



Case report

Treatment of patella infera by patellar tendon lengthening and augmentation with tibialis anterior tendon allograft



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ABSTRACT

Management of patella infera remains a difficult therapeutic endeavor. We report a case of a 21-year-old man, who had development of patella infera and knee flexion contracture after a patella fracture. Patella infera was treated by patellar tendon lengthening and augmentation with a tibialis anterior tendon allograft fixed with bioabsorbable cross-pins. The patient regained an anatomic patellar position and full range of motion at two years after surgery.

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1. Introduction

Patella infera is a common complication after trauma to the knee joint, especially the patella. It is characterized by a permanent shortening of the patellar ligament and is associated with a severely limited range of motion of the knee. Shortening of the patellar ligament is associated with soft tissue contractures, quadriceps weakness, restriction of joint motion, patellofemoral incongruence and altered patellofemoral contact stresses [1,2].

For the treatment of patella infera, patellar tendon lengthening surgery is often needed. After surgery, limited range of motion of the knee joint can recur easily. Hence, early range of motion exercises for the knee joint should be started. Several procedures for the treatment of patella infera have been reported [3,4].

In this report, a case of patella infera with knee contracture after patellar fracture was treated successfully by z-lengthening of the patellar tendon and augmentation with tibialis anterior tendon allograft with firm fixation using bioabsorbable cross-pins.

2. Case

A 21-year-old male suffered a fall on a frozen road. He sustained a fracture of the left patella. A long leg splint was applied for 4 weeks. The patient developed limited knee flexion secondary to pain and was

unable to tolerate a continuous passive motion machine for passive mobilization of the patella. His symptoms did not improve. Six months following injury, he was referred to our hospital. The range of knee motion was 0°–105° and he had neither knee instability nor extension lag. There was atrophy of the quadriceps muscle; the circumference of the left thigh was 1.5 cm less than the right. Lateral radiograph of the left knee showed a shortened patellar tendon (26.9 mm, contralateral patellar tendon length was 45.8 mm) (Fig. 1a). The Insall–Salvati ratio [5] was 0.52 and the Caton–Deschamps index [6] was 0.34. Magnetic resonance imaging (MRI) of the knee showed a thickened (13.3 mm) and shortened patellar tendon (Fig. 1b). The lysholm score was 52 preoperatively.

Surgery for restoration of patellar height and the arc of motion was performed. A longitudinal midline incision was made from the upper pole of the patella to the tibial tubercle. A shortened thickened patellar tendon with adhesions in the fat pad and ligamentum mucosum was observed. The adhesions of the fat pad were excised and patellar tendon was released.

For patellar tendon lengthening, a z-plasty of the patellar tendon was performed. The medial half of the patellar tendon was incised transversely just below the lower pole of the patella. The lateral half of the patellar tendon was incised transversely just above the tibial tuberosity (Fig. 2a).

For augmentation of the patellar tendon, a tibialis anterior tendon allograft was used. Adherent muscles and soft tissues of the tibialis anterior tendon were removed, and it was prepared to pass tightly through a 7-mm slotted graft sizer. Each ends of graft were sutured using No. 2 Ethibond (Ethicon Inc, Somerville, New Jersey) in a running whipstitch fashion.

Two parallel patellar tunnels (7 mm in diameter) were created longitudinally using guide pins placed under fluoroscopic guidance.

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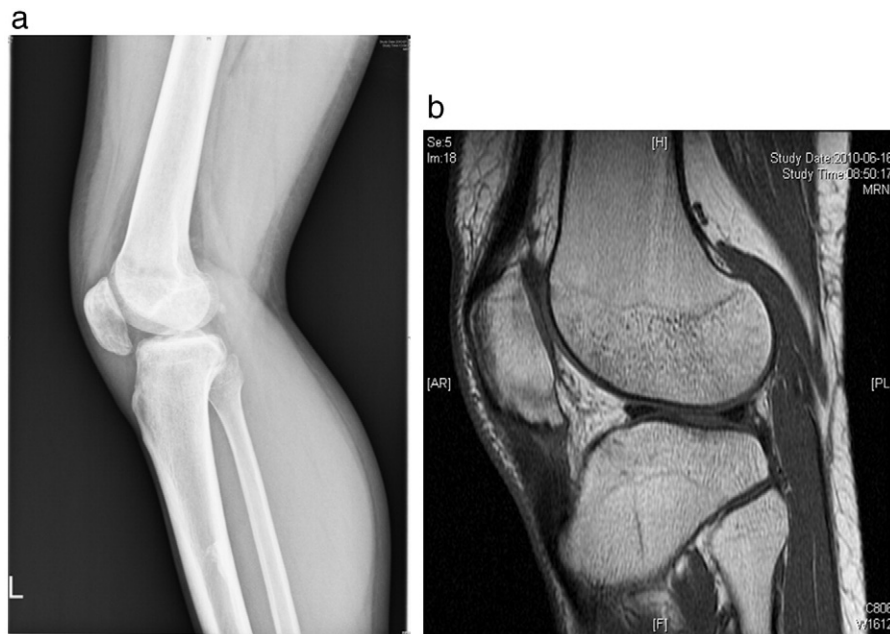


Fig. 1. **a** Six months after patellar fracture, a lateral radiograph showed severe patella infera. **b** MRI showed that the patellar tendon was thickened and shortened.

The tunnels were located 12 mm posteriorly from the anterior margin of the patella (Fig. 2b). To maintain a sufficient bony bridge between the two tunnels, two guide pins were inserted at 7 mm intervals. The two tunnels were drilled first with a 6 mm diameter reamer and then dilated to 7 mm. The jig for bioabsorbable cross-pins (Mitek, Ethicon, USA) was inserted in the medial patellar tunnel (Fig. 3). The sleeves for the insertion of two cross-pins were placed perpendicular to the tunnels. For the confirmation of centralization of drill hole in tunnel, a Kirschner wire was inserted into each drill hole.

The tibial tunnel was drilled transversely with a 6 mm diameter reamer and then the tunnel size was enlarged to 7 mm (Fig. 2b). The

prepared tibialis anterior tendon graft was inserted into the tibial tunnel and then each end of the graft was passed through the patella tunnels by pulling the leading sutures.

The graft was fixed temporarily by holding the two sutures above the patella while the patellar height was adjusted under fluoroscopic guidance. When the normal patellar height was achieved, two bioabsorbable cross-pins (diameter, 3.3 mm; length, 42 mm) were inserted. Sutures at the ends of the graft were tied tightly at the top of the patella (Fig. 4). The graft was checked for stability of fixation under full flexion.

On the day after surgery, partial weight bearing was allowed with crutches. Progressive rehabilitation with continuous passive motion

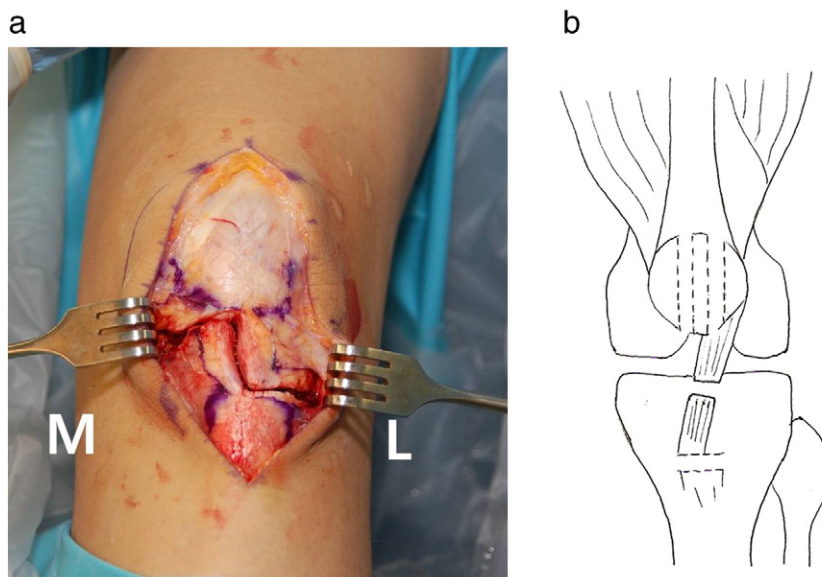


Fig. 2. **a** For patellar tendon lengthening, z-plasty of the patellar tendon was performed. A longitudinal incision was made in the midline of the patellar tendon. The medial half of the patellar tendon was incised transversely just below the lower pole of the patella. The lateral half of the patellar tendon was incised transversely just above the tibial tuberosity. **b** Two parallel patellar tunnels (7 mm in diameter) were created longitudinally using guide pins. The tibial tunnel was drilled transversely with a 7 mm diameter.

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