



# The Open Orthopaedics Journal

Content list available at: <https://openorthopaedicsjournal.com>



## CASE REPORT

### Chondral Injury After Inside-Out Meniscal Suture Repair Using Meniscal Sutures

Takatomo Mine\*, Riri Hayashi, Koichiro Ihara, Hiroyuki Kawamura, Ryutaro Kuriyama and Yasuhiro Tominaga

Department of Orthopedic Surgery, National Hospital Organization Kanmon Medical Center, Shimonoseki Japan.

**Abstract:** Chondral injury after arthroscopic meniscal suture repair is rare. We present a case of chondral injury due to the migration of suture after meniscal repair. The aberrant suture that remained temporarily at the medial tibiofemoral joint may have led to the chondral lesion of the femoral medial condyle and the tibial medial plateau at the weight-bearing portion.

**Keywords:** Meniscal suture, Chondral lesion, Arthroscopy, Tibiofemoral joint, Chondral injury, Femoral.

#### Article History

Received: October 18, 2018

Revised: January 14, 2019

Accepted: January 16, 2019

## 1. INTRODUCTION

Concerning the treatment of meniscal tears, partial meniscectomy or meniscal suture repair are typically performed. Complications arising from meniscal suture repair, such as deep infection, repair failure, neurovascular injuries, arthrofibrosis and chondral injury, have been reported [1 - 5]. Chondral injury due to the migration of sutures after meniscal repair is rare. We present a case of meniscal repair using meniscal sutures (Stryker meniscal repair kit) that resulted in a chondral injury of the femoral medial condyle and the tibial medial plateau.

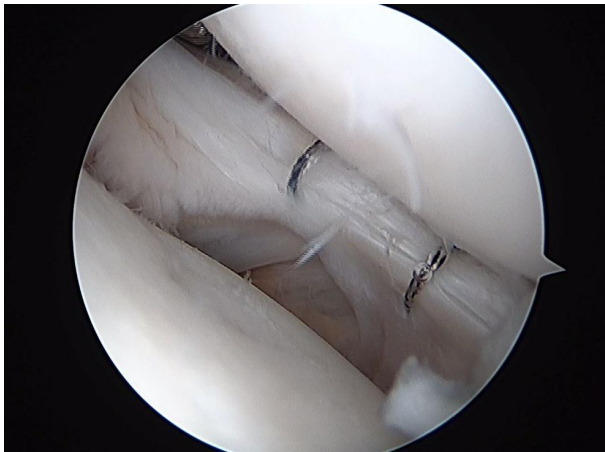
## 2. CASE

An 18-year-old female had complained of right knee pain and a giving way sensation 1 year previously. Her clinical diagnosis was an Anterior Cruciate Ligament (ACL) injury and a lateral meniscus tear. She underwent ACL reconstruction (Fig. 1) and lateral meniscal suturing with nonabsorbable sutures that were knitted into a mesh (Fig. 2). After the operation, her knee function was improved. Six months later, she suddenly complained of right knee pain, crepitation, and a giving way sensation.

\* Address correspondence to this author at the Department of Orthopedic Surgery, National Hospital Organization Kanmon Medical Center, Shimonoseki Japan; Tel: +81-83-241-1199; Fax: +81-83-241-1301; E-mail: mine.takatomo.ga@mail.hosp.go.jp



**Fig. (1).** A plain radiograph showed the presence of endobutton and a GT system in the femoral medial condyle.



**Fig. (2).** Lateral meniscal suturing with nonabsorbable sutures that were knitted into a mesh.

A physical examination revealed no swelling, effusion, or medial joint line tenderness in the right knee. The range of motion was between 0° and 145°. McMurray tests for medial meniscus were positive. The results of a Lachman test, anterior and posterior drawer tests, and varus and valgus stress tests

were normal. The patient had no patellofemoral symptoms. Magnetic Resonance Imaging (MRI) showed a reconstructed ACL and medial meniscus tear and synovial plica in the suprapatellar pouch (Figs. 3A and B). There were no bone bruises on the femoral medial condyle or the tibial medial plateau.

Arthroscopy revealed a reconstructed ACL, a tear in the posterior third of the medial meniscus, new synovial plicae, and one suture that was used to repair the lateral meniscus in the suprapatellar pouch. The suture appeared to be connected to synovial plicae (Fig. 4A). The chondral lesion of the femoral medial condyle and the tibial medial plateau were found at the weight-bearing portion. The chondral lesion appeared thin and cleft-like (Fig. 4B). In the posterior portion of the lateral meniscus, a horizontal tear remained (Fig. 4C). The suture and plica were resected by a punch. The medial meniscal repair was performed with non-absorbable sutures and Fast-Fix adhesive. The horizontally torn posterior third of the lateral meniscus was resutured.

Postoperatively, the patient was kept on a non-weight bearing schedule for 2 weeks, and a range motion was allowed after 2 weeks. Activity was limited for 1 month. The knee crepitation disappeared after surgery, and the patient was able to resume daily activities. The Lysholm knee score was 94.

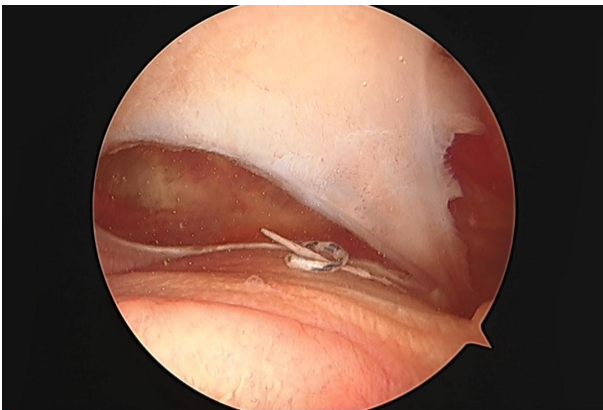
A



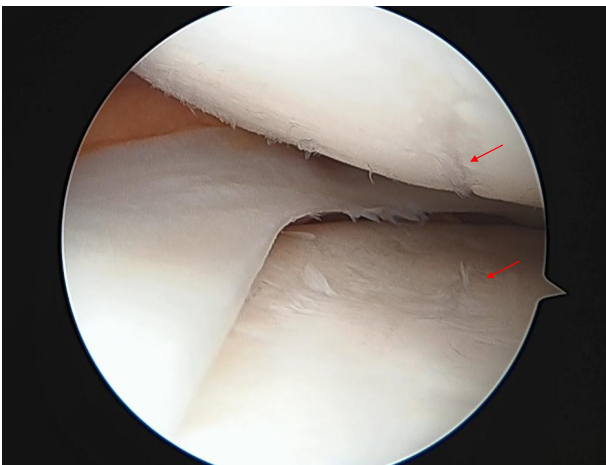
B



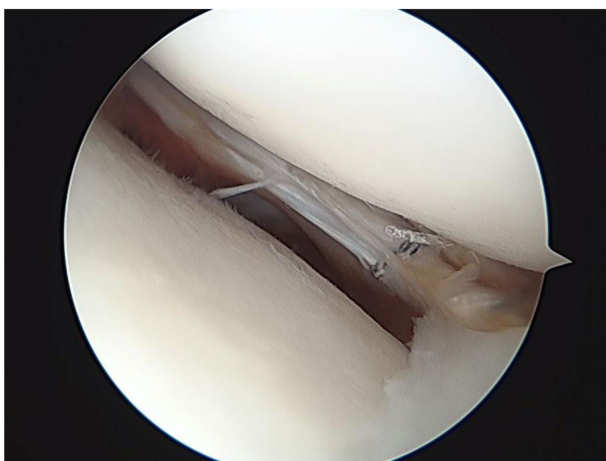
**Fig. (3).** Preoperative magnetic resonance imaging (left knee, T2-weighted image, sagittal view). A. medial meniscal tear, B. synovial plica in suprapatellar pouch.



**Fig. (4A).** Arthroscopic view from an anterolateral portal: A. New synovial plica and an migrated suture in suprapatellar pouch.



**Fig. (4B).** Cleft-like chondral defect in the femoral medial condyle and the tibial medial plateau.



**Fig. (4C).** In the posterior portion of lateral meniscus, a horizontal tear remained. One suture disappeared

### 3. DISCUSSION

There are two main methods to treat meniscal tears: meniscectomy or meniscal sutures. However, once the meniscus has been removed, secondary osteoarthritic changes occur due

to the loss of meniscal function, including alterations in load distribution, impact absorption, and articular sliding and stabilization. To repair the meniscal tear, the inside-out, outside-in, and all-inside techniques can be used. We often use the inside-out and all-inside techniques. In the inside-out technique, 2.0 or 0 nonabsorbable sutures are often used. In the all-inside technique, nonabsorbable sutures, meniscus arrows or staples, and bioabsorbable implants are often used. Good-to-excellent results can be expected from the meniscal repair. Johnson reported that 76% of the cases were successful [6], and Rubman that 88% were clinically asymptomatic [7]. Reported complications after meniscal repair by the inside-out technique include: infection, arthrofibrosis, nerve injury, vascular injury, and chondral injury [1 - 5]. However, chondral injury is a rare complication. Complications involving chondral injury after using biodegradable meniscus arrows have been reported [8 - 10]. Subcutaneous migration of meniscal arrows is a well-documented complication. Chondral injury due to migration inside the knee joint is also a serious complication. On the other hand, chondral injury due to the migration of suture after meniscal repair, as in the present case, has not often been reported. Kelly reported chondral injury after arthroscopic meniscal repair using the outside-in Mulberry knot suture technique [11]. In the present case, we used nonabsorbable sutures that were knitted into a mesh. This suture had a larger contact area in the meniscus than conventionally used sutures. This meniscal suture was made and sold only in Japan. Presently, this meniscal suture kit is not being produced. However, we have used other sutures to repair the meniscal tears. Therefore, it is necessary to be careful to avoid this complication.

Concerning the chondral injury, in this case, it could be also considered that the injury might be an osteoarthritic change after trauma or meniscus injury. However, the chondral lesion appeared thin and cleft-like. We considered that the aberrant suture that remained temporarily at the medial tibiofemoral joint may have led to the chondral lesion of the femoral medial condyle and the tibial medial plateau at the weight-bearing portion. The following scenario could be considered: The knot of suture used for repairing the lateral meniscus came loose, and the suture migrated in the knee joint. The suture that remained at the medial tibiofemoral joint may have led to the chondral lesion of the femoral medial condyle and the tibial medial plateau at the weight-bearing portion. Subsequently, the suture moved into the suprapatellar pouch. The sudden right knee pain, crepitation, and giving way sensation 6 months after the primary operation may have been caused by the new synovial plicae connected with the migrated suture and medial meniscal tear. It is difficult to determine the mechanism of the complication due to the meniscal suture, and care should be taken to minimize the complication when repairing meniscal tears.

### CONCLUSION

To prevent this complication, we consider that it is important to use thinner suture (2.0) and to prevent the knot of the suture from loosening by tying off a few more times and not cutting off the suture so close to the knot.

**ETHICS APPROVAL AND CONSENT TO PARTICIPATE**

Not applicable.

**HUMAN AND ANIMAL RIGHTS**

No animals/humans were used for studies that are the basis of this research.

**CONSENT FOR PUBLICATION**

Not applicable.

**CONFLICT OF INTEREST**

The authors declare no conflict of interest, financial or otherwise.

**ACKNOWLEDGEMENTS**

Declared none.

**REFERENCES**

- [1] Small NC. Complications in arthroscopic meniscal surgery. *Clin Sports Med* 1990; 9(3): 609-17. [PMID: 2199072]
- [2] Albrecht-Olsen P, Kristensen G, Burgaard P, Joergensen U, Toerholm C. The arrow versus horizontal suture in arthroscopic meniscus repair. A prospective randomized study with arthroscopic evaluation. *Knee Surg Sports Traumatol Arthrosc* 1999; 7(5): 268-73. [http://dx.doi.org/10.1007/s001670050162] [PMID: 10525694]
- [3] DeHaven KE. Meniscus repair. *Am J Sports Med* 1999; 27(2): 242-50. [http://dx.doi.org/10.1177/03635465990270022301] [PMID: 10102109]
- [4] Koski JA, Ibarra C, Rodeo SA, Warren RF. Meniscal injury and repair: clinical status. *Orthop Clin North Am* 2000; 31(3): 419-36. [http://dx.doi.org/10.1016/S0030-5898(05)70161-9] [PMID: 10882468]
- [5] Grant JA, Wilde J, Miller BS. Comparison of inside-out and all-inside techniques for the repair of isolated meniscal tears: A systematic review. *Am J Sports Med* 2011. [PMID: 21737837]
- [6] Johnson MJ, Lucas GL, Dusek JK, Henning CE. Isolated arthroscopic meniscal repair: a long-term outcome study (more than 10 years). *Am J Sports Med* 1999; 27(1): 44-9. [http://dx.doi.org/10.1177/03635465990270011501] [PMID: 9934417]
- [7] Rubman MH, Noyes FR, Barber-Westin SD. Arthroscopic repair of meniscal tears that extend into the avascular zone. A review of 198 single and complex tears. *Am J Sports Med* 1998; 26(1): 87-95. [http://dx.doi.org/10.1177/03635465980260013301] [PMID: 9474408]
- [8] Song EK, Lee KB, Yoon TR. Aseptic synovitis after meniscal repair using the biodegradable meniscus arrow. *Arthroscopy* 2001; 17(1): 77-80. [http://dx.doi.org/10.1053/jars.2001.7800] [PMID: 11154373]
- [9] Menche DS, Phillips GI, Pitman MI, Steiner GC. Inflammatory foreign-body reaction to an arthroscopic bioabsorbable meniscal arrow repair. *Arthroscopy* 1999; 15(7): 770-2. [http://dx.doi.org/10.1016/S0749-8063(99)70011-3] [PMID: 10524827]
- [10] Seil R, Rupp S, Dienst M, Mueller B, Bonkhoff H, Kohn DM. Chondral lesions after arthroscopic meniscus repair using meniscus arrows. *Arthroscopy* 2000; 16(7): E17. [http://dx.doi.org/10.1053/jars.2000.9244] [PMID: 11027775]
- [11] Kelly JD IV, Ebrahimpour P. Chondral injury and synovitis after arthroscopic meniscal repair using an outside-in mulberry knot suture technique. *Arthroscopy* 2004; 20(5): e49-52. [http://dx.doi.org/10.1016/j.arthro.2004.03.022] [PMID: 15122157]

© 2019 Mine *et al.*

This is an open access article distributed under the terms of the Creative Commons Attribution 4.0 International Public License (CC-BY 4.0), a copy of which is available at: <https://creativecommons.org/licenses/by/4.0/legalcode>. This license permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.