to physical therapy for quadriceps strengthening exercises with follow-up. Arthroscopic evaluation of the left knee confirmed a bucket-handle tear of the lateral meniscus with a large immobile displaced fragment within the intercondylar notch. The fragment was excised, followed by a platelet-rich plasma (PRP) injection. The right knee was managed conservatively without surgical intervention. No conclusions regarding the prevention of future osteoarthritis can be drawn from this case.

Case 2

An 18-year-old patient presented with right knee pain. MRI of the right knee was ordered for her. It showed a discoid lateral meniscus with features of degeneration. A follow-up MRI of the bilateral knees was done three years later. It showed progression of the right knee discoid meniscus degeneration to a complex tear involving the posterior horn, body, and anterior horn with a displaced fragment. A similar complex tear of the lateral meniscus was noted on the left side as well. Again, confirmed was the presence of a mega root, para-meniscal cyst, and meniscal flap fragment bilaterally. These findings were similar to the previous patient, hence concluding a bucket-handle tear variant bilaterally. The patient is undergoing physiotherapy with strengthening exercises currently showing improvement with regular follow-up. The patient's imaging results are shown in Figures *5*-*7*.

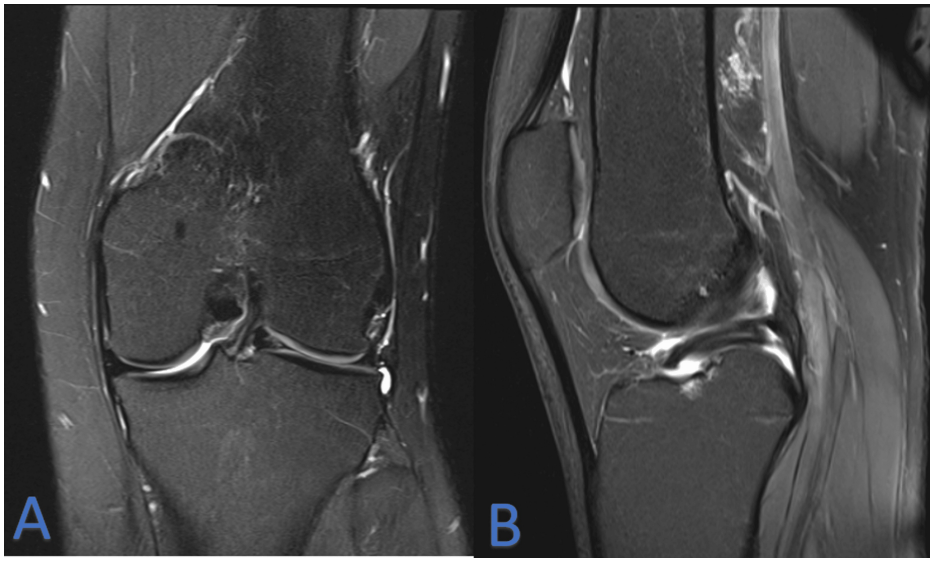


FIGURE 5: Left knee MRI of Patient 2 showing a complex tear of the lateral likely discoid meniscus and displaced fragment: (A) coronal T2 FS and (B) sagittal PD FS

PD: proton density; FS: fat suppression

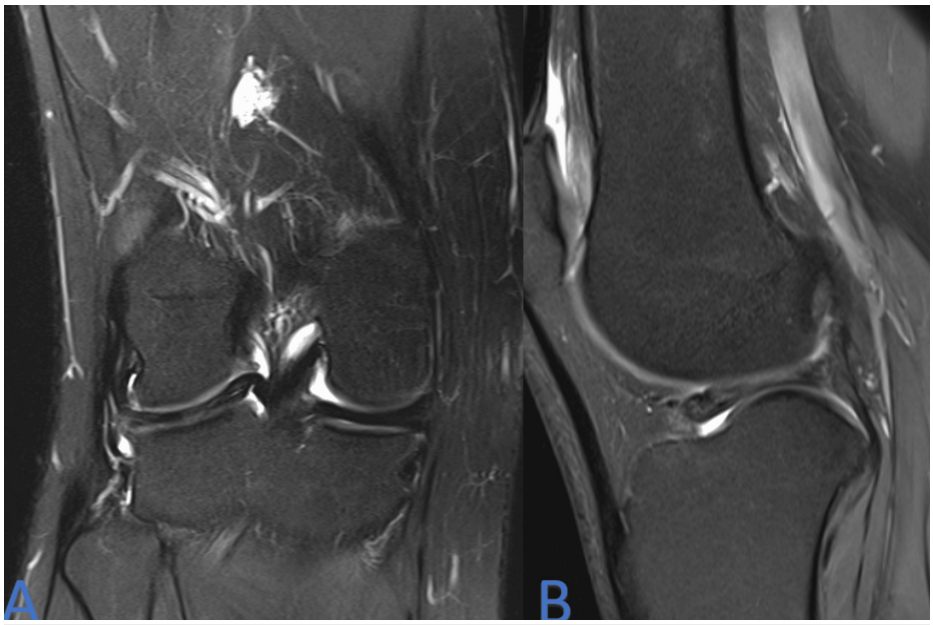


FIGURE 6: Right knee MRI of Patient 2 during follow-up after three years showing a complex tear of the lateral likely discoid meniscus and displaced fragment: (A) coronal T2 FS and (B) sagittal PD FS

PD: proton density; FS: fat suppression

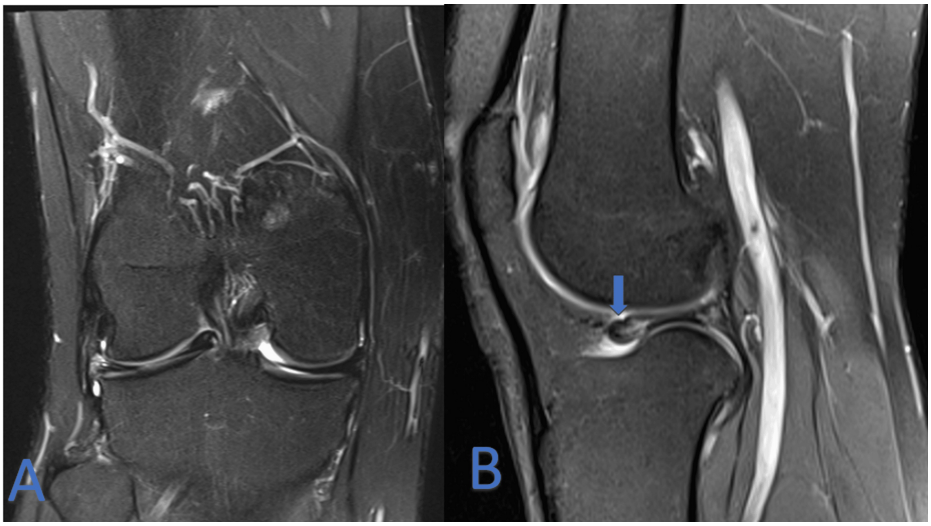


FIGURE 7: Right knee MRI of Patient 2: (A) coronal T2 FS and (B) sagittal PD FS

The arrow depicts the discoid lateral meniscus with degeneration.

PD: proton density; FS: fat suppression

Case 3

A 30-year-old patient presented with bilateral knee pain worsening over the last year with locking and clicking on physical examination. She was a known case of bilateral discoid lateral meniscus with no radiological record available at the hospital. An MRI examination of the bilateral knees was ordered for her.

The right lateral meniscus demonstrated a complex tear of the body with marked attenuation, volume loss, and extrusion. The anterior horn was not visualized in its normal position and appeared flipped posteriorly, resulting in a bulky appearance of the posterior horn with increased intra-meniscal signal. An additional oblique horizontal tear of the posterior horn extended to the inferior articular surface.

On the left side, the lateral meniscal body appeared attenuated with a displaced meniscal fragment in the intercondylar notch demonstrating continuity with the anterior and posterior horns, suggestive of a longitudinal bucket-handle tear. Associated intra-meniscal signal changes with focal tears in the anterior and posterior horns of the lateral meniscus were noted.

Again, confirmed was the presence of a mega root, para-meniscal cyst, and meniscal flap fragment bilaterally. The patient is now referred for bilateral knee arthroscopy. The patient's imaging results are shown in Figures *8*-*9*.

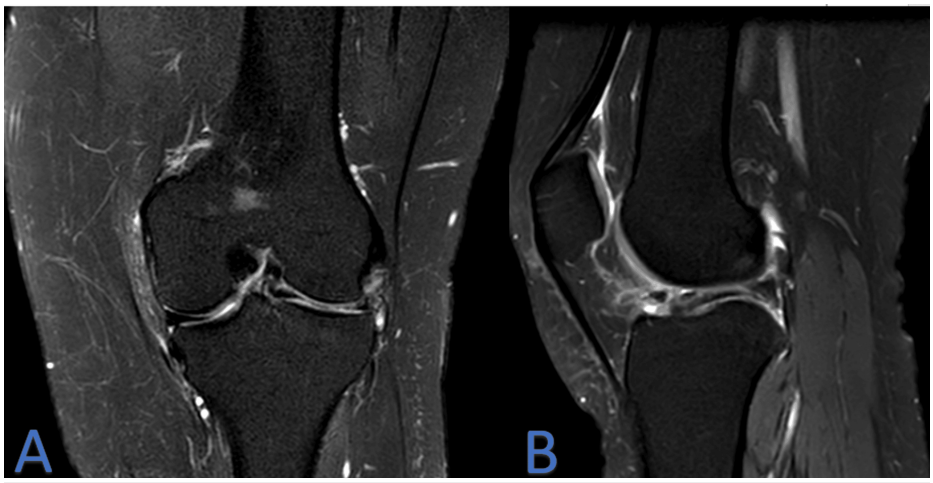


FIGURE 8: Left knee MRI of Patient 3 showing an intact bucket-handle tear of the discoid meniscus: (A) coronal T2 FS and (B) sagittal PD FS

The arrow depicts the flipped torn meniscus.

PD: proton density; FS: fat suppression

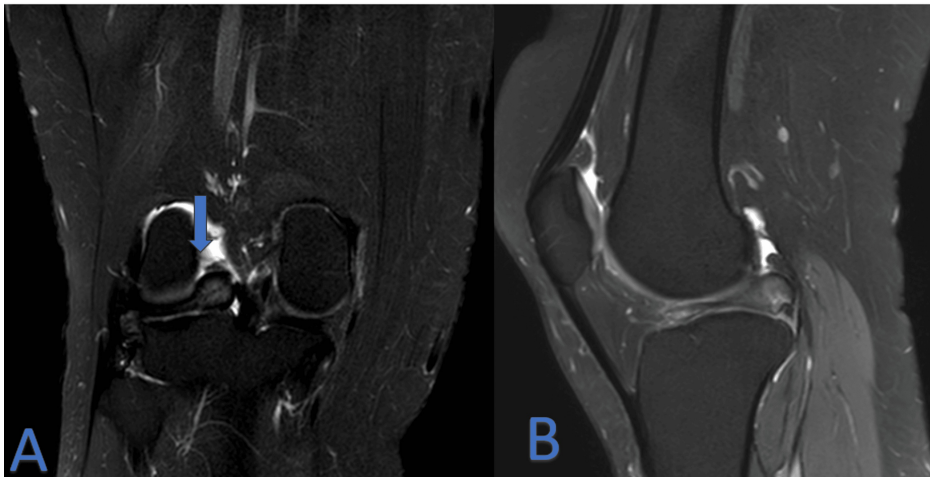


FIGURE 9: Right knee MRI of Patient 3 showing a complex tear of the discoid meniscus: (A) coronal T2 FS and (B) sagittal PD FS

The arrow depicts the flipping of the anterior horn with severe degeneration.

PD: proton density; FS: fat suppression

Discussion

The discoid lateral meniscus is not an uncommon condition. Reports suggest diverse tear patterns of the discoid lateral meniscus. The bucket-handle tear is most commonly seen in young individuals with a history of trauma. Compared with a normal meniscus, the discoid meniscus is more prone to injury owing to its abnormal shape and structural composition [1]. The instability of the discoid meniscus is identified as lacking menisco-capsular attachments or a tear [2]. There are three types of discoid meniscus according to the Watanabe classification: the complete, incomplete, and Wrisberg-type discoid meniscus. The Wrisberg variant is characterized by posterior meniscal hypermobility due to deficient posterior meniscotibial attachments, which may result in clicking during knee movements. The posterior horn of the discoid lateral meniscus may anteriorly flip, resembling a bucket-handle tear. The MRI-based diagnostic criteria for a discoid meniscus include a mid-body width of 14 mm, as proposed by Araki et al., while others reported thresholds of 15 mm and 13 mm, respectively. Another feature used on sagittal MRI is three or more consecutive 5 mm sagittal slices showing maintained continuity of the anterior and posterior horns, referred to as the "bow-tie" appearance [3].

A range of tear patterns have been recognized in the discoid lateral meniscus encompassing radial, horizontal cleavage, intrasubstance, degenerative, and longitudinal tears. Displacement of torn meniscal fragments may occur in discoid lateral menisci, with fragments migrating anteriorly, posteriorly, or centrally into the intercondylar notch. In discoid lateral meniscus, the inverted flip meniscus tears are readily underappreciated, where the torn segment from one horn shifts and sits under the other horn. This may be attributed to tears occurring more centrally, leaving the residual meniscal rim within normal size limits. The signal changes in discoid lateral meniscus are more generalized as well. The occurrence of a discoid lateral meniscus can be easily missed in the presence of a tear attributing to the consequences of the secondary changes [3].

MRI signs of bucket-handle tear include absent bow-tie sign, double posterior cruciate ligament (PCL) sign, and displaced meniscal fragment [4]. Although arthroscopy remains the diagnostic gold standard, MRI is a valuable modality for the identification and characterization of meniscal injuries. Furthermore, a discoid meniscus spans the tibial plateau in part or in whole, permitting for more than two bow-tie segments to be illustrated, even in the existence of a bucket-handle tear. Bucket-handle tears occur more commonly in the medial meniscus, whereas discoid morphology predominantly affects the lateral meniscus. Discoid lateral meniscal morphology may obscure the MRI appearance of an associated bucket-handle tear [5]. Our findings are consistent with previous reports that large radial tears, deformed bucket-handle tears, and inverted flap tears may obscure the underlying discoid meniscal morphology.

In our case series, all three patients demonstrated bilateral inclusion with notably similar imaging features and intact ACLs. Neither had an established history of trauma, which varies from the typical bucket-handle tear pattern reported in younger patients following injury. Previous right knee imaging in Case 2 showed discoid lateral meniscal morphology, providing direct evidence of a pre-existing discoid meniscus. In the remaining knees, including Case 3, prior imaging was unavailable, and the underlying discoid morphology was suspected based on current MRI findings and the reported clinical history. Frequent imaging features across all patients included bilateral displaced meniscal flap fragments, mega-root appearance, para-meniscal or intra-meniscal cyst formation, and widespread degenerative signal alteration of the lateral meniscus. These findings demonstrate degenerative changes and displaced meniscal fragments, while the potential contribution of chronic degeneration and mechanical instability to bucket-handle tear-like patterns remains hypothetical.

At a broader healthcare service level, integrating radiology into primary care can support timely diagnosis and coordinated patient management. These cases presented herein further show the potential imaging spectrum of discoid lateral meniscus degeneration. Available previous examinations demonstrated evolution from a relatively maintained discoid meniscus to diffuse degeneration, complex tearing, and ultimate displacement of meniscal fragments into the intercondylar notch, resulting in a bucket-handle tear-like appearance as mentioned in Case 2. Identification of associated findings such as an enlarged anterior root of the lateral meniscus (mega-root appearance) best appreciated on sagittal images, meniscal cysts, diffuse meniscal enlargement, and bilaterality may assist in recognizing the underlying discoid morphology when classic MRI criteria are masked by tearing and degeneration. Reassessment of persistent or unexplained symptoms following the initial evaluation is important to identify potentially overlooked underlying meniscal abnormalities.

This study is limited by its small sample size and retrospective selection of patients, introducing potential selection bias. Therefore, these findings cannot establish the prevalence or diagnostic accuracy of the described MRI features.

Conclusions

This case series emphasizes the significance of taking into account discoid meniscus tear mimics when MRI demonstrates bucket-handle-like displacement of the lateral meniscus in the setting of intact ACLs, especially bilaterally in younger patients. This knowledge and the above-mentioned diagnostic consideration can enhance radiologic strength and guide suitable surgical planning.

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: Rabia Bahauddin, Alaa Al-Taie, Syed Alam, Renan Ibrahem Adam

Acquisition, analysis, or interpretation of data: Rabia Bahauddin, Alaa Al-Taie, Syed Alam, Renan Ibrahem Adam

Drafting of the manuscript: Rabia Bahauddin, Alaa Al-Taie, Syed Alam, Renan Ibrahem Adam

Critical review of the manuscript for important intellectual content: Rabia Bahauddin, Alaa Al-Taie, Syed Alam, Renan Ibrahem Adam

Supervision: Rabia Bahauddin, Alaa Al-Taie, Syed Alam

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. Research Publication Office issued approval MRC-04-26-264. **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.

References

1. Choi J, Chung H, Ahn J, Yoon Y: Central hole tear of the discoid meniscus of the knee in magnetic resonance imaging: mimicking the bucket-handle tear. J Comput Assist Tomogr. 2009, 33:155-9. 10.1097/rct.0b013e318166d6a7
2. Sohn DW, Bin SI, Kim JM, Lee BS, Kim SJ: Discoid lateral meniscus can be overlooked by magnetic resonance imaging in patients with meniscal tears. Knee Surg Sports Traumatol Arthrosc. 2018, 26:2317-23. 10.1007/s00167-017-4704-6
3. Kim HY, Kim JM, Lee BS, Ryu J: Tear pattern of the complete discoid lateral meniscus according to meniscal morphology. Orthop J Sports Med. 2025, 13:23259671241306842. 10.1177/23259671241306842
4. Helms CA, Laorr A, Cannon WD Jr: The absent bow tie sign in bucket-handle tears of the menisci in the knee. AJR Am J Roentgenol. 1998, 170:57-61. 10.2214/ajr.170.1.9423600
5. Asiri FA, Al-Ahaidib A, Al-Ahaideb A: A bucket-handle tear in a discoid lateral meniscus: a case report and literature review. Clin Med Case Rep. 2019, 3:126.