



## Case report

# An adult case of spontaneous healing of concurrent osteochondritis dissecans of the lateral femoral condyle after saucerization with meniscal repair for discoid lateral meniscus: A case report

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## ABSTRACT

**Background:** The treatment strategy for osteochondritis dissecans (OCD) with discoid lateral meniscus (DLM) in adults remains unclear.

**Case presentation:** A 22-year-old man presented with left knee pain after spraining his knee. Physical examination revealed lateral joint line tenderness and a positive McMurray test. Radiographic imaging showed OCD of the lateral femoral condyle classified as stage 3 on Brückl's classification. Magnetic resonance imaging showed complete DLM with anterocentral shift based on Ahn's classification and an OCD of 11 mm × 8 mm, grade 2 based on Nelson's classification. On computed tomography (CT), a demarcated fragment was observed in the lesion. Based on these findings, saucerization with meniscal repair was performed for unstable DLM. The OCD lesion presented with softening without any fissure and was diagnosed as grade 1. No surgical procedure was added. One year after surgery, the union of the fragment was confirmed on radiograph and CT. At the final follow-up five years after surgery, the Lysholm score had improved from 58 to 100 points.

**Conclusions:** We experienced an adult case of stable OCD with concurrent DLM that achieved spontaneous healing after undergoing reshaping surgery for DLM, mimicking normal meniscal morphology, without additional treatment for the stable OCD lesion.

## 1. Introduction and importance

Osteochondritis dissecans (OCD) is a disorder of the subchondral bone, which secondarily affects the overlying articular cartilage. The knee is the most commonly affected site. Patients may be asymptomatic or present with pain and mechanical symptoms. It affects skeletally immature patients who engage in sports. In this group, the condition is usually described as juvenile OCD. However, it also occurs in adults, and the prognosis is worse [1,2]. With appropriate treatment, the lesions can still resolve, particularly in juveniles [3–5]. However, lesions that do not heal can lead to premature joint degeneration [6]. OCD of the knee affects the medial femoral condyle more frequently than the lateral femoral condyle.

OCD of the lateral femoral condyle reportedly occurs in 14.5–19% of

persons with a discoid lateral meniscus (DLM) [7,8]. DLM is significant in the development of OCD of the lateral femoral condyle. Repetitive abnormal stress on weaker osteochondral structures produced by a discoid meniscus during growth can cause OCD of the lateral femoral condyle. Ideally, saucerization, which forms a DLM to mimic a normal meniscus, can treat OCD by reducing the stress on cartilage from an abnormal meniscus. However, there is minimal evidence on the treatment strategy of OCD with torn DLM, particularly in adults who have a lower healing potential. We present a case of OCD of the lateral femoral condyle combined with DLM, which healed after saucerization with repair for the symptomatic DLM without surgical intervention for the OCD in an adult patient. The work has been reported in line with the SCARE criteria. [9].

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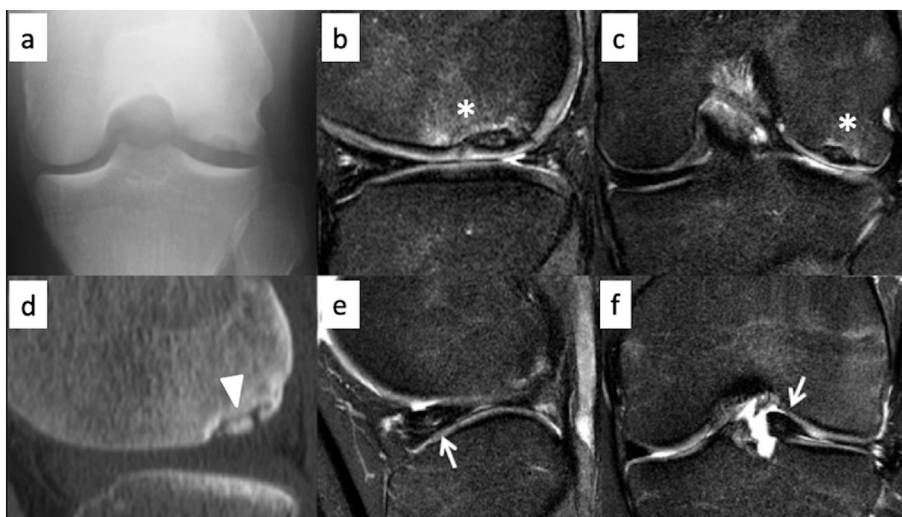
## 2. Case presentation

Informed consent has been obtained from the patient, and all identifying details have been omitted. The patient was a 22-year-old male who complained of sharp pain in the left knee. He twisted his left knee in a motorcycle accident two weeks earlier. The position of knee at the time of injury was not remembered. Prior to the accident, the patient never experienced pain in the knees. He did not engage in sports. A physical examination revealed a range of motion of 0° in knee extension and 120° in flexion. He complained of pain when knee flexed deeply. There was no complaint of locking. There was tenderness on the posterolateral joint line and no swelling of the knee joint. McMurray test was positive on the lateral side. Anterior drawing test and Pivot shift test were negative. In the Rosenberg view of a plain radiograph, OCD was detected on the lateral femoral condyle. The OCD was classified as stage 3 based on Brückl's classification [10]. Computed tomography (CT) showed a detached fragment measuring 11 mm × 8 mm. Magnetic resonance imaging (MRI) revealed subchondral marrow edema on T2-weighted fat-saturated images of the lateral femoral condyle, with no high linear signal between the fragment and the underlying bone. A complete DLM with anterocentral shift [11] was diagnosed on MRI (Fig. 1) based on Ahn's classification. A complete DLM with a longitudinal tear was found on arthroscopy, extending from the mid-body to the posterior horn. After confirming DLM, saucerization was started at the free edge of the meniscus with a standard arthroscopic punch or forceps, referring the circumferential fibers at the anterior part of the DLM. The central portion of the DLM was then resected, piece by piece, to restore the normal width of the peripheral rim. After saucerization, surgical stabilization of the meniscus to the capsule was performed using the inside-out and all-inside techniques. For inside-out repairs, dual meniscal repair needles loaded with 2-0 braided polyester suture (Stryker, Japan) were passed through the meniscus with a mechanical insertion device (Meniscal Suture Kit, Stryker, Japan). All-inside meniscal repairs were performed with the FasT-Fix 360 (Smith & Nephew, Inc., Endoscopy Division, Andover, MA). The cartilage of the lateral femoral condyle only exhibited softening with a continuous surface. It was diagnosed as grade 1a based on the International Cartilage Research Society classification system. No surgical procedure was added for the articular cartilage (Fig. 2). Postoperative rehabilitation began with a range of motion exercise one week postoperatively. The patient's knee was supported by a brace one week after surgery. Partial weight-bearing was allowed during the third week, and full weight-bearing was allowed after six weeks. One year after surgery, the patient's Lysholm score had improved from 58 to 100. CT scan demonstrated bone union of the previous OCD lesion of the lateral femoral condyle. MRI showed

resolution of the bone edema, without distortion of the triangular shape of the lateral meniscus (Fig. 3). During the postoperative follow-up five years later, the patient had no further symptoms stemming from the torn meniscus and had recovered his full range of motion. Activity was not restricted following recovery from the surgical intervention.

## 3. Clinical discussion

This case report showed that OCD of the lateral femoral condyle in adults can be resolved with proper DLM treatment to reduce the abnormal stress on the cartilage. OCD is classified as juvenile or adult type according to the status of the growth plate. The difference between juvenile and adult types is crucial in determining the prognosis and treatment. Non-surgical treatment, including activity modification, is primarily indicated for stable juvenile OCD. In cases with concurrent DLM, several case reports proposed to remove the abnormal stress from the DLM to accelerate the healing of the OCD of the lateral femoral condyle [7,12–15]. Mitsuoka et al. reported the case of a 10-year-old boy who was treated with partial meniscectomy for a discoid lateral meniscus without treatment for OCD of the lateral femoral condyle [7]. They suggested that an abnormal repetitive load on weaker osteochondral structures damaged the discoid lateral meniscus. This was identified as one of the main causes of OCD of the lateral femoral condyle. Matsumoto et al. reported a juvenile case with bilateral OCD lesions of the lateral femoral condyles. The lesions were successfully treated via partial meniscectomy [12]. They proposed that an abnormal contact force caused the development of an OCD lesion in the lateral femoral condyle. Lim and Bae also reported a case of a skeletally immature patient, whose OCD of the lateral femoral condyle healed after partial meniscectomy without surgical interventions for OCD [13]. The previous case reports were juvenile cases, exhibiting continuity of the articular surface. These environments had a higher healing potential for the OCD, even when treating only the symptomatic DLM. In OCD of the medial femoral condyle with non-DLM, Camathias et al. reported that meniscal suturing alone for juvenile OCD showed good or excellent results in clinical scoring and MRI assessment [16]. They emphasized that meniscal stabilization was effective in the treatment of OCD. Bulgheroni et al. reported a case of OCD development after re-tear of DLM [17]. They mentioned the importance of preserving the peripheral meniscal rim. In the present case, meniscal repair was performed using the inside-out and all-inside techniques. Meniscal tears longer than 1.5 cm were repaired with the inside-out technique. In case of difficulty repairing the posterior horn with the inside-out technique, the FasT-Fix was added at the posterior horn. Combining these two techniques, meniscal stabilization was acquired.



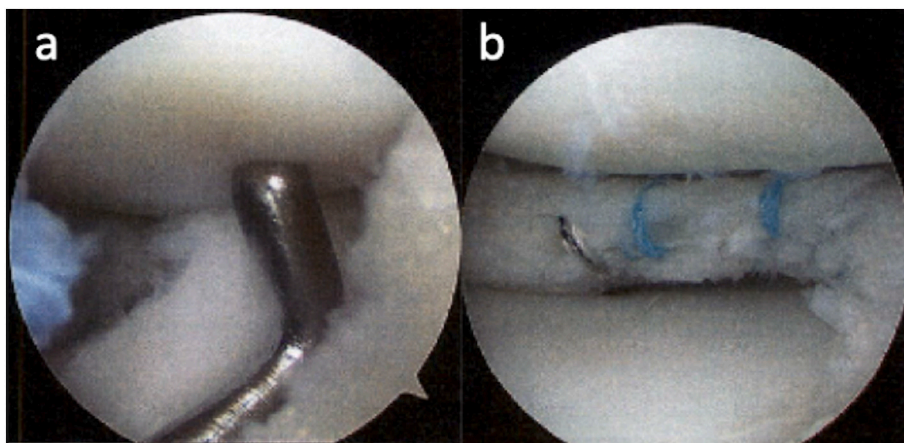
**Fig. 1.** Imaging findings of the affected knee before surgery.

(a) Rosenberg view of a plain radiograph, showing osteochondritis dissecans on the lateral femoral condyle.

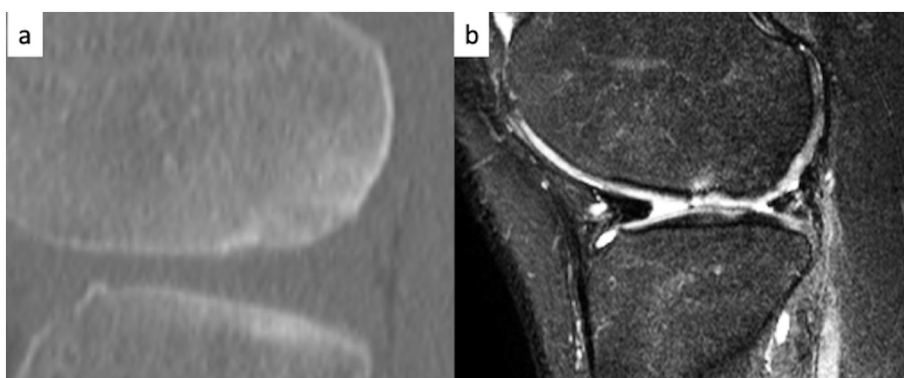
(b, c) Magnetic resonance imaging revealing subchondral marrow edema (asterisk) on T2-weighted fat-saturated images of the lateral femoral condyle, with no high linear signal between the fragment and the underlying bone.

(d) Computed tomography showing a detached fragment (arrowhead) measuring 11 mm × 8 mm.

(e, f) A complete type of discoid lateral meniscus with anterocentral shift on Ahn's classification diagnosed by magnetic resonance imaging (white arrow).



**Fig. 2.** Arthroscopic views of the affected knee showing (a) torn meniscus with smooth cartilage surface and (b) saucerization with repair.



**Fig. 3.** Imaging findings one year after surgery

(a) Computed tomography showing bone union of the osteochondritis dissecans lesion.

(b) Magnetic resonance imaging showing resolution of the bone edema without distortion of the triangular shape of the lateral meniscus.

Adult OCD cases have a worse prognosis [2,5,18]. More aggressive intervention was proposed to treat adult OCD. It was difficult to distinguish between OCD and DLM as the cause of the symptoms in the present case. This was necessary to treat the OCD properly. Arthroscopic drilling has been suggested for stable lesions with an intact articular surface. However, drilling was reported to be less effective among adults [19]. Moreover, performing osteochondral transplantation after debriding the lesion with a smooth cartilage surface is difficult. The treatment strategy for adult OCD with DLM has not been established. The present case was an adult-type OCD with a smooth cartilage surface and small lesion size. We decided against surgical intervention for OCD because several factors, excluding age, favored conservative treatment. This resulted in healing of the detached fragment. This result supports the hypothesis proposed by previous case reports of juvenile OCD with DLM. Particularly for lesions of the lateral femoral condyle with concurrent DLM, removing abnormal stress from the meniscus is a significant factor for healing. Postoperative protocols may have affected the natural healing process of the stable OCD. It is difficult to conclude on its efficacy with just one case. This case report does not intend to recommend conservative management for all adult OCD with DLM cases. The prognosis also varies, depending on multiple factors such as the size and site of the lesion, patient activity, and the stability of the OCD fragment. This case report illustrates the healing potential of adult OCD by reprocessing normal meniscal function.

#### 4. Conclusion

We experienced an adult case of stable OCD with concurrent DLM

that achieved spontaneous healing after undergoing reshaping surgery for DLM, mimicking normal meniscal morphology, without additional treatment for the stable OCD lesion.

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#### Ethical approval

This article does not contain any studies with human participants or animals performed by any of the authors.

#### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

#### Research registration

Research Registry was not required.

#### Guarantor

Prof. Hiroaki Nakamura.

**CRedit authorship contribution statement**

Kazuya Nishino: Conception and design. Drafting of the article.  
 Yusuke Hashimoto: Conception, and critical revision of the article for important intellectual content.  
 Yohei Nishida: Interpretation of data.  
 Shinya Yamasaki: Design and revision of the article.  
 Hiroaki Nakamura: Conception and design, final approval of the article.

**Declaration of competing interest**

The authors declare that they have no conflict of interest.

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