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Partial central meniscectomy with using of an additional stabilization sutures of the lateral discoid meniscus as a method of preventing meniscus extrusion in the postoperative period

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Faculty Disclosure Information

- The authors declare no conflicts of interest related to this presentation.

Objective

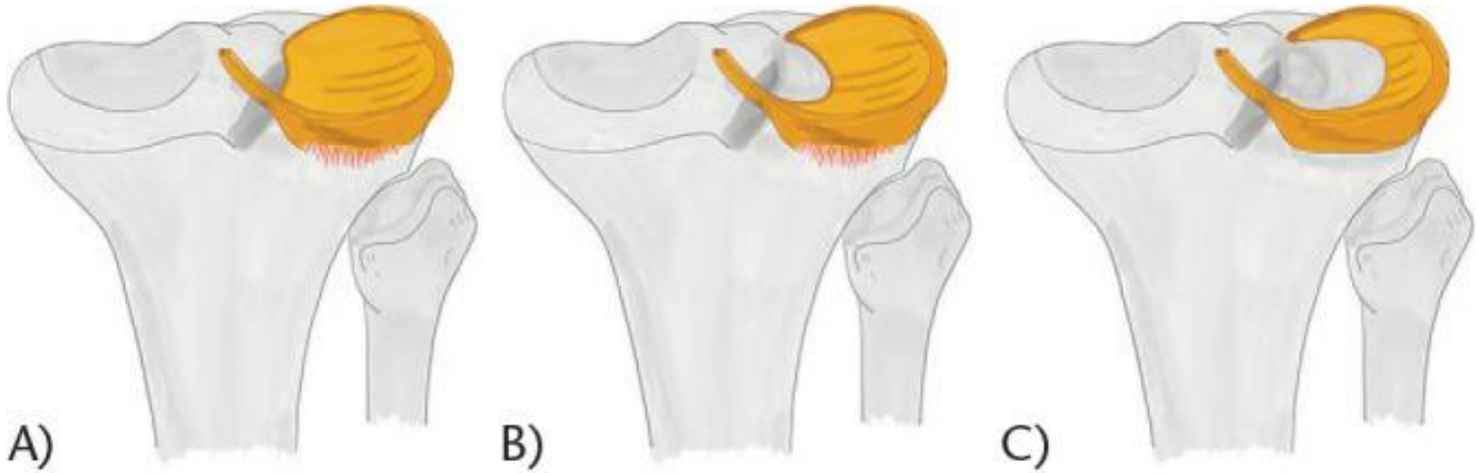
- A discoid meniscus is a morphological abnormality wherein the tibial plateau is covered with a wide and thick meniscus instead of the typical "C" shape[1]. This condition can occur in either meniscus, with incidence rates varying from 0.4% to 17% for the lateral meniscus and from 0.06% to 0.3% for the medial meniscus[2].
- In 1969, Watanabe *et al*[3] first proposed a classification system for the discoid lateral meniscus (DLM) (Fig.1).
  The types include complete DLM, incomplete DLM, and Wrisberg DLM.

1.Furumatsu T, Maehara A, Okazaki Y, Ozaki T. Intercondylar and central regions of complete discoid lateral meniscus have different cell and matrix organizations. J Orthop Sci. 2018;23:811–818. doi: 10.1016/j.jos.2018.05.006.

2.Kim JH, Ahn JH, Kim JH, Wang JH. Discoid lateral meniscus: importance, diagnosis, and treatment. J Exp Orthop. 2020;7:81. doi: 10.1186/s40634-020-00294-y.

3. Watanabe M, Takeda SJ, Ikeuchi HJ. Atlas of arthroscopy. Second ed Tokyo, Japan: Igaku- Shoin Ltd, 1969.

Fig.1



The Watanabe classification for lateral discoid meniscus includes three types:
(A) **Type I (Complete Discoid):** A fully disc-shaped meniscus covering the entire tibial plateau, mechanically stable with intact posterior coronal insertions.
(B) **Type II (Incomplete Discoid):** A partially formed meniscus covering up to 80% of the tibial surface, stable upon palpation, with normal posterior coronal attachments.
(C) **Type III (Wrisberg Variant):** A meniscus with a normal or slightly discoid shape, exhibiting instability due to the absence of posterior coronal fixation, with only Wrisberg's ligament providing support.

- Wrisberg DLM (type III) has normal discoid morphology but lacks posterior attachment (popliteomeniscal fascicles) and only has the Wrisberg ligament attached; hence, it is more susceptible to “snapping knee syndrome”.
- The primary objective of treatment is to maintain a stable meniscus with an anatomy as close as possible to a normal meniscus. This ensures the meniscus can continue its essential role in absorbing and distributing loads. Partial meniscectomy, which includes reshaping or meniscal saucerization, involves removing the central portion of the meniscus to restore its natural "C" shape (Fig.2).

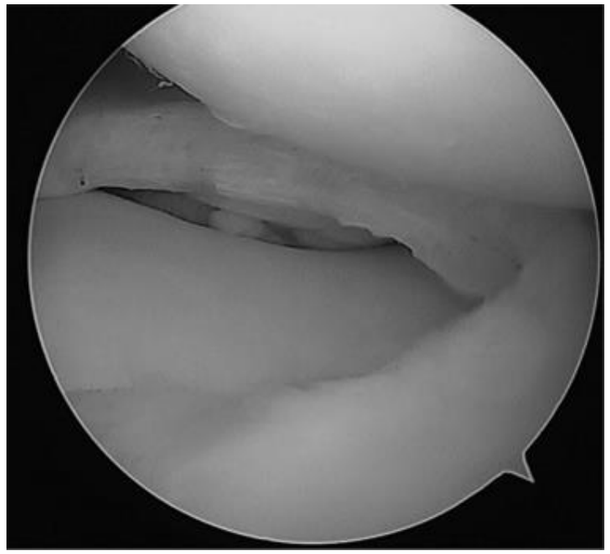


Fig.2
Arthroscopic saucerization of lateral discoid meniscus, leaving a stable meniscus with a peripheral rim of 7 mm.

- If peripheral instability is present, it should be addressed with peripheral repair whenever feasible. Comparative studies on saucerization alone versus saucerization with fixation show that while both methods yield positive long-term outcomes, patients who undergo stabilization experience slightly better functional results and fewer degenerative changes in the knee.

A frequent problem of treatment with this technique is extrusion of the meniscus (Fig.3), which causes discomfort to patients in the postoperative period. The use of additional stabilizing sutures of the meniscus to the joint capsule after partial meniscectomy prevents extrusion of the meniscus, which improves the functional status of patients in the postoperative period.

Fig.3
Schematic illustration of the normal anatomical position of the meniscus, its displacement in meniscal extrusion, and its position following additional meniscal fixation.

Material and Methods

- 18 patients (men and women aged 18-45) with discoid lateral meniscus type III (classification of Watanabe, 1969) were included. The diagnosis was confirmed by an MRI (Fig.4).
- Patients were divided into 2 groups. The main group included patients with using additional stabilization sutures (Fig.5) after partial central meniscectomy under arthroscopic control (n=9). The comparison group – partial central meniscectomy (n=9). Patients of both study groups were assessed for the functional state of the knee joint according to the Lysholm scale and meniscal extrusion before surgery and 12 months after surgery.

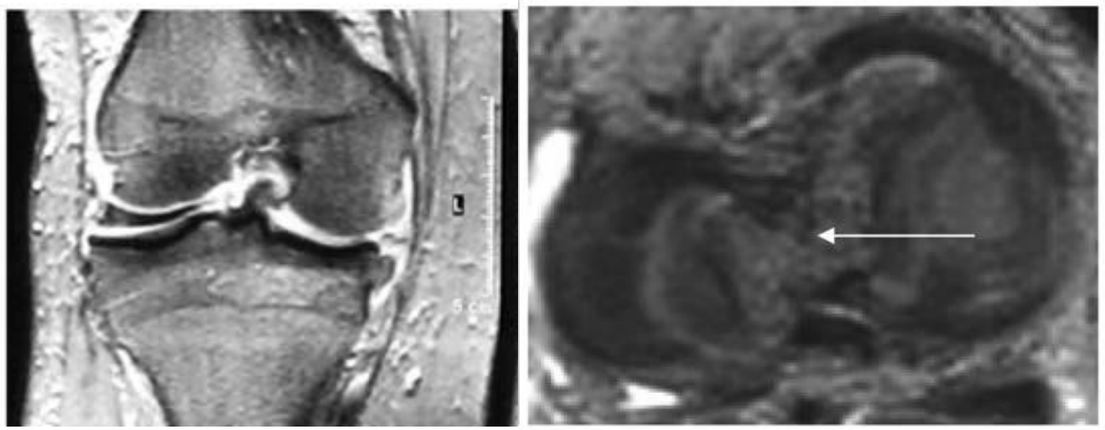
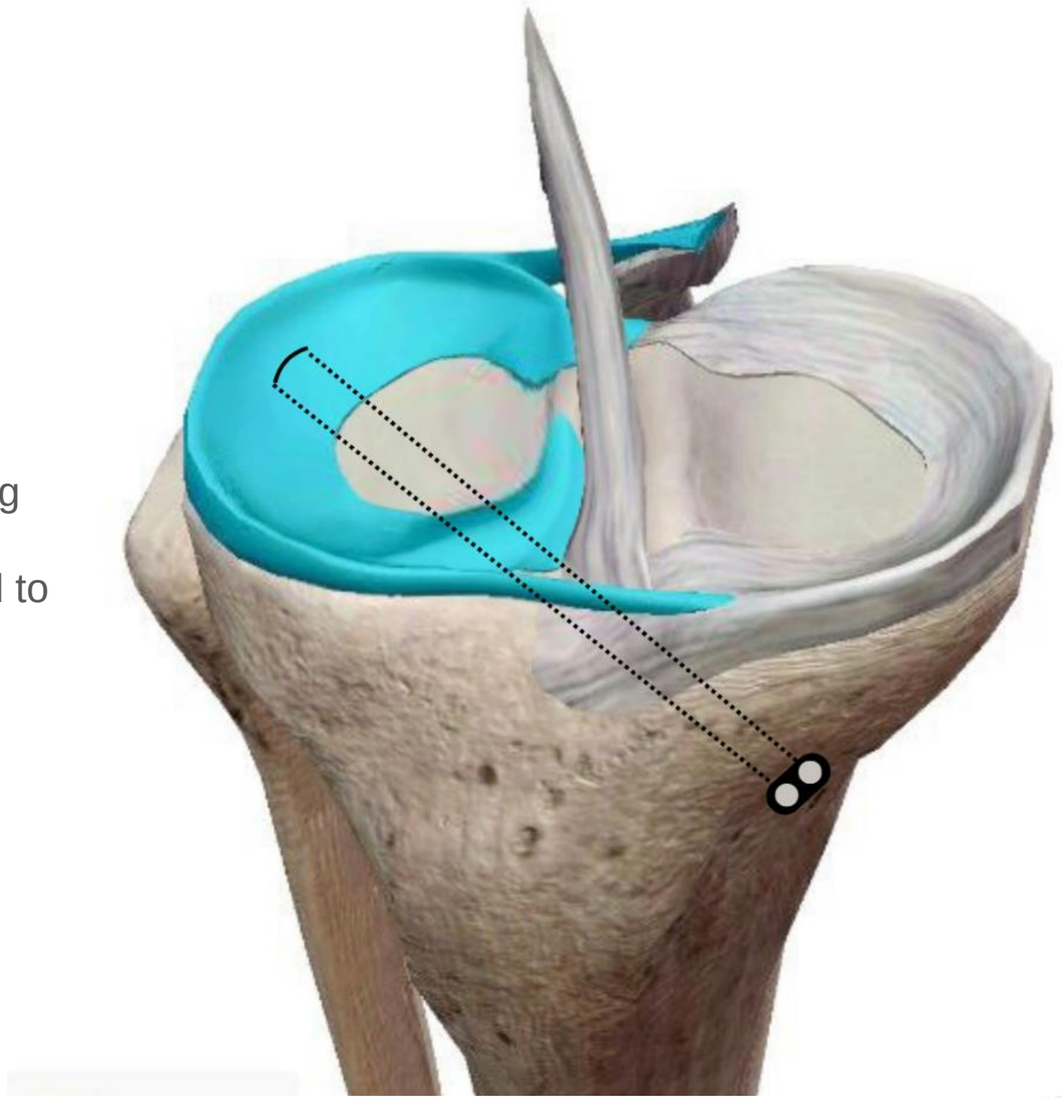


Fig.4
MRI image of the knee with a lateral discoid meniscus

Fig.5
Schematic illustration of an additional stabilizing suture placed in the discoid lateral meniscus following partial central meniscectomy, anchored to the tibial plateau using an Endobutton device.

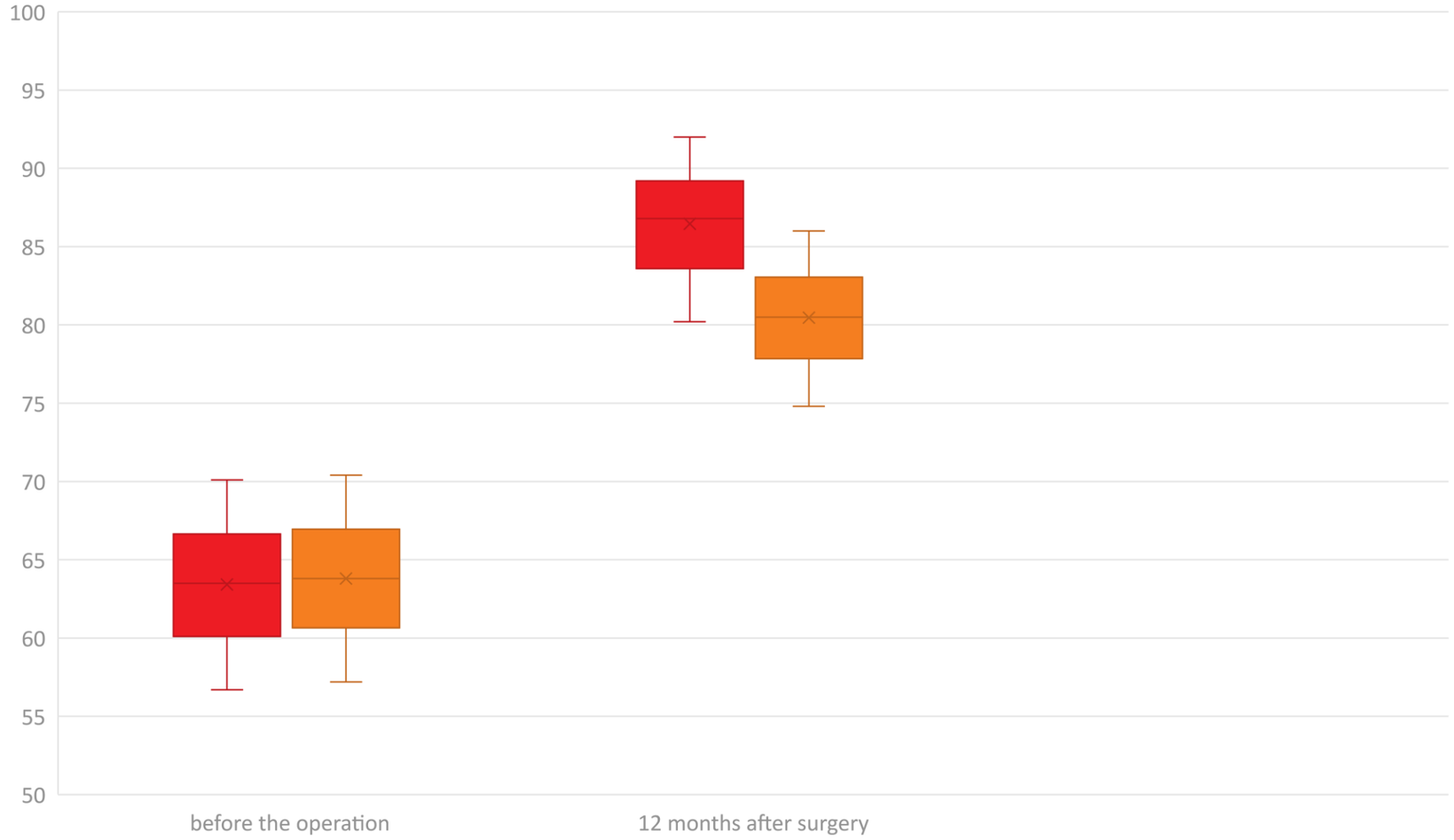


Result

- In the main group of the patients with discoid lateral meniscus type III, the score on the Lysholm scale was 63,5±4,4 points before the operation, in the comparison group of the patients - 63,8±4,2 points (p<0,05).
- The average value of extrusion distance before surgery was obtained 3.3 ± 0.6 mm (p < 0,05) for main and comparison groups.
- Patients in the main group underwent a partial central meniscectomy, suturing of the meniscus using the inside-out suture technique for fixation meniscus to capsule under arthroscopic control.
- Patients in the comparison group underwent a partial central meniscectomy under arthroscopic control without the use of additional sutures.
- 12 months after surgery, the extrusion distance of the main group was 2.2 ± 0.4 mm (p < 0.05) and 3.5 ± 0.4 mm (p < 0.05) of the comparison group.
- The score on the Lyscholm scale in the patients of the main group was 86,8±4,1 points (p < 0.05), in the comparison group - 80,5±3,5 points (p <0.05) (Table 1).

Table 1

The score on the Lysholm scale



main group

comparison group

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Conclusions

- Additional methods of stabilization of the lateral meniscus in discoid lateral meniscus improved the functional status of the knee joint and the results of the treatment of extrusion of the lateral meniscus in patients. This method will improve the functional state of the patient's joint in the postoperative period and reduce the load on the lateral meniscus in the form of extrusion.

Thank you for your attention!