

Arthroscopic and Magnetic Resonance Images of an Inferiorly Displaced Meniscal Flap Tear

Dear Editor,

The menisci are important tissues in the healthy knee due to their shock absorption and load distribution properties. Meniscal tears are important clinically due to pain and swelling and the mechanical symptoms they cause such as locking. The arthroscopic anatomical classification of meniscal tears was described by Dandy in 1990.¹ In the paper, he noted that the majority (69%) of meniscal tears were vertical types which gave rise to bucket handle tears. The other types of tear morphology included horizontal which gave rise to flaps, radial, cystic degeneration, and tears with inverted fragments. In particular, the paper reported that 6% of medial meniscal tears were inverted fragments which arose from horizontal flap tears or ruptured bucket handle fragments. Such inverted fragments could be found tucked beneath the intact meniscal rim. Dandy made a note that inverted tears were often difficult to recognise but could be identified by thickening and rounding of the meniscal margin.

Various papers published in radiological journals have described the magnetic resonance imaging (MRI) and ultrasonographic appearance of medial meniscus tears with an inferiorly displaced flap.²⁻⁵ On MRI, the displaced flap could be seen adjacent to the medial tibial plateau and deep to the medial collateral ligament.² It was noted, however, that inferior flap tears can be inconspicuous and easily overlooked by both radiologists and orthopaedic surgeons. Anecdotally, such flap tears with displacement of the fragment inferiorly into the medial gutter are not a rare finding during arthroscopic debridement. Despite this, the orthopaedic literature contains few reports on the arthroscopic appearance of the inferiorly displaced flap tear. We present a case report of a patient with an infolded medial meniscal flap tear identified at arthroscopy. This finding was not noted in the initial report of the MRI scan. Postoperatively, the MRI films were reviewed and the inferiorly displaced flap was identified retrospectively. The images of both the arthroscopy and the MRI scan are presented.

Case Report

The patient was a 53-year-old gentleman who first came under our follow-up in 2002. He had a medical history of borderline hypertension and on diet control. The patient

leads an active sporting lifestyle and engages in badminton and marathon running. The initial presentation was recurrent left knee pain after playing badminton. The symptoms were not responsive to physiotherapy and oral glucosamine supplements. An MRI scan showed an anterior horn tear of the lateral meniscus with a meniscal cyst lateral to it. The patient underwent left knee arthroscopy, partial lateral meniscectomy and marsupialisation of the cyst in 2002. Marsupialisation as an arthroscopic technique of treating meniscal cysts has been described in 2007.⁶ The patient's symptoms improved markedly after the operation. He was well until 2010 when he developed right knee medial joint pain after running on the treadmill 5 months before presentation. There was severe exacerbation of the pain whenever he engaged in physical exercises. There were no locking or laxity symptoms, but an MRI scan was ordered in view of the length of the symptoms. The radiological report stated an under-surface oblique tear in the medial meniscus extending into the posterior horn. There was also subchondral oedema of the weight-bearing aspect of the medial femoral condyle. A decision for arthroscopic debridement of the medial meniscus was made after discussion with the patient.

Routine preoperative assessment for surgical fitness was performed. The patient underwent right knee arthroscopy using standard anteromedial and anterolateral ports after sterile cleansing and draping. Intraoperatively, we noted that the posterior horn of the medial meniscus was fibrillated. Anterior to it was a meniscal edge which appeared rounded and thickened. A probe was used to dislodge the infolded flap from beneath itself. Figure 1 shows the medial meniscus flap tear and the remnant meniscal edge after debridement with a shaver. There was also an isolated area over the medial femoral condyle with full-thickness denuded cartilage and osteonecrotic subchondral bone. Microfracture of this lesion using a 1.6 mm wire to drill holes spaced about 4 mm apart was performed. The lateral meniscus and the cruciate ligaments were intact. Postoperatively, the patient was put on continuous passive motion of the right knee and allowed only toe-touch weight-bearing on the right leg with crutches. The MRI films were reviewed post-arthroscopy and the inferiorly displaced flap identified (Fig. 2). The patient was reviewed in the outpatient clinic

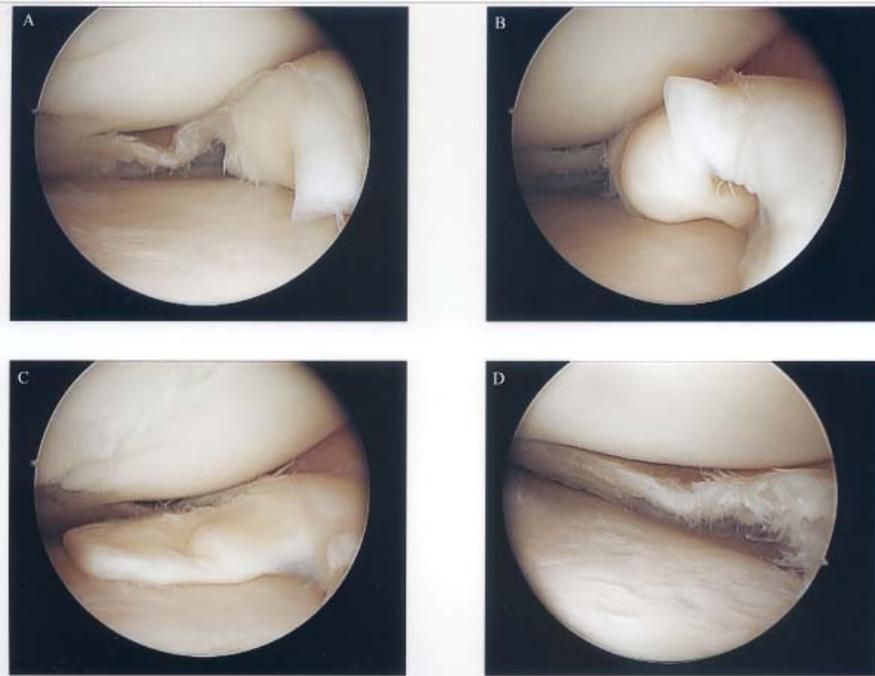


Fig. 1. Arthroscopic images of the patient's medial meniscus. (A) The posterior horn of the medial meniscus is shown where there is fibrillation of the meniscus with a rounded and thickened edge anterior to it. (B) Probing the meniscal edge reveals a possible flap tear displaced inferiorly beneath itself. (C) The meniscal flap is fully brought into the joint. (D) The flap is debrided leaving the remnant meniscal edge.

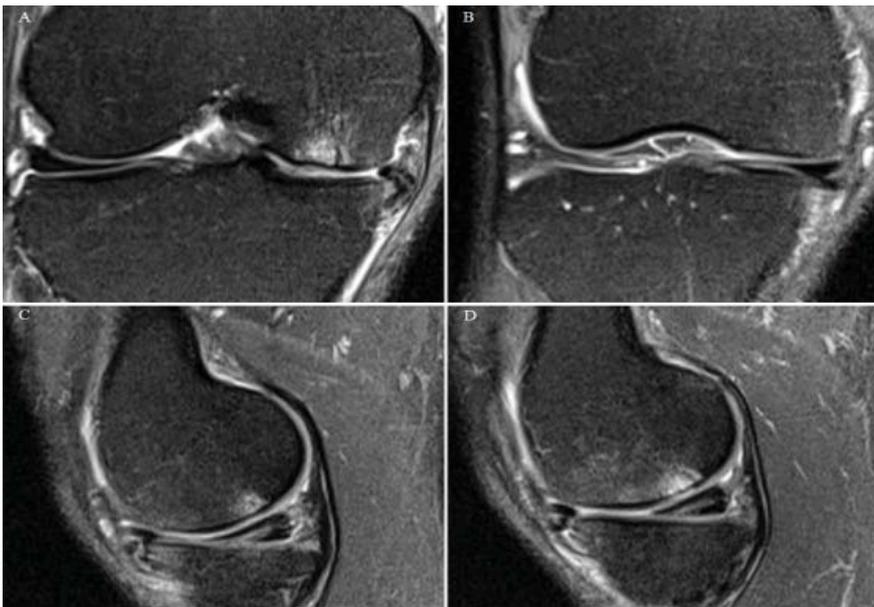


Fig. 2. The MRI images were reviewed again after arthroscopy. (A,B) The T2-weighted coronal sections show the medial meniscus tear displaced inferiorly and medially into the medial tibial gutter. There is an area of marrow edema at the medial femoral condyle corresponding to the area of denuded cartilage seen arthroscopically. (C,D) The sagittal sections show the posterior horn tear with a horizontal cleavage line anterior to it corresponding to the flap tear displaced inferiorly beneath itself.

2 weeks after his operation. He no longer experienced the preoperative symptoms of pain and was able to ambulate well with crutches.

Discussion

This case report presents both the arthroscopic and MRI images of a medial meniscus flap tear displaced inferiorly into the medial tibial gutter. While such an anatomic morphology may not be common, it is important to recognise it as the tear may be missed on MRI imaging or arthroscopically without an adequate index of suspicion.

In this respect, we concur with Dandy when he reported in his paper that inverted fragments may be difficult to recognise.¹ While we acknowledge that retrospectively reviewing our patient's MRI images allowed us to identify the flap tear, it was initially not noted, likely due to the uncommon nature of this tear. A high index of suspicion with careful review is hence required to identify a tear such as the one presented in our report. As such, a flap tear may be inconspicuous and easily overlooked by both radiologists and orthopaedic surgeons. The symptoms associated with such a tear morphology may also be more severe due to the lesion being thicker than usual, and the patient would

be expected to have dramatic relief after arthroscopic debridement as in this case.

The orthopaedic literature contains few reports on the arthroscopic appearance of inferiorly displaced flap tears which the present case report serves to highlight. A meniscal edge which appears rounded and thickened should alert the arthroscopic surgeon to the possibility of a displaced flap tear. The meniscus should be probed to dislodge the flap, which the surgeon may then debride. Through this case report, we hope to increase the awareness of this uncommon tear and remind musculoskeletal radiologists and orthopaedic surgeons alike of the possibility of such a tear when they review preoperative MRI images.

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