CASE REPORT

Total knee replacement for osteoarthritis of the knee with congenital dislocation of the patella

We carried out three total knee replacements with proximal realignment in two patients with severe osteoarthritis of the knee and congenital dislocation of the patella. During the operation, the femur and the tibia were cut according to the recommendations of the manufacturer of the implant. The femoral component was placed in external rotation and the centre of the tibial component aligned in relation to the tibial tuberosity with regard to rotation and translation. After making the bone cuts, the iliotibial tract was detached from Gerdy’s tubercle, the iliotibial tract was detached from the popliteus tendon divided, and the biceps femoris tendon elongated by Z-plasty. After the trial implants were positioned, a proximal re-alignment procedure was performed. One knee had deep infection. There was one dislocated patella which was repositioned, and walking ability was improved in all knees. We believe that the rotational alignment of a prosthesis is as important as the soft-tissue surgery.

We treated two patients (three knees) with severe osteoarthritis (OA) and congenital lateral dislocation of the patella by total knee replacement (TKR) with proximal realignment, as described by Insall, Bullough and Burstein1 (Figs 1 and 2).

Case 1. A 44-year-old woman, with mental retardation and bilateral OA of the knees presented to our clinic. She had no other neurological conditions. Both knees showed severe valgus deformity and lateral dislocation of the patella. She could only walk with a frame or with support from a carer, but her pain was mild. She also had a healed unrecognised and untreated fracture of the neck of the right femur. The patellae were located on the lateral side of the lateral femoral condyle and the central ridges were absent. They remained dislocated throughout the full range of movement and could not be reduced manually. There was no history of trauma and her elder brother had a similarly dislocated left patella. We considered this to be a case of familial congenital dislocation of the patellae. She was admitted for TKR to improve her walking ability.

Pre-operative assessment. CT scanning of the legs was undertaken to evaluate rotational deformity in the femur and tibia; it revealed internal torsion of the femur. The images of the left leg were used for this evaluation because of the previous fracture of the right femur.

Various points were considered. An extended soft-tissue release would be required to correct the valgus deformity in order to achieve a good soft-tissue balance. It was felt that a semi-constrained implant was needed. The femoral component should be placed in external rotation, the centre of the tibial component aligned with regard to the rotation and translation of the tibial...
thus, the patella could be repositioned in the patellar groove of the femoral component. After irrigation of the wound, the lateral edge of the vastus medialis muscle was sutured to the lateral edge of the quadriceps tendon. Good patellar tracking was confirmed in flexion and extension.

The knee was immobilised in plaster for one week. Exercises and walking training with a walker were then started. She was able to return home with a more stable gait after one month. Subsequently she decided after discussion with her mother to undergo a left TKR which was performed in a similar manner to that on the right, except that a Z-plasty of the biceps tendon was not necessary.

The right knee was followed up for four years and 11 months and the left for one year and eight months. During this period, she suffered a trochanteric fracture of the left femur which was treated by open reduction and internal fixation, and healed satisfactorily. She had no pain and her gait had improved. She had full extension in the right knee and 5° of flexion deformity in the left. Flexion of the right knee was to 95° and for the left to 120°. There was no extension lag in either knee. Anteroposterior and skyline radiographs of the right knee at the latest follow-up showed no loosening of the implant and the patella was stable in the centre of the femoral groove (Figs 3 and 4).

Case 2. This patient is the elder brother of the previous woman. He presented at 53 years of age with OA of the left knee with dislocation of the patella. He also had moderate OA with a valgus deformity of the right knee, but the patella was not dislocated. He had problems with walking and could only stand with his weight on the right leg. He underwent left TKR.

There was 5° of passive hyperextension and 130° of active flexion at the left knee before operation. There was an extension lag of 40°, and an effusion was present. The femorotibial angle was 160°. The medial soft tissues were loose under valgus stress. The skin over the front of the knee was thin and scarred from previous ulceration.

A TKR was performed in the same way as for the first case, however, Z-plasty of the biceps tendon was not necessary to correct the alignment.

An acute infection of the left knee occurred on the seventh post-operative day. Methicillin-resistant Staphylococcus aureus was the causative microorganism. Irrigation was started on the same day. Two Salem double-lumen tubes (Nippon Sherwood, Tokyo, Japan), were inserted into the joint space for continuous irrigation. However, the infection could not be controlled. Six months later, the implant was removed and cement spacers impregnated with Vancomycin antibiotic inserted. Eight months later a revision was undertaken with no subsequent recurrence of infection and a satisfactory result at the latest follow-up at two years and three months. He could walk with a stable left knee and no pain. The knee flexed to 80° and extended to 0° with no extension lag. Radiographs showed no evidence of loosening of the implant and the patella was stable in the centre of the femoral groove.
Discussion

Congenital dislocation of the patella is rare and there are few accounts of TKR for OA of the knee associated with this condition. Marmor\(^3\) described a patient who had a TKR without repositioning of the patella. This patient was satisfied with relief of pain and stability of the knee. Bullek, Scuderi and Insall\(^4\) reported five TKRs in two patients with congenital dislocation of the patella, and one with dislocation of the patella caused by juvenile rheumatoid arthritis. The dislocation was treated by a modified proximal re-alignment and achieved good results. Bergquist, Baumann and Finn\(^5\) reported a TKR with repositioning of the patella for a patient who had congenital dislocation. This patient also had an excellent result. Proximal realignment was speculated in their method, but the details of the procedure were not clear.

Marmor\(^3\) did not reposition the patella because it would have reduced the degree of flexion. In a knee with dislocation of the patella, the quadriceps muscle, the patella and the patellar tendon pass through the shortest path and the quadriceps muscle does not lengthen during flexion. In our patients, flexion decreased compared with that before operation.

We chose to reposition the dislocated patella because of the importance of active extension of the knee in walking, standing up from a chair and climbing stairs.\(^6,7\) The patients in this report could not fully extend their knees pre-operatively, but post-operatively they regained active extension and lost their pre-operative extension lag.

Several papers describe medial transposition of the tibial tuberosity as useful for the repositioning of the dislocated patella.\(^8,9\) However, if the femoral component is set in external rotation and the centre of the tibial component set in relation to the tibial tuberosity, the same effect as medial transposition of the tibial tuberosity can be achieved. The key to the procedure for repositioning the patella then becomes the proximal realignment.\(^10^-12\)

The exact cause of the deep infection in the second patient was not clear, but it may have been associated with the thin scarred skin over the anterior aspect of the knee. Patients with congenital dislocation of the patella commonly have other abnormalities and complex deformities of the knee\(^11,12\) which can make operation difficult and complications more likely. However, TKR is a useful procedure for OA of the knee in association with congenital dislocation of the patella.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References


The Journal of Bone and Joint Surgery