Patellar tendon lengthening for patella infera using the Ilizarov technique

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Patella infera can cause knee pain and lead to patellofemoral osteoarthritis. Treatment is usually unsatisfactory. We describe a case of severe patella infera after operative treatment for fracture of the patella. We used Ilizarov external fixation and gradual lengthening of the patellar tendon. The patellar height was restored and the patient’s symptoms were much improved.

Patella infera indicates an abnormally low patella, and most often results from soft-tissue contracture or hypotonia of the quadriceps muscle. Pathological shortening of the patellar tendon, whether secondary to disease, trauma or surgery, is often associated with chronic knee pain and limitation of movement. It is a rare complication of knee surgery and can usually be prevented by early post-operative physiotherapy. Currently, there is no satisfactory form of treatment. We report a case of patella infera, treated using the Ilizarov external fixator (U & I corporation, Gyeonggi-do, Republic of Korea).

Case report
A 23-year-old male fell onto his left knee while running. Radiographs revealed a displaced transverse fracture of the mid-portion of the patella (Fig. 1). Open reduction and internal fixation using tension band wiring was undertaken. However, one month later he fell again with further displacement of the fragments (Fig. 2). Revision of the fixation was performed using cannulated screws and wire.

Six months later, there was increased pain, flexion was limited to 60° and radiographs showed patella infera with an Insall-Salvati index of 0.38 (normal, 1.02 ± 0.2) and a Blackburne-Peel ratio of 0.11 (normal, 0.8 ± 0.26) (Fig. 3). He received physiotherapy for two months without symptomatic improvement.

Three months after the second operation, an Ilizarov external fixator was applied to the tibia and patella. One round ring and one half ring were applied to the tibia and one half ring was applied to the patella. Two wires were passed through the mid patellar area with a diagonal angle of approximately 25° (Fig. 4), without removal of the cannulated screws and wire used previously. On the first post-operative day lengthening of the patellar tendon of 1 cm was obtained until resistance was felt. The lengthening was continued at the rate of 1 mm/day from the second post-operative day.

Radiographs showing a) the anteroposterior and b) the lateral view of a displaced transverse fracture of the patella.

Radiographs showing a) the anteroposterior and b) the lateral view, taken at the time of further injury.
After 38 mm of lengthening the patellar height was the same as on the normal side. Active range-of-movement exercises, and full weight-bearing were undertaken throughout the procedure. Approximately 80° of active flexion was possible with the Ilizarov fixator applied. The fixator was retained for three months to prevent recoil of the patellar tendon. After removal of the fixator, cannulated screws and wire, the final range of flexion achieved was 120°, compared with 140° for the contralateral knee. Radiographs taken three months after operation when there was marked symptomatic improvement showed a near-normal patellar height (Fig. 5).

Discussion
Patella infera may be due to fracture, prolonged immobility, or post-operative arthrofibrosis. Noyes, Wojtys and Marshall described its natural history as consisting initially of transient patella infera due to peri-patellar and fat-pad contracture and quadriceps weakness following trauma or surgery then restriction of movement due to arthrofibrosis followed by permanent shortening of the patellar tendon, and finally the development of patellofemoral osteoarthritis.

Forms of treatment involving lengthening of the patellar tendon, osteotomy of the tibial tuberosity and patellectomy have been described, with variable results.

We undertook lengthening of the patella tendon using the Ilizarov technique, which may be used for lengthening contracted soft tissue without serious complications. The Ilizarov frame had some advantages for post-operative rehabilitation in that no fixation on the femoral side was required and the two upper half rings allowed movement of the knee to occur freely.

Elongation of the inferior pole of the patella resembled an osteophyte caused by abnormal stress and the normal height of the main portion of the patella was restored.

Further aggressive post-operative mobilisation might improve the results, but lengthening of the patellar tendon using the Ilizarov technique seems an appropriate form of treatment for patients with patellar infera.

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References


