

Lessons Learned from a Case with Valgus Deformity of the Knee Following Partial Removal of Lateral Discoid Meniscus

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Few studies have focused on the possible change in the axial alignment of the lower limb after lateral meniscectomy. Here, we present a patient with valgus deformity of the knee following the partial removal of lateral discoid meniscus. With the distal femur osteotomy and fixation, this complication was treated successfully. This case suggested that we should pay more attention to the axial alignment of the lower limb in patients with torn discoid lateral meniscus before meniscectomy, as a severe valgus inclination may develop in some of these patients.

A 43-year-old woman was referred to our hospital because she complained that she had limped for snapping during daily activities for the past 2 months, resulting in lateral pain of her right knee. She had experienced minor trauma. She was noted clinically to have audible and palpable snapping during the movement of the right knee. The valgus deformity was noted on both the knees when she was in a standard standing position. However, we did not pay more attention on this. Tenderness of lateral side and positive McMurray sign of the right knee were checked out. To rule out intra-articular pathology, magnetic resonance imaging (MRI) of the right knee was performed. Coronal and sagittal MRI of the right knee showed Grade III discoid meniscus tear. The patient underwent right knee arthroscopy with spinal anesthesia. A small pneumatic tourniquet was applied. The meniscus was probed to identify the posterior attachment. The complete type discoid lateral meniscus was noted. Probing of the meniscal synovial edge showed complete longitudinal tear from anterior to posterior. Rough wear and scarring were presented at tear edges. Grade II cartilage degeneration was also noted in the lateral compartment. Hence, we decided to do a partial meniscectomy.

However, her knee was becoming more symptomatic with increasing pain and swelling only 1 month after the surgery.

The standing X-ray showed that the right knee was in fact much more valgus than the left. We used the tibiofemoral angle to evaluate the axial alignment of the lower limb. However, we did not give the order of a full-length weight-bearing X-rays before arthroscopy surgery. Hence, we judge the right knee according to the deformity of the left knee [Figure 1]. The anti-inflammatory drugs, quadriceps exercise, and knee brace were consequently given to this patient for more than 6 months, but there was no significant relief of symptoms. There had been no indication for such a patient to receive a total knee arthroplasty. In addition, she displayed a good range of motion and stability. The patient was a great candidate for a distal femoral varus osteotomy to correct the supero-lateral tilt to the joint line. The operative technique was explained in detail by Sternheim *et al.* in 2011.^[1] X-rays were taken 3 months after the surgery to evaluate the union of the osteotomy. Good fusion was seen at the site of the osteotomy. The correction of the valgus deformity is shown in Figure 1c. The patient has been followed up for 22 months since osteotomy, who complained a variety of discomfort such as knee soreness for the first 12 months. Then, she returned to the normal life.

There has been a trend toward choosing meniscal preservation procedures for treating discoid lateral meniscus. Kim *et al.*^[2] presented that the partial meniscectomy group showed better clinical and radiological results than the total

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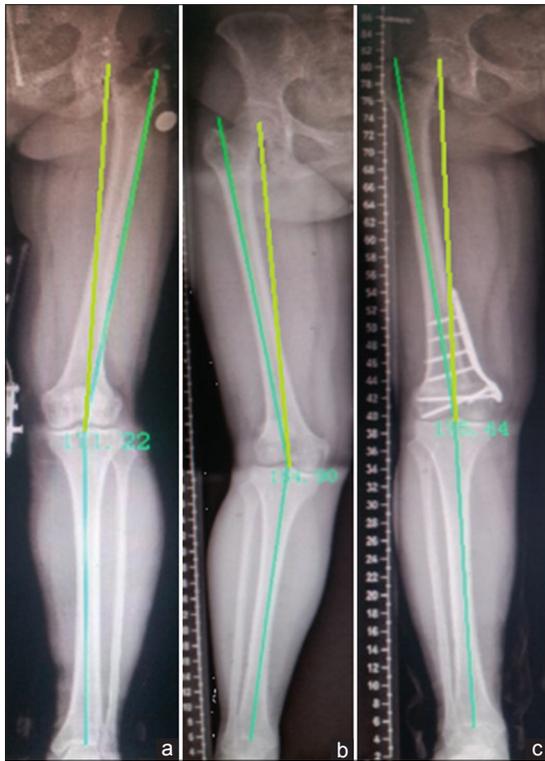


Figure 1: (a) Left TFA is 171.22° before meniscectomy. (b) Right TFA is 164.90° at 3-month follow-up after meniscectomy. (c) Right TFA is 175.44° at 6-month follow-up after osteotomy. Valgus deformity of the right knee was corrected. TFA: Tibiofemoral angle. The mean TFA in normal people is 174°.

meniscectomy group with more than 5 years of follow-up. They concluded that the clinical and radiographic outcomes were related to the volume of the meniscus removed, with less resection being associated with improved results.

Results of some studies denied the correlation between partial or total meniscectomy with the clinical results and axial alignment. A 10-year follow-up results of arthroscopic meniscectomies for symptomatic discoid lateral menisci in 17 adolescents found no correlation between the type of meniscectomy (partial or total) and the clinical and radiographic results.^[3] Recently, Habata *et al.*^[4] reported similar results. However, the average age in that study was 22.3 years, and thus the patients may have been too young for the discoid meniscus to lead to malalignment or degenerative changes in the knee.

In contrast to the previous studies, Wang *et al.*^[5] found a valgus inclination developing in some of their patients. We consider that it should be some explanations for the reason that the valgus deformity is formed in the patient following meniscectomy. The normal lateral meniscus acts as joint filler, covering up to two-thirds of the articular surface of the underlying tibia plateau. Narrowing the joint space initially is caused by the removal of the meniscus (approximately 1 mm); it is further narrowed by a reduction of the contact area following the absence of the meniscus. Biomechanical

studies have shown that the maximal contact pressure was increased by 91–183% after meniscectomy. Increased contact stress resulting from the decreased contact area may produce bone remodeling, producing a flattened femoral condyle. Softening of the joint cartilage also results in the increased joint space narrowing and osteophyte formation. Without the menisci, the load is supported centrally on each plateau, diminishing the lever arm of load support. Regardless of size or thickness, discoid meniscus is greater than normal meniscus, so the reduced area, the loss degree as stabilization filler, and the limb alignment changes are significantly greater than normal meniscal resection after discoid meniscus resection.

Although the short-term results of our case are good, it still needs a long-term follow-up. Actually, this case has taught us a lot. Careful preoperative physical examination and the full length standing weight-bearing plain film of lower limbs should be done to assess the presence or absence of knee deformity before surgery. If we find the presence of the patient's knee joint valgus deformity, we should carefully consider how discoid meniscus resection may effect, which will increase valgus deformity or lead to increased lateral knee pain after the surgery. Under that condition, we may also advance to inform patients and their families, if the patient has knee valgus deformity combined with severe signs or symptoms, it is necessary to treat patient with distal femur osteotomy. Whether osteotomy and meniscectomy can be done in a one-stage operation, it still needs better designed studies to illustrate. Our patient always complained lateral knee pain for more than 1 year after osteotomy; we thought this was due to not enough deformity correction. The valgus stress would be significantly reduced if 2° or 3° over-correction was done.

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Conflicts of interest

There are no conflicts of interest.

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