Acta orthop. scand. 46, 695–699, 1975

Princess Alexandra Hospital, Harlow, England.

CHONDROMALACIA AND THE UNSTABLE PATELLA

D. J. DANDY & H. POIRIER

Accepted 8.ii.75

This paper reports a series of operations done for patella instability, in which the symptoms of chondromalacia patellae regressed without shaving or drilling of the articular cartilage.

MATERIAL AND METHOD

Fifty-seven patients were operated upon and 47 (11 males and 36 females) were traced and examined. Nine of the 47 had operations on both knees and two were operated on twice to make a total of 58 operations available for study.

Symptoms began between the ages of 11 and 18 in 43 cases, with a peak at the age of 13; girls were generally slightly younger at the onset of symptoms than boys. The duration of symptoms before operation ranged between 6 months and 30 years, with a mean of 4 years 4 months, and the interval between operation and review ranged between 1 year and 5 years 9 months, with a mean of 3 years 11 months.

From the patient's history, the stability of the patella was placed in one of three categories; normal, recurrent subluxation, or recurrent complete dislocation. The extensor mechanism was considered to be subluxing if the patient gave the typical account of the knee "giving way" without warning during walking or running, sometimes followed by an effusion into the joint (Hughston 1968).

Tenderness of the soft tissues medial to the patella was a common finding and helped to distinguish the condition from a meniscus injury, in which the tenderness is along the joint line. Patients were said to have recurrent dislocation if their patella had dislocated completely more than once.

Patients were considered to have chondromalacia patellae if, in addition to the symptoms of dislocation or subluxation of the patella, they complained of pain or discomfort when climbing or descending stairs, getting out of a chair or rising from a squatting position, or of aching when the knee was straightened after being flexed for a long time as in a car or the theatre. The pain could usually be reproduced by pressing the patella against the femur, the undersurface of the patella being tender. These symptoms were classed as mild, severe or absent.

A medial plication of the capsule was done to avoid growth changes if the apophysis of the tibial tubercle had not fused to the tibia (6 cases). A Goldthwaite operation (Goldthwaite 1904) was done in three patients who were keen athletes because it was less likely to impair their performance than an extensive procedure requiring arthrotomy. The tibial tubercle was transposed in 39 cases. Hauser's oper-

ation (Hauser 1938) was done if the patella tendon was long or lax and its insertion needed to be moved distally as well as medially to obtain a satisfactory alignment (15 cases). If the tubercle needed only to be moved medially (24 cases) it was elevated on a distally-based osteoperiosteal flap and swung to a prepared bed on the tibia where it was held with a screw (Elmslie's operation). Immobilisation after this operation is short because the continuity of the extensor mechanism is not completely disrupted. If the undersurface of the patella was found at operation to be excessively fibrillated, ulcerated or eburnated, realignment was combined with patellectomy (14 cases).

FINDINGS

A total of 42 of the 58 knees were made completely stable by operation, but 6 of the 28 which dislocated before operation subluxated afterwards (Table 1). There was no difference betwen the results of the various procedures. Altogether 28 of the 30 knees (93 per cent) with subluxating patellae before operation and 20 of the 28 (62 per cent) with complete dislocation gave rise to the symptoms of chondromalacia patellae (Table 2) but these symptoms regressed after realignment, particularly if the extensor mechanism had been successfully stabilised. Of the 44 cases that were realigned without patellectomy, 35 (80 per cent) had chondromalacia. The symptoms of chondromalacia were improved in 26 (74 per cent), unchanged in 6 (17 per cent) and worse in 3 (9 per cent) and this improvement was obtained without shaving or drilling the articular surfaces. Stability of the patella was achieved in 28 of these 35 patients; the symptoms of chondromalacia were improved in 24 of these (86 per cent), unchanged in 3 and worse in 1. Stability was not achieved in the remaining 7 patients; the symptoms of chondromalacia were improved in 2 (28 per cent) of these, unchanged in 3, and worse in 2.

Table 1. Stability after operation related to stability before.

Stability before operation	Stability after operation		
	Normal	Subluxation	Dislocation
Dislocation (28 knees)	20	6	2
Subluxation (30 knees)	22	8	–
Total (58 knees)	42	14	2

One patient had a femoral vein thrombosis with oedema of the lower limb after patellectomy and another had two early episodes of dis-

location of the extensor apparatus to the medial side of the femur, but had not suffered such a dislocation during the two years prior to review. Many patients experienced difficulty with kneeling. Of the 37 knees in which a screw had been used to secure the tibial tubercle, 33 were so tender over the head of the screw that kneeling was not possible. Eight of the 15 in which a realignment had been done without the use of a screw gave rise to some complaint, but none of the six medial plications, in which the tubercle was left undisturbed, produced pain on kneeling. In three patients the symptoms of chondromalacia were worse after operation than before.

Table 2. Stability of the extensor mechanism related to the symptoms of chondromalacia.

	Symptoms of chondromalacia			
	None	Slight	Severe	Total
Before operation				
Dislocation	8	7	13	28
Subluxation	2	4	24	30
Total	10	11	37	58
After operation				
Dislocation	1	1	–	2
Subluxation	4	4	6	14
Normal stability	24	10	8	42
Total	29	15	14	58

Two patients who underwent plication for dislocation continued to suffer dislocation but were helped by tubercle transposition when growth was complete, and six patients reported that their knees were unchanged. We could not find any clinical feature consistently associated with failure, and there was no correlation between the result and the length of history or the length of follow-up.

DISCUSSION

It is well known that recurrent dislocation of the patella is associated with chondromalacia patellae (Heywood 1961) and we have confirmed this observation. We have also found that subluxation of the patella, a condition which itself often goes unrecognised (Hughston 1968) is al-

most always associated with the symptoms of chondromalacia (93 per cent of cases), and that this association is stronger than that with recurring dislocation (62 per cent of cases). The explanation of this may be that the episodes of subluxation occur more frequently than the more dramatic, but less frequent, episodes of complete dislocation, and that the abnormal lateral shear stress imposed on the articular cartilage of the patella is consequently greater in patients with subluxation.

The symptoms of chondromalacia improved in 74 per cent of all patients after realignment of the extensor mechanism, and this figure is similar to the results of patellaplasty (Cave & Rowe 1950), shaving or drilling the articular cartilage (Wiles et al. 1956, Wiles et al. 1960), and tibial tubercle transposition (Devas & Golski 1973). Our own series differs from others in relating improvement in the symptoms of chondromalacia to the attainment of patella stability; if the patella mechanism was made stable, the symptoms of chondromalacia were more likely to improve (86 per cent of cases) than if stability was not achieved (28 per cent of cases). Patients who have the symptoms of chondromalacia as well as those of patella instability can, therefore, expect to derive considerable benefit from realignment of the extensor mechanism of the knee.

CONCLUSIONS

Instability of the extensor mechanism is important in the aetiology of chondromalacia patellae and the symptoms of chondromalacia are likely to regress in most patients with dislocation or subluxation of the patella when the patella mechanism has been made stable. This improvement occurs without shaving or drilling of the patella and is probably due to the reduction of abnormal shear stresses on the articular cartilage. The use of a screw to secure the tibial tubercle is often associated with persistent pain, tenderness and disability.

SUMMARY

Fifty-eight realignment operations for dislocation or subluxation of the extensor mechanism are described. Patellectomy was combined with realignment in 14. Thirty-five of the 44 patients (80 per cent) in whom the patella was retained also had chondromalacia patellae, which improved after realignment in 26 (74 per cent) without shaving or drilling

of the articular surface. The symptoms of chondromalacia were more likely to regress if stability of the extensor mechanism was achieved.

ACKNOWLEDGEMENTS

We are indebted to Mr. G. R. Fisk for permission to include his patients in this study.

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Key words: surgery, operative; orthopaedics; knee injuries; patella; dislocation; tendon transfers; osteoarthritis; chondromalacia

Correspondence to:

D. J. Dandy, FRCS
Consultant Orthopaedic Surgeon
Addenbrooke's Hospital
Hills Rd
Cambridge, CB2 2QQ
England