

PATELLOFEMORAL DISORDERS TREATED BY OPERATIONS

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Thirty-six patients with patellofemoral disorders treated with various operative procedures were evaluated after an average follow-up period of 29 (6 to 72) months. Instability of the patella, either recurrent dislocation or subluxation, was present preoperatively in 27 knees (Group A). Twelve patients (Group B) were operated on for chondromalacia, which was not combined with a history of instability.

Good results were obtained in 15 cases in Group A and in only three cases in Group B. Simple procedures, lateral release alone and medial duplication alone appeared to be ineffective methods.

Key words: chondromalacia; dislocation, patella; knee.

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Lateral patellofemoral instability with recurrent dislocations or subluxations is a pathological entity *per se*, but is often combined with chondromalacia patellae (Hughston 1968, Insall et al. 1976, Larson 1979), the former being assumed to be the main etiological factor of the latter.

The etiology of chondromalacia without instability is more obscure. Direct trauma has been implicated as an etiological factor. Also, minor malalignment has been considered as an important factor although this has been debated (Lancourt & Cristini 1975, Marks & Bentley 1978, Perrild et al. 1982).

A series of operative procedures was performed in our institution for patellofemoral instability and chondromalacia. The present study was planned to analyze predisposing factors of patellofemoral instability, and evaluate the results of the operative treatment.

PATIENTS AND METHODS

A total of 44 patients were treated in 1974–1980 for recurrent dislocations, subluxations or chondromalacia

of the patella using various operative procedures. Cases considered as traumatic dislocations of the patella were not included. Patellofemoral abnormalities predisposing to recurrent dislocation or subluxations could be evaluated in 41 knees of 39 patients, and the results of operative treatment could be assessed in 39 knees of 36 patients after an average follow-up period of 29 months (6 to 72 months).

Group A

In 29 knees symptoms of instability (giving-way) due to recurrent dislocations or subluxations of the patella occurred preoperatively. Twelve of the patients in this group also complained of patellofemoral pain not related to the episodes of giving way, and chondromalacia was verified at operation or arthroscopy in ten cases.

Group B

Twelve patients had patellofemoral arthralgia without symptoms of instability and with chondromalacia verified at arthroscopy or operation. These were taken to have a minor patellofemoral incongruity with lateral hypercompression based on clinical examination, arthroscopic findings or tangential X-ray views.

For evaluating predisposing factors leading to instability, a Q angle of $\geq 15^\circ$ in males and $\geq 20^\circ$ in females was considered abnormal (Insall et al. 1976, James

1979). The importance of the upper limit, for the patellar tendon/patellar length ratio set at 1.20 by Insall & Salvati (1971) and at 1.30 by Jacobsen & Bertheussen (1974) was analyzed. A tangential view measuring sulcus angle and patellofemoral congruence angle (Merchant et al. 1974) was made. A sulcus angle $\geq 150^\circ$ and a congruence angle $\geq +16^\circ$ was considered abnormal.

The results of operative treatment assessed at follow-up were graded as good, when no symptoms were present, and there was no restriction of activities or when occasional pain after strenuous effort was present. The results were graded as fair when the patient complained of residual instability and/or had some pain which restricted activities to some extent, but the patient felt that the knee was better than preoperatively. In cases graded as poor, persistent symptoms (instability and/or pain) were present and the knee was unchanged or worse than preoperatively.

RESULTS

In evaluating patella alta as an abnormality predisposing to patellofemoral instability, a patellar tendon/patellar length ratio of 1.20 did not differentiate between the two groups, but the ratio of 1.30 differentiated much more effectively. A shallow femoral sulcus was also significantly more often present in Group A. By using a PT/PL ratio of 1.30 and a sulcus angle of 150° as the limits, only three of 29 patients in the unstable Group A were normal in both respects; in the stable Group B nine of 12 patients had normal values in both respects ($P = 0.0001$).

No patients had squinting of the patella or pathological Q angle and only one patient had a tibio-femoral angle $\geq 10^\circ$.

The results of operative treatment as evaluated at follow-up are shown in Tables 1 and 2. Four patients in Group A were reoperated during the follow-up time. Two operations were performed for recurrent dislocation, and two with release of medial reefing after increasing pain. In Group A six patients still complained of instability or recurrent subluxations at follow-up, but a redislocation had not occurred. Twelve of the patients in this group had significant pain at follow-up. Eleven of 19 patients in Group A, who did not have retropatellar pain preoperatively, complained of this at follow-up.

In Group A lateral release or medial duplica-

Table 1. Results of operative treatment in Group A, 27 knees in 24 patients.

Procedure	Good	Fair	Poor
Lateral release	—	—	1
Proximal medialization	—	—	3
Lateral release and proximal medialization	8	2	—
Lateral release and distal medialization*	2	1	—
Lateral release combined with proximal and distal* medialization	5	3	2
Total	15	6	6

* One distal medialization by the Hauser method, and 12 by the Roux-Goldthwait method.

Table 2. Results of operative treatment in Group B, 12 knees in 12 patients

Procedure	Good	Fair	Poor
Lateral release	—	2	3
Lateral release and proximal medialization	3	1	2
Lateral release and distal* medialization	—	1	—
Total	3	4	5

* Distal medialization by the Hauser method.

tion alone resulted in inferior results compared with other procedures.

The three patients in Group B with good results were the only ones in this group with verified pathological congruence angles preoperatively.

We did not find any clear relationship between postoperative congruence angles and the clinical results.

DISCUSSION

Femoral trochlear dysplasia resulting in a shallow sulcus was observed in two-thirds of the patients in Group A, in accordance with earlier reports

(Brattström 1964). Patella alta has been considered a highly significant cause of recurrent dislocation of the patellae (Lancourt & Cristini 1975). We found a patellar tendon/patellar length ratio of 1.30 to be significantly correlated with symptoms of patellofemoral instability. A ratio >1.3 and femoral trochlear dysplasia were frequently combined, and one or both were present in 26 of 29 knees in Group A compared with only 3 of 12 in Group B.

Conservative treatment for both instability and chondromalacia is generally recommended before resorting to surgery (Hughston 1968, Insall et al. 1976, Larson 1979, De Haven et al. 1980). In accordance with this policy, two-thirds of our patients had received conservative treatment, prior to surgery, but the results had been unsatisfactory. The remaining one-third were operated on acutely after a recurrent dislocation.

Most patients in Group A were cured of their instability by the operation, and there were only two cases with recurrent dislocations. The problems among patients with less satisfactory results were mainly related to patellofemoral pain.

In Group A, our overall results were satisfactory in accordance with several published series (Hughston 1968, Insall et al. 1976). However, our results show that medial duplication as the only procedure for recurrent dislocations or subluxations and lateral release alone for instability and/or chondromalacia are insufficient methods.

On the other hand, our results of treatment of chondromalacia without a history of instability were unacceptable. In Group B, the only successful operations were those three cases where a subluxation was verified in tangential X-ray views. This indicates that the results of medial-

ization operations based on clinical and/or arthroscopic assessment of minor patellofemoral incongruity with lateral hypercompression are unpredictable.

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