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Case report

Acquired femoral flexion deformity due to physeal injury during medial patellofemoral ligament reconstruction

Gerd Seitlinger [a,*], Philipp Moroder [b], Christian Fink [c,d], Guido Wierer [e]

[a] Department of Orthopedic Surgery Oberndorf, Academic Teaching Hospital of the Paracelsus Medical University, Paracelsusstrasse 37, 5110 Oberndorf, Austria
[b] Center for Musculoskeletal Surgery, Campus Virchow, Charité –Universitaetsmedizin, Augustenburger Platz 1, 13353 Berlin, Germany
[c] Gelenkpunkt — Center for Sports and Joint Surgery, Olympiastraße 39, 6020 Innsbruck, Austria
[d] Research Unit of Orthopedic Sports Medicine and Injury Prevention, Institute for Sports Medicine, Alpine Medicine and Health Tourism (ISAG), UMIT, Eduard-Wallnöfer-Zentrum 1, 6060 Hall in Tirol, Austria
[e] Department of Orthopaedics and Traumatology, Paracelsus Medical University Salzburg, Muellner Hauptstrasse 48, 5020 Salzburg, Austria

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ABSTRACT

Background: Reconstruction of the medial patellofemoral ligament (MPFL) is the most frequent surgical procedure performed in patients with patellar instability. Recently, concerns regarding physeal injury during femoral tunnel placement for anatomical MPFL reconstruction in children have been discussed.

Methods: This is the first case to report partial posterior physeal growth arrest and subsequent flexion deformity of the distal femur after MPFL reconstruction in a skeletally immature patient. The cause and treatment are discussed.

Results: Postoperative knee extension deficit and recurrent patellar instability were successfully treated with revision surgery including, distal femoral extension osteotomy, medialization of the tibial tuberosity, trochleoplasty and MPFL graft tensioning.

Conclusion: This case highlights that care should be taken during femoral tunnel placement for anatomic graft fixation to avoid physeal injuries in skeletally immature patients.

1. Introduction

Reconstruction of the medial patellofemoral ligament (MPFL) is the most frequent surgical procedure performed in patients with patellar instability [1–3]. Concerns regarding physeal injury in children during femoral tunnel placement for anatomic graft fixation have been discussed recently [4–6]. Drilling the femoral tunnel directly lateral from the MPFL insertion is prone to damage the distal femoral physis and might cause growth disturbances. However, this is the first case to report partial growth arrest and subsequent flexion deformity of the femoral physis following MPFL reconstruction in a skeletally immature patient.

* Corresponding author at: Department of Orthopedic Surgery Oberndorf, Paracelsusstrasse 37, 5110 Oberndorf, Austria.
E-mail addresses: g.seitlinger@gmx.de (G. Seitlinger), philipp.moroder@charite.de (P. Moroder), c.fink@gelenkpunkt.com (C. Fink), wierer@gmail.com (G. Wierer).

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2. Case report

A 14-year-old female patient presented with progressive limping, knee extension deficit and recurrent lateral patellar dislocations on her left knee three years after MPFL reconstruction using the ipsilateral gracilis tendon as a free tendon autograft. Physical therapy and daily exercise achieved no improvement.

Clinical examination revealed a knee extension deficit of 20° compared to the normal contralateral knee with no signs of any flexion deficit. Lateral patellar dislocation was reproducible up to 60°of knee flexion and patellar tracking appeared to be abnormal with a positive J-sign (Video 1). Knee radiographs identified a flexion deformation of the distal femur of 20°, a straight leg axis, a Caton-Deschamps ratio of 1.1 and a trochlear dysplasia. Radiographs after the index operation revealed no femoral deformity (Figure 1 A–D).

On computed tomography (CT) scans the femoral torsion was 0°, the tibial torsion was 30° and the tibial tubercle–trochlear groove (TT–TG) distance was 32 mm. Magnetic resonance imaging (MRI) showed a high-grade trochlear dysplasia and the screw position for femoral fixation of the gracilis tendon graft appeared to breach the dorsomedial femoral physis (Figure 2 A–C). The tibial tubercle–posterior cruciate ligament (TT–PCL) distance was 27 mm.

Due to recurrent patellar instability, flexion deformity of the distal femur and persisting knee extension deficit the patient was scheduled for revision surgery. Surgery started with an open wedge, extension osteotomy of the distal femur via a lateral approach using a TomoFix lateral distal femur plate (DePuy Synthes, West Chester, PA) (Figure 3 A). Secondly, medial translation of the tibial tubercle hinged on a distal periosteal flap was performed by a modified Elmslie-Trillat procedure and secured with two cortical screws at the end of the procedure [7]. Thirdly, deepening trochleoplasty according to Bereiter [8] addressed the trochlear dysplasia, in which no degenerative articular changes were observed. Finally, the gracilis tendon graft that remained

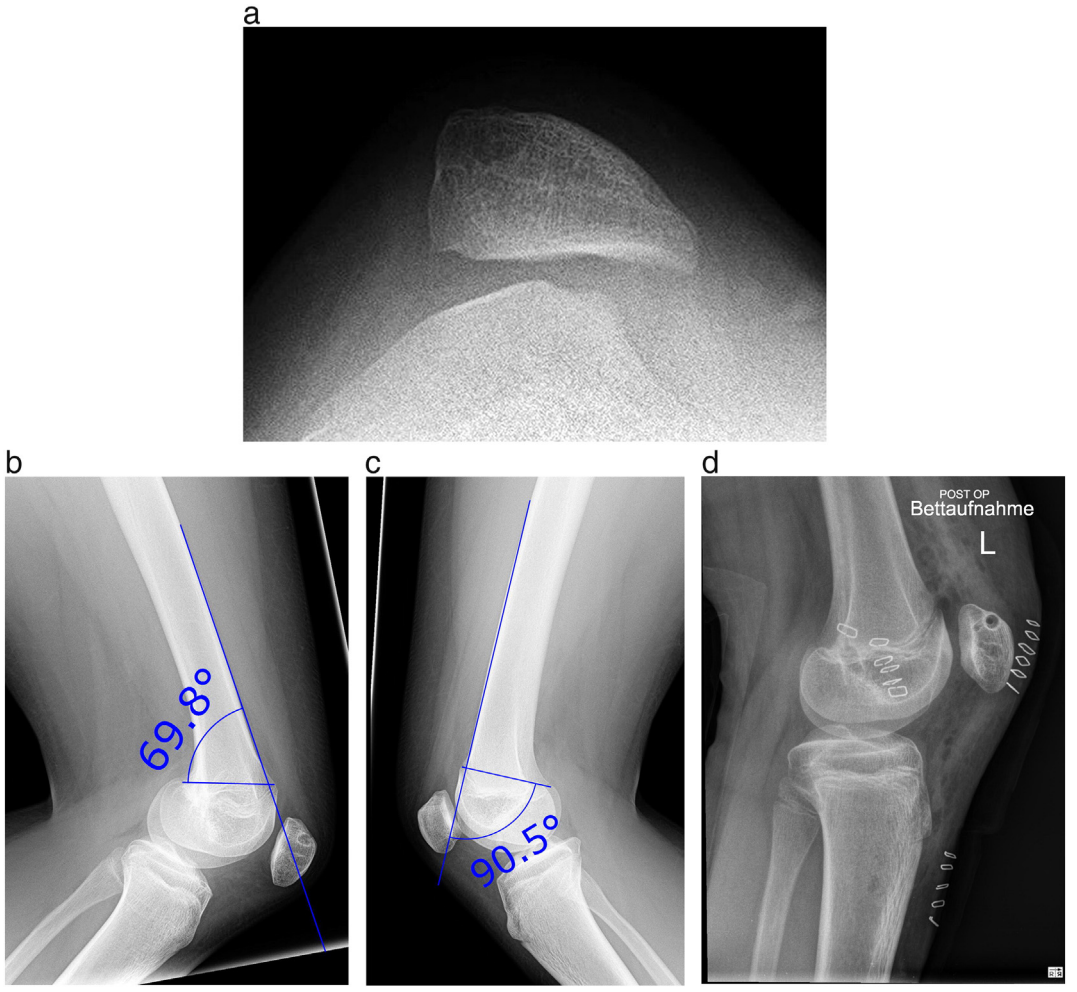

Figure 1. (A–D): (A, B) Radiographic images demonstrating a trochlea dysplasia and flexion deformity of the distal femur of 20° compared to the healthy contralateral knee (C). Lateral X-ray after index operation with no sign of femur deformity (D).

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