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Krogius tenoplasty for recurrent dislocation of the patella

Failure associated with joint laxity

Thirty-three patients treated with a Krogius tenoplasty for recurrent dislocation of the patella have been followed for an average of 3 years; the knees were classified according to Rünow. In 14 of 34 operated knees dislocations had recurred. Most of the recurrences were found in patients with generalized joint laxity, whereas only one of nine knees with only a high Insall index had redislocated. Patients with generalized joint laxity should not be treated with the Krogius tenoplasty as the sole procedure.

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Guidelines for the choice of treatment in recurrent dislocation of the patella are not clear. Rünow (1983) has recently presented a grading of patellar instability based on the occurrence of generalized joint laxity and local abnormalities of the femoro-patellar joint. The grading was proposed to facilitate discrimination between patients needing surgery and those in whom conservative therapy will suffice.

Rünow's grading was employed in the present retrospective investigation of patients who have undergone a Krogius tenoplasty for recurrent dislocation of the patella. The aim of the study was to find etiological factors associated with recurrences after surgery.

Patients and methods

Thirty-seven patients underwent a Krogius (1904) tenoplasty in our department during the years 1975–82. Four patients were lost to follow-up, three have emigrated, one moved to a different county, and one patient had bilateral procedures; thus 34 knees were examined clinically and radiographically (Table 1). Mean observation time from the last surgical procedure was 34 (5–80) months.

Operative procedure

The Krogius (1904) tenoplasty was performed with an approximately 1-cm-wide, double-stalked flap of the medial retinaculum. This flap was moved over the patella, and attached with non-absorbable sutures to the lateral retinaculum, where a longitudinal release was first performed. In one case a loose body was removed, and in two cases shaving of the patellar articulating surface was performed. Postoperatively, the leg was fitted with a knee cast for 6 weeks; full weight bearing was allowed. After this period, active physical therapy was commenced.

Clinical examination

At follow-up, the range of motion of the knees, the width of the scar at the widest point, and the occurrence of generalized joint laxity were recorded. The

Table 1. Patients treated with Krogius tenoplasty for recurrent patellar dislocation

	No. of patients	Age at first dislocation	Age at surgery	Years between first dislocation and surgery	Observation (months)	Bilateral dislocations	Frequent dislocations (>2/year)	Significant trauma
Males	8	18 (10–29)	22 (15–36)	4 (1–7)	37 (15–80)	2	6	6
Females	25	12 (3–20)	20 (6–39)	10 (0.3–25)	32 (5–77)	12	20	9
Total	33	13	21	8	34	14	26	15

following three criteria had to be fulfilled to diagnose generalized joint laxity: (1) hyperextension of the elbow >10 degrees; (2) hyperextension of the knee >10 degrees; and (3) passive apposition of the thumb to the volar aspect of the forearm (Rünow 1983).

Radiographic examination

All knees were examined radiographically with the patients in the supine position; the following variables were determined by the methods described by the respective authors: (1) The Insall index, i.e. the ratio between the length of the patellar tendon and the patella (Insall & Salvati 1971); (2) The Norman index, i.e. the vertical position of the patella related to body length (Norman et al. 1983); (3) The condylar angle, i.e. an expression of the depth of the femoral condylar groove (Brattström 1964). These methods are the same as those employed by Rünow (1983), except that he used a 45 degree angle between the long axis of the femur and the central ray when examining the femoral condylar groove, as opposed to Brattström's (1964) 30 degree view. The mean angle plus two standard deviations for both their normal materials was, however, approximately 145 degrees.

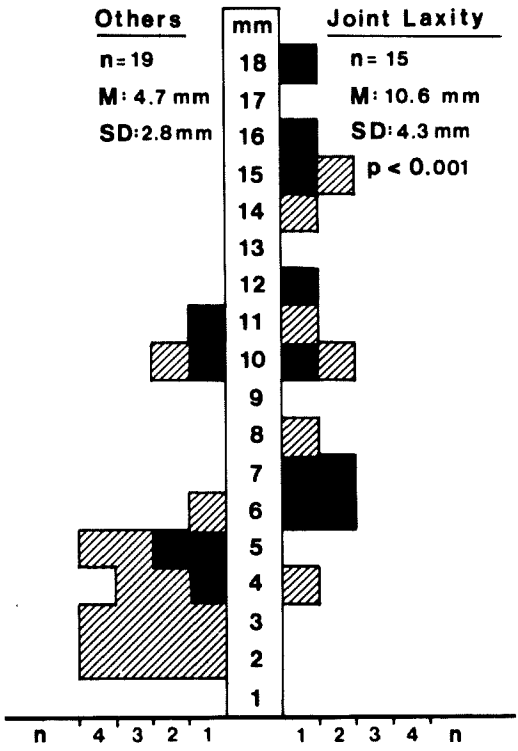

Figure 1. Width of scars of 34 knees from 33 patients with and without joint laxity operated according to Krogius. Filled squares are knees with recurrences of patellar dislocations. Mean scar width of these knees was 9.4 mm, SD 4.3; and without recurrence 5.8 mm, SD 4.1; $p = 0.021$. Student's two-tailed *t*-test.

Results

Complications

There was one wound infection that healed with antibiotics, and one patient developed transient peroneal nerve palsy, probably through pressure from the cast. At the follow-up examination, 19 patients had hyper- or hypoaesthesia over the anterior aspect of the knee and the proximal part of the lower leg. Most of these patients felt discomfort on touch, especially on kneeling.

Recurrence of dislocations

Dislocation or subluxation of the patella had recurred in 14 of the 34 operated knees. Eight of these had undergone additional procedures, either another soft tissue plasty, or medial and distal transfer of the tibial tuberosity. Two patients without recurrence of dislocations had undergone ventralization of the tibial tuberosity due to disability ascribed to chondromalacia of the patella.

Joint laxity

Fourteen patients had evidence of generalized joint laxity at the follow-up examination; nine of these had had recurrence (Table 2). The patients with joint laxity had wider scars, and the patients with recurrences also had wide scars (Figure 1).

Table 2. Incidence of joint laxity and recurrences of patellar dislocation following the Krogius operation

Recurrences	Joint laxity		Total
	Yes	No	
Yes	9	5	14
No	6	14	20
Total	15	19	34

Table 3. Instability grade according to Rünow (1983) in thirty-three patients examined after Krogius tenoplasty for patellar dislocation. Several patients with Grade II–IV instability also had abnormal Norman index and/or condylar angle

Grade	Patients	Recurrences
0	2	1
I	8	3
II	7	5
III	9	1
IV	7	3
Total	33	13

Grade 0: Normal patellar articulation.
Grade I: Norman index >0.25 and/or condylar angle >145 degrees.
Grade II: Generalized joint laxity.
Grade III: Insall index >1.3.
Grade IV: Generalized joint laxity and Insall index >1.3.

Discussion

The grading of patellar dislocations introduced by Rünow (1983) was developed as a prognostic factor of the risk of incurring repeated dislocations. The grading is based on two variables: occurrence of generalized joint laxity and high Insall index. Rünow proposed that patients with Grades III and IV should undergo adequate surgery early, whereas patients with a lower grade could be spared unnecessary surgery because the risk of repeated dislocations is low. Rünow has shown that other known prognostic factors such as age at onset of dislocations, degree of trauma at the first dislocation, bilateral dislocations, and frequency of dislocations are dependent on these two variables.

In this retrospective study of Krogius tenoplasty, it was possible to grade patellar instability according to Rünow (Table 3). All but two patients had either joint laxity or abnormal femoro-patellar articulation. Recurrences were most common in Grade II, i.e. patients with joint laxity only. Scars after surgical treatment of recurrent patellar and shoulder dislocations are often wide and thin (Macnab & Macnab 1978). As seen here, these scars were associated with generalized joint laxity; they reflect abnormal connective tissue healing. Recurrences were also most common in patients with wide scars. This appears logical since the Krogius tenoplasty, to be successful, depends on stable soft tissue healing, a condition that patients with joint laxity do not fulfil. Instead, primary medial transfer, and depending on the Norman index, distal transfer of the quadriceps tendon insertion should be chosen. On the other hand, patients without joint laxity can be expected to do well with a soft tissue procedure which involves less risk of serious complications. In a prospective study, Rünow's grading may prove to be of value, not only in deciding when to operate, but also how.

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