

CASE REPORT

Regeneration of the lateral discoid meniscus after arthroscopic saucerization in an adult patient undergoing high tibial osteotomy: A case report

Ji-Hoon Baek  | Su Chan Lee | Chang Hyun Nam | Hye Sun Ahn | Jin-Hong Kim 

Joint & Arthritis Research, Department of Orthopaedic Surgery, Himchan Hospital, Seoul, Republic of Korea

Correspondence

Jin-Hong Kim, Joint & Arthritis Research, Department of Orthopaedic Surgery, Himchan Hospital, 120, Sinmok-ro, Yangcheon-gu, Seoul 07999, Republic of Korea.
Email: himchanhospital@gmail.com

Funding information

None

Abstract

Arthroscopic saucerization of the lateral discoid meniscus is considered due to an increase in the load of the lateral compartment after high tibial osteotomy (HTO). We report a case of lateral discoid meniscus regeneration after arthroscopic saucerization in a middle-aged female patient who underwent HTO.

KEYWORDS

arthroscopic saucerization, discoid meniscus, high tibial osteotomy, regeneration

1 | INTRODUCTION

High tibial osteotomy (HTO) has been an effective surgical method for treatment of medial compartment osteoarthritis in knees with varus deformity.^{1,2} Re-alignment of a varus deformity of the knee via HTO shifts the weight-bearing axis to the lateral compartment, increasing the load on the lateral meniscus.

Patients who have degenerative medial osteoarthritis and a lateral discoid meniscus in the same knee might require HTO in clinical practice. A lateral discoid meniscus is an abnormally shaped meniscus with atypical ultrastructure and histology,^{3,4} and the overall prevalence is estimated to range from 0.4% to 20%.^{5,6} A discoid meniscus tends to be incur greater damage than a normal morphologic meniscus.⁵ Arthroscopic saucerization is specifically considered for a lateral discoid meniscus because an

increase in load on the lateral compartment after HTO enhances the risk of tear of the lateral meniscus.⁷ This study presents a case of lateral discoid meniscus regeneration after arthroscopic saucerization in a 54-year-old female patient who underwent HTO.

2 | CASE REPORT

A 54-year-old female patient who complained of serious pain in the left knee for about 3 years presented to the clinic in June 2020. She had no systemic musculoskeletal disease or other medical history, such as hypertension or diabetes mellitus. She was 161.0 cm in height and 71.0 kg in weight, with a body mass index of 27.4 kg/m². The patient reported difficulty walking because of left knee pain and had experienced no improvement in symptoms

Level of evidence: 4.

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2022 The Authors. *Clinical Case Reports* published by John Wiley & Sons Ltd.

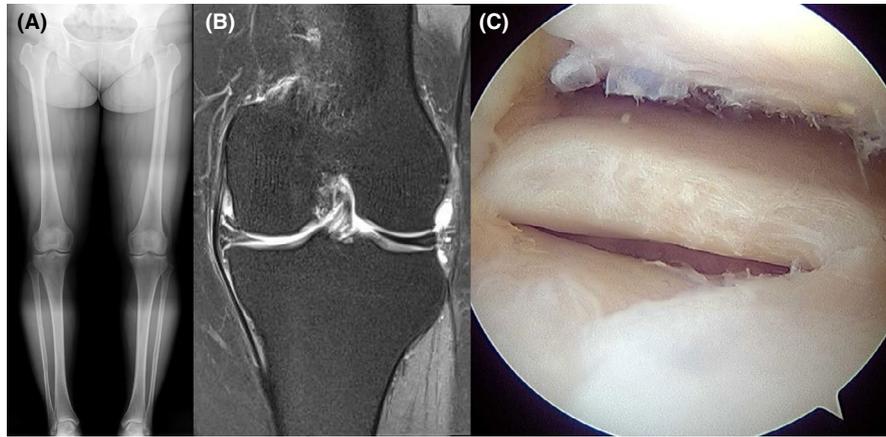


FIGURE 1 Before high tibial osteotomy (A). A preoperative standing anteroposterior radiograph of the bilateral lower extremities shows a left hip-knee-ankle angle of 5.3° (B) Magnetic resonance imaging of the left knee joint reveals a medial meniscus tear with cartilage denudation of the medial femoral condyle and an incomplete type of lateral discoid meniscus. (C) Arthroscopic saucerization was performed to address the lateral discoid meniscus

after receiving both medication and injections at another clinic. A physical examination revealed moderate effusion and medial pain with limited range of motion in the left knee. A Kellgren–Lawrence (K–L) grade III osteoarthritic change of the left knee was documented. Magnetic resonance imaging findings for the left knee were a medial meniscus tear and cartilage denudation of the medial femoral condyle. Additionally, incomplete discoid of the lateral meniscus was also diagnosed (Figure 1). The patient's Hospital for Special Surgery (HSS) score for the left knee was 65. A weight-bearing X-ray revealed a moderate varus deformity, and the hip-knee-ankle (HKA) angle was 5.3° (Figure 1).

We attributed the patient's medial knee symptoms to the varus alignment and medial osteoarthritis of the left knee. Thus, the alignment correction procedure for a varus knee could result in changes in knee pressure and relieve medial pain in the knee joint. An opening wedge HTO was performed through a medial approach above the pes anserinus. Intraoperatively, the medial osteotomy wedge was opened to 6° , and the desired correction was achieved. Additionally, arthroscopic saucerization of the lateral discoid meniscus was implemented because an increase in load of the lateral compartment after HTO enhances the risk of a tear in the lateral meniscus (Figure 1).⁷ The patient recovered without any complications and was advised to perform non-weight-bearing mobilization with a walker during rehabilitation. The patient's HSS score of the right knee was 85 at 3 months after surgery.

At the one-year clinic visit, the patient complained of skin irritation near the plate. We decided to remove the plate and screw and perform a second-look arthroscopic examination. Metal removal and arthroscopy of the left knee were carried out. This arthroscopic examination

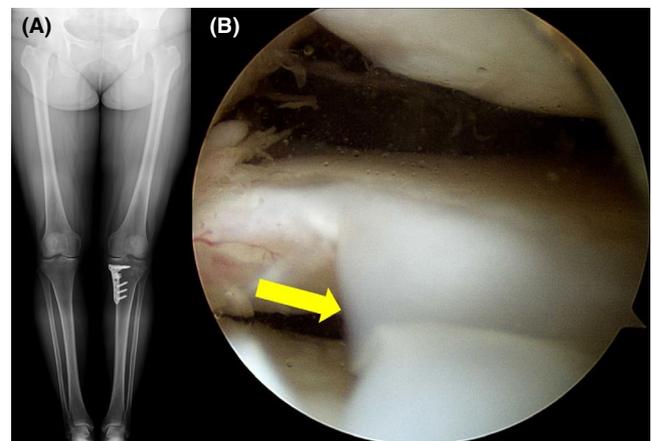


FIGURE 2 (A) A postoperative standing anteroposterior radiograph of the bilateral lower extremities reveals a hip-knee-ankle angle of -1.2 . (B) A second-look arthroscopic photograph shows regeneration of the lateral discoid meniscus (yellow arrow)

revealed regrowth of the lateral meniscus in the area of previous saucerization (Figure 2).

3 | DISCUSSION

The most important finding of this study was that regeneration of the lateral discoid meniscus after arthroscopic saucerization can occur in an adult patient undergoing HTO. This finding was confirmed by an arthroscopic examination during a plate and screw removal procedure.

Few studies have specifically addressed the regeneration findings of a discoid meniscus in patients who have previously undergone an arthroscopic procedure. Only three cases regarding the regeneration of a lateral discoid meniscus following an arthroscopic procedure have been

TABLE 1 Studies regarding regeneration of the lateral discoid meniscus after an arthroscopic procedure

Author(s) (year)	Number of patients	Age at primary A/S procedure	Age at secondary A/S procedure
Bisicchia and Tudisco ⁸ (2013)	1	11.0 years	13.4 years
Stein et al. ⁹ (2013)	1	3.0 years	5.0 years
Han et al. ⁶ (2018)	1	20.0 years	20.4 years
Present study (2022)	1	54.0 years	55.0 years

Abbreviation: A/S, arthroscopic.

documented in the literature (Table 1).^{6,8,9} Bisicchia and Tudisco⁸ reported the case of an 11-year-old boy who was arthroscopically treated for an incomplete lateral discoid meniscus who experienced re-growth of the remnant meniscus. The authors suggested that the meniscal regeneration was due to increased vascularity and cellularity of the inner parts of the meniscus and a growth spurt in the young patient. Stein et al.⁹ reported regeneration of a lateral discoid meniscus following arthroscopic meniscal repair and saucerization performed at age 3 in a 5-year-old girl. She returned to the clinic with recurrent knee pain after the first operation. The torn lateral meniscus was again saucerized and repaired using an arthroscopic procedure. The authors did not specifically mention any possible causes of meniscus regeneration in that case. Han et al.⁶ reported a case of lateral discoid meniscus regeneration in a 20-year-old male patient who underwent arthroscopic partial meniscectomy for a complete lateral discoid meniscus. The authors demonstrated that a discoid meniscus that regenerates after an arthroscopic procedure might be more susceptible to tearing due to the increased mechanical stresses and hypermobility that are present postoperatively. In addition, they mentioned that the relatively abundant cellularity and vascularity available in young adults could be reasons for the regeneration of a lateral discoid meniscus.

In our case, the patient was a middle-aged adult and did not have the same regeneration ability of the meniscus as younger patients. However, re-alignment of the proximal tibia via HTO shifts the weight-bearing axis to the lateral compartment of the knee, which increases the load on the saucerized lateral discoid meniscus and results in a hematoma. We assumed that this hematoma acted as a scaffold for meniscus regeneration. In conclusion, this case demonstrates the regeneration of the lateral discoid meniscus after arthroscopic saucerization and HTO in a middle-aged patient.

ACKNOWLEDGMENTS

None.

CONFLICT OF INTEREST

Each author certifies that he or she has no commercial association (e.g., consultancies, stock ownership, equity interest, patent, and licensing arrangements) that might pose a conflict of interest in connection with the submitted article.

AUTHOR CONTRIBUTIONS

Ji-Hoon Baek and Jin-Hong Kim involved in writing and revision of article. Su Chan Lee, Chang Hyun Nam, and Hye Sun Ahn collected the data.

ETHICAL APPROVAL

This study was approved by the Institutional Review Board of Himchan hospital.

CONSENT

Patient provided written informed consent to participate in the study.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Ji-Hoon Baek  <https://orcid.org/0000-0002-0742-0433>

Jin-Hong Kim  <https://orcid.org/0000-0003-3335-8757>

REFERENCES

1. Matthews LS, Goldstein SA, Malvitz TA, Katz BP, Kaufer H. Proximal tibial osteotomy. Factors that influence the duration of satisfactory function. *Clin Orthop Relat Res*. 1988;229:193-200.
2. Moreland JR, Bassett LW, Hanker GJ. Radiographic analysis of the axial alignment of the lower extremity. *J Bone Joint Surg Am*. 1987;69(5):745-749.
3. Atay OA, Pekmezci M, Doral MN, Sargon MF, Ayvaz M, Johnson DL. Discoid meniscus: an ultrastructural study with transmission electron microscopy. *Am J Sports Med*. 2007;35(3):475-478.
4. Papadopoulos A, Kirkos JM, Kapetanios GA. Histomorphologic study of discoid meniscus. *Arthroscopy*. 2009;25(3):262-268.

5. Ellis HB Jr, Wise K, LaMont L, Copley L, Wilson P. Prevalence of discoid meniscus during arthroscopy for isolated lateral meniscal pathology in the pediatric population. *J Pediatr Orthop*. 2017;37(4):285-292.
6. Han SB, Babu CP, Choi JH, Suh DW, Jang KM. Regeneration of lateral discoid meniscus after arthroscopic partial meniscectomy in an adult patient. *Knee Surg Sports Traumatol Arthrosc*. 2018;26(8):2278-2281.
7. Prakash J, Song EK, Lim HA, Shin YJ, Jin C, Seon JK. High tibial osteotomy accelerates lateral compartment osteoarthritis in discoid meniscus patients. *Knee Surg Sports Traumatol Arthrosc*. 2018;26(6):1845-1850.
8. Bisicchia S, Tudisco C. Re-growth of an incomplete discoid lateral meniscus after arthroscopic partial resection in an 11 year-old boy: a case report. *BMC Musculoskelet Disord*. 2013;7(14):285.
9. Stein MI, Gaskins RB 3rd, Nalley CC, Nofsinger C. Regeneration of a discoid meniscus after arthroscopic saucerization. *Am J Orthop (Belle Mead NJ)*. 2013;42(1):E5-8.

How to cite this article: Baek J-H, Lee SC, Nam CH, Ahn HS, Kim J-H. Regeneration of the lateral discoid meniscus after arthroscopic saucerization in an adult patient undergoing high tibial osteotomy: A case report. *Clin Case Rep*. 2022;10:e05574. doi:[10.1002/ccr3.5574](https://doi.org/10.1002/ccr3.5574)