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ANTEROLATERAL ROTARY INSTABILITY OF THE KNEE JOINT

Results after Stabilization by Extraarticular Transposition of the Lateral Part of the Patellar Ligament. A Preliminary Report

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A method using the lateral third of the patellar ligament and the adjacent part of the patella as an extraarticular transplant to the lateral femoral condyle in the stabilization of anterolateral rotary instability of the knee is described and discussed. The operation was performed in six patients. The stabilizing effect of the procedure could be evaluated in only five of them due to the development of septic arthritis in one patient. Four of these five patients had ruptured the anterior cruciate ligament, while the fifth patient had a congenital anterolateral instability. In this patient the procedure was combined with an Ellison operation. In all five patients the operation eliminated the instability and resulted in good function.

The procedure is recommended for further testing in the treatment of anterolateral rotary instability of the knee as an alternative method to procedures applying the iliotibial band.

Key words: anterior cruciate ligament; anterolateral rotary instability; knee; surgical repair

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During recent years considerable attention has been given to anterolateral rotary instability of the knee. In this condition the lateral tibial condyle subluxates forwards during the final phase of knee extension. Spontaneous reduction occurs with a sudden slip when the knee is flexed 20–40 degrees. The condition is characterized by a sensation of the knee "going out" or "giving way" (Slocum et al. 1976). The phenomenon itself, and various tests to show the instability clinically, have been described by several authors (Galway et al. 1972, Slocum et al. 1976, Losee et al. 1978).

There is general agreement that anterolateral rotary instability is due to insufficiency of the anterior cruciate ligament. In addition insufficiency of the lateral ligaments and capsule may contribute to this type of instability (Hughston et al. 1976, Fetto & Marshall 1979).

Various operative procedures have been proposed in the treatment of anterolateral rotary instability, such as dynamic stabilization (Ellison 1979) or static stabilization (Galway et al. 1972, Losee et al. 1978) by means of a strip of the iliotibial band.

After a few static and dynamic reconstructive procedures using the iliotibial band with variable success we looked for alternative procedures. Since 1979 we have used the lateral part of the patellar ligament in a reconstructive procedure to stabilize knees with marked anterolateral rotary instability. Lanny Johnson suggested this method during an instructional course in arthroscopy in Skövde, Sweden, in 1977. This suggestion was based on his experience with the use of the medial part of the patellar ligament in anteromedial rotary instabilities. However, to our knowledge the method has not been described in the litera-

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Table 1. Patients

Case no.	Age (years)	Sex	Interval from injury (years)	Previous operative procedure
1	48	M	7	Resection of MM
2	25	M	1.5	Suture of ACL and MC, resection of MM
3	57	M	15	None
4	27	M	3	Resection of LM
5	7	M	–	Tibial derotation osteotomy
6	28	M	3	None

MM = medial meniscus ACL = anterior cruciate ligament
LM = lateral meniscus MC = medial capsule

ture. Since our results are most promising, we feel justified in drawing attention to the possible use of this method in the treatment of anterolateral rotary instability of the knee.

PATIENTS AND METHODS

Patients

The present material consists of six patients who were seriously disabled because of knee instability. The Slocum test for anterolateral instability (Slocum et al. 1976) and the anterior drawer sign were positive in all patients. All patients, except one, had sustained a rupture of the anterior cruciate ligament. Details are given in Table 1. One case represented a congenital an-

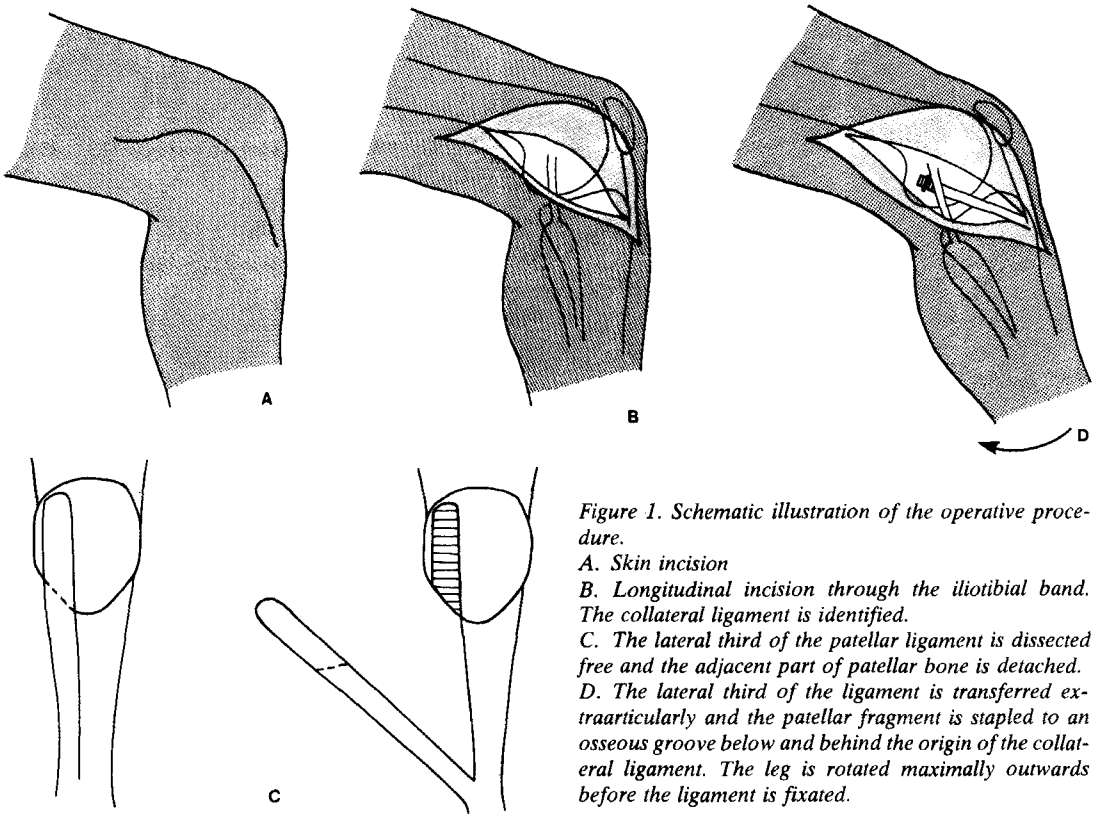

Figure 1. Schematic illustration of the operative procedure.
A. Skin incision
B. Longitudinal incision through the iliotibial band. The collateral ligament is identified.
C. The lateral third of the patellar ligament is dissected free and the adjacent part of patellar bone is detached.
D. The lateral third of the ligament is transferred extraarticularly and the patellar fragment is stapled to an osseous groove below and behind the origin of the collateral ligament. The leg is rotated maximally outwards before the ligament is fixated.

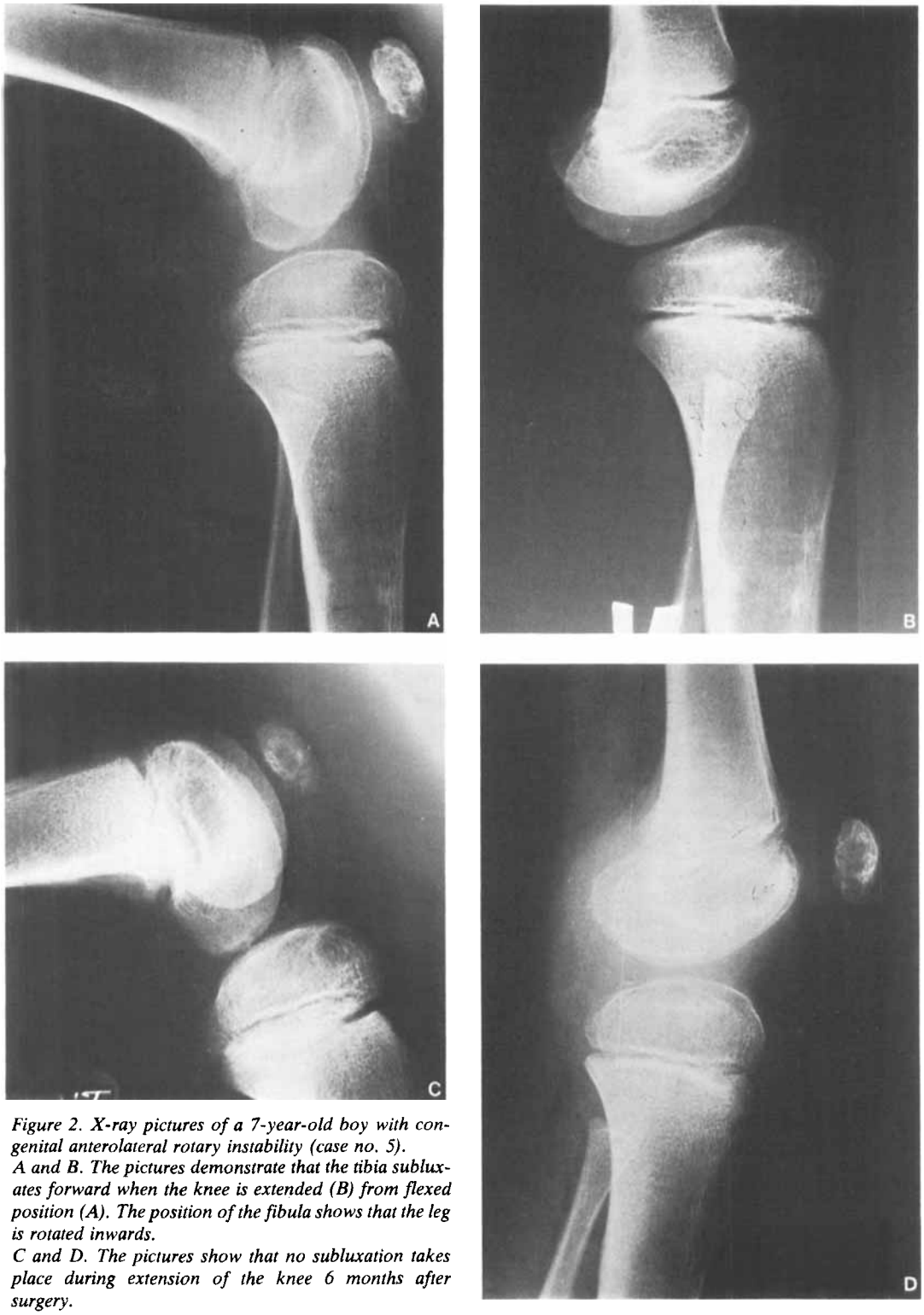

Figure 2. X-ray pictures of a 7-year-old boy with congenital anterolateral rotary instability (case no. 5).
A and B. The pictures demonstrate that the tibia subluxates forward when the knee is extended (B) from flexed position (A). The position of the fibula shows that the leg is rotated inwards.
C and D. The pictures show that no subluxation takes place during extension of the knee 6 months after surgery.

terolateral rotary instability (case no. 5). This was a boy of 7 years, in whom the condition previously had been misinterpreted as an internal torsion deformity of the leg, and a derotation osteotomy had been performed. In this particular case the lateral tibial condyle was subluxated anteriorly during every step of walking (Figure 2).

Methods

Prior to operation and under the same anaesthesia arthroscopy was performed to evaluate the condition of the joint surfaces and the ligaments, and in particular to exclude interposition of ruptured menisci as a reason for the registered dysrhythmic articulation of the knee.

The operations were performed in epidural anaesthesia, the knee being semiflexed. Pneumatic tourniquets were applied.

The operative procedure is illustrated in Figure 1

The patellar ligament and patella are approached through an anterolateral incision turning posteriorly above the femoral attachment of the lateral collateral ligament. The iliotibial band is incised longitudinally and the patellar ligament divided at the junction of the lateral and medial third. By use of an oscillating saw the lateral anterior part of the patella with the origin of the lateral third of the patellar ligament is detached. The patellar fragment with the lateral third of the patellar ligament is transferred beneath the iliotibial band to the lateral side of the femoral condyle, the patellar fragment being stapled to an osseous groove prepared below the origin of the lateral collateral ligament. To prevent damage to the joint surface during stapling of the transferred bone fragment the joint surface should be identified through incisions of the capsule anterior and posterior to the collateral ligament. The transferred ligament should be fixated with the leg in maximal external rotation, the knee being flexed approximately 45 degrees. However, care should be taken that the transferred ligament does not prevent complete extension of the knee or flexion beyond 90 degrees. After stapling of the fragment the knee is extended during internal rotation of the leg to make sure that the forward subluxation instability of the lateral tibial condyle during the final 20–40 degrees of extension has been eliminated. The incision of the capsule and the iliotibial band is closed with sutures. The knee is immobilized with a long leg cast in 50 degrees of flexion and maximal external rotation for 6 weeks. Static muscle exercises are recommended during the period of immobilization.

The method described was performed in all patients. In case no. 5, which represented a congenital anterolateral rotary instability, the method was combined with an Ellison procedure. Supplementary reconstruction of the lateral collateral ligament was performed in case no. 6. This was done by transfer of the anterior half of the biceps tendon to the lateral femoral condyle.

Following removal of the plaster, physiotherapy with particular stress on active extension and external rotation exercises is recommended. Weight-bearing is allowed as soon as the knee can be fully extended.

RESULTS

In one patient the operation was complicated by a serious septic arthritis. Arthrodesis of the knee had to be performed in this patient due to complete destruction of the articular cartilage.

The results in the five other patients were assessed 6 to 17 months (mean: 11 months) postoperatively. All these patients felt that the operated knee now was stable and they were all very satisfied with the result. Objectively the knees were found to be stable when evaluated by the Slocum test for anterolateral rotary instability. The anterior drawer sign was completely negative in three patients, slightly positive in two. In one patient a slight reduction (10 degrees) of the flexion mobility was found, whereas the extension was normal in all patients. One patient (case no. 2, Table 1) complained of weakness of the quadriceps muscles. None of the patients complained of pain. Three patients (case nos. 2, 4 and 6) who were engaged in sporting activities before the injury have resumed training.

Pre- and postoperative X-ray pictures of the case of congenital anterolateral instability are shown in Figure 2.

DISCUSSION

Although treatment of anterolateral rotary instability of the knee was first described many years ago (Jones & Smith 1913, Hey Groves 1920, Palmer 1938), it is mainly during the last 10 years that the condition has been defined as a separate type of instability subject to specific stabilizing operative procedures. The use of the iliotibial band in dynamic procedures (Kennedy 1978, Ellison 1979) and static procedures (Galway et al. 1972, Losee et al. 1978, Ireland & Trickey 1980) has certainly proved efficient. However, improved methods are needed since the methods mentioned do not invariably give satisfactory results.

One reason for failures of static procedures using a strip of the iliotibial band might be that this structure is relatively thin and consequently may lose its stabilizing effect because of stretching. Transferral of the lateral third of the patellar ligament, as described in this paper, is likely to be considerably stronger. Also the bony union between the transferred patellar fragment and the femoral condyle offers an advantage compared to the use of the iliotibial band.

The use of the lateral third of the patellar ligament as described here has the disadvantage that the tibial attachment of the ligament is positioned slightly distal to the insertion of the iliotibial band. Because of this the direction of the transferred part of the patellar ligament will have a less stabilizing effect on anterolateral rotary instability than a transferred iliotibial band unless the patellar fragment is transferred as far distally towards the joint surface as possible. This has to be borne in mind if the method is used.

Although our results seem to be most promising, the presented series is too small and the length of the observation period is too short to warrant a general recommendation of the method described. As Ellison (1979) has pointed out a minimum of 5 years is required to determine the ultimate results in reconstructive surgery of the knee. However, the experience gained so far justifies a more extensive trial of this procedure. Finally, it should be noted that the method can easily be combined with the Ellison dynamic transfer of the iliotibial band in cases of severe instability, as shown in one case of congenital anterolateral rotary instability in the presented series.

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