

Effect of lateral release on patellar motion in chondromalacia

An MRI study of 11 knees

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Preoperatively and postoperatively, patellar motion in 11 knees with chondromalacia was analyzed by MRI at 0°, 10°, 20°, and 30° of knee flexion. The preoperative patellar position clearly deviated from normal at 0°–10° of knee flexion. The lateral release operation corrected this deviation.

We report MRI analysis of patellar position after lateral release in patients with chondromalacia.

Patients and methods

The study group comprised 11 patients (6 males and 5 females, aged 30 ± 13 years) with the clinical diagnosis chondromalacia. The patients had no history of patellar dislocation. No clear lateral displacement or tilt was observed in tangential radiographs at 30° of knee flexion. Changes of the patellar cartilage were assessed arthroscopically. According to the classification of Ogilvie-Harris and Jackson (1984), the cartilage changes were Grade I in 7 patients and Grade II in 4 patients. Additionally, 1 male and 2 females had a hypertrophied medial synovial plica, and 2 males and 2 females had a hypertrophied infrapatellar fat pad, which was resected.

Our data were compared with data from 20 healthy subjects (10 males, aged 29 ± 6 years, and 10 females, aged 25 ± 4 years). Ten right and 10 left knees were examined.

Operation

After arthroscopy, an open release of the lateral retinaculum was carried out to the tibial condyle from the vastus lateralis 5 cm proximal to the patella. The synovium was not incised if the synovial plica and/or the hypertrophied infrapatellar fat pad were not resected.

The patellofemoral relationship was examined with the knee in 0°, 10°, 20°, and 30° of flexion. The evaluation was made before the lateral release on an average of 11 (7–16) months after the operation.

The lateral patellofemoral angle, the lateral patellar tilt, and the lateral patellar displacement (Figure 1) were measured from axial MRIs with a computer-assisted system (Kujala et al. 1989a).

The statistical analysis was performed with a *t*-test for paired and unpaired data.

Results

Quadriceps relaxed

The lateral patellofemoral angle was greater postoperatively than preoperatively. The greatest difference was noted in full extension.

Preoperatively, the patella tilted more and had a more lateral position in full extension compared with 30° of knee flexion. The lateral patellar tilt was smaller postoperatively than preoperatively, with the greatest difference of 7.4° when the knee was in extension.

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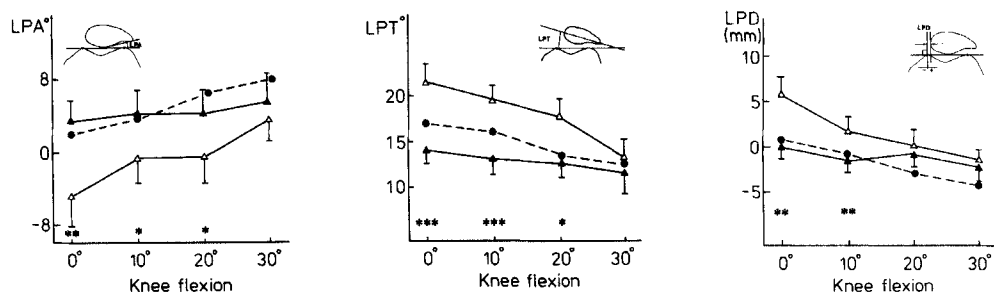


Figure 1. Mean lateral patellofemoral angle (LPA), lateral patellar tilt (LPT), and displacement (LPD) before (Δ) and after ($\blacktriangle$) lateral release in patients with chondromalacia in different knee flexions. Mean normal values are indicated as $\bullet$. Stars indicate statistical difference between preoperative and postoperative values (* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$). Bars correspond to 1 SEM.

The preoperative and postoperative values of the lateral patellar displacement differed when the knee was in extension and at 10° of flexion, preoperative values being greater than postoperative ones (Figure 1).

Quadriceps contracted

Quadriceps contraction moved the patella laterally both preoperatively and postoperatively. The lateral patellar displacement increased from 5.5 ± 7 mm to 6.4 ± 5.5 mm preoperatively and from 0.0 ± 3.9 mm to 3.0 ± 4.9 mm postoperatively ($P < 0.01$). The mean value of the lateral patellar tilt decreased preoperatively from $21^\circ \pm 6.7^\circ$ to $17^\circ \pm 7.1^\circ$ ($P < 0.01$), and no difference was observed postoperatively.

Discussion

Our MRI results can be compared with normal values recorded in an earlier study (Kujala et al. 1989a). The preoperative examination with the knee in extension showed that there was a smaller lateral patellofemoral angle in our patients, greater patellar tilt, and greater lateral patellar displacement. The difference in patellar subluxation between our patients and controls was not obvious at 30° of knee flexion, but was evident in extension. This accords with an earlier MRI study (Kujala et al. 1989b). After lateral release, restoration of patellar congruity was obvious at 0°–10° of knee flexion. However, our limited material does not allow an analysis of the association between the MRI findings and the subjective results.

Our results show that lateral release gives a good restoration of the patellofemoral congruity when the quadriceps muscle is relaxed. However, the results are less obvious during an isometric contraction of the quadriceps muscle. In some cases, this may be a consequence of a musculus vastus medialis atrophy. However, we believe that the pathologic quadriceps angle caused these poor results. The abnormal quadriceps pull is not corrected by the lateral release alone. Therefore, our method might help the surgeon to evaluate whether or not some other operative procedure should also be added to restore the muscle vector.

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References

- Kujala U M, Österman K, Korman M, Komu M, Schlenzka D. Patellar motion analyzed by magnetic resonance imaging. *Acta Orthop Scand* 1989a; 60(1): 13-6.
- Kujala U M, Österman K, Korman M, Nelimarkka O, Hurme M, Taimela S. Patellofemoral relationships in recurrent patellar dislocation. *J Bone Joint Surg (Br)* 1989b; 71(5): 788-92.
- Ogilvie-Harris D J, Jackson R W. The arthroscopic treatment of chondromalacia patellae. *J Bone Joint Surg (Br)* 1984; 66(5): 660-5.