A Novel Technique for Patellar Fracture Fixation With Simultaneous Medial Patellofemoral Ligament Reconstruction

A Rare Case of Patellar Dislocation Combined With a Patellar Fracture

Hangzhou Zhang,*† MD

Investigation performed at the Department of Orthopaedics, Joint Surgery, and Sports Medicine, The First Affiliated Hospital of China Medical University, Shenyang, People’s Republic of China

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The medial patellofemoral ligament (MPFL) is the main soft tissue restraint of the medial patellar stabilizers. Patellar dislocation usually leads to this ligament being torn or to osteochondral injury. A range of tendon grafts have been used for MPFL reconstruction; however, reports of patellar dislocation combined with a large, displaced vertical patellar fracture are sparse in the literature. Small marginal patellar fractures are common with acute patellar dislocations. We present a rare case of an acute patellar fracture combined with patellar dislocation in a 19-year-old girl. Our case is unique because it is not a “typical” marginal patellar fracture but rather a large, displaced vertical patellar fracture requiring reduction and internal fixation. Owing to a history of preexisting recurrent patellar dislocation combined with the presence of trochlea dysplasia, MPFL reconstruction was required. The patient was successfully treated with MPFL reconstruction and patellar fracture fixation using two 4.0-mm cannulated screws plus sutures. Such a case has not been described previously in the literature.

CASE REPORT

A 19-year-old girl presented to an emergency department with pain and swelling of the right knee after a jump during a table tennis match. Physical examination revealed swelling in the knee, pain upon palpation, and limited knee motion. Plain radiographs and computed tomography (CT) scans were obtained from the emergency department that confirmed the diagnosis of patellar subluxation with a vertical fracture involving the medial third of the patella (Figure 1). Her medical history revealed symptoms of recurrent patellar instability (patellar dislocation >2 times before this injury), and now she was diagnosed with the same in the outpatient department. Surgical treatment was recommended to her prior to this patella fracture and patella dislocation, but she refused since she was preparing for an important entrance examination. The tibial tubercle–trochlear groove distance (TT-TG) was 16 mm. The patient was subsequently taken to the operating room for patellar reduction and internal fixation combined with MPFL reconstruction. Consent for publication was obtained from the patient. The study was also approved by the local ethics committee (2017-114-2).

*Address correspondence to Hangzhou Zhang, MD, Department of Orthopaedics, Joint Surgery and Sports Medicine, The First Affiliated Hospital of China Medical University, 155 Nanjing North Street, Shenyang 110001, Liaoning Province, People’s Republic of China (email: zhanghz1000@sina.com).
†Department of Orthopaedics, Joint Surgery and Sports Medicine, The First Affiliated Hospital of China Medical University, Shenyang, People’s Republic of China.

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The surgical technique involved patellar fracture fixation and reconstruction of the MPFL at the medial border of the patella (Figure 2).

For patellar reduction and internal fixation, a 6- to 8-cm medial parapatellar incision was used to expose the medial face of the patella. Then, the fracture surface was carefully cleaned. The fracture was anatomically reduced and then held firmly with large towel clips, with special attention to restoring a smooth articular surface; to fix the vertical fracture, two 4-mm cannulated screws (Synthes USA) were passed transversely from the medial side to the lateral side through each fragment (Figure 3A). A lateral retinacular release was performed on this patient with tight lateral structures using a banana knife.

MPFL Reconstruction

We performed the MPFL reconstruction after patellar reduction and internal fixation. For this, 4-mm partially threaded cannulated screws (Synthes USA) were used instead of bone tunnels (Figure 3, B and C). The superomedial edge of the patella was exposed using a nucleus pulposus forceps. The MPFL for this patient was reconstructed with a semitendinosus tendon fixed with sutures. Using a 2-cm incision at the pes anserinus, the semitendinosus tendon was freed and harvested with a tendon stripper. Then, two No. 2 FiberWire sutures (Arthrex) were passed through the 2 cannulated screws. The reconstructed ligament was then fixed with the 2 sutures that passed through the 2 cannulated screws (Figure 3D).

Next, augmentation was achieved with No. 2 nonabsorbable sutures with the overlying patellar fascia. A 2- to 3-cm incision was made over the median femoral epicondyle; the femoral insertion site was then identified under fluoroscopy as described by Schöttle et al^12^ on a true lateral knee view. Graft tension was evaluated through the arc of motion. If a single measurement discrepancy for the length change pattern of the graft was <3 mm, the measurement was considered isometric. The femoral tunnel was overreamed with a reamer equal to the diameter of the semitendinosus graft (7
DePuy Mitek) with the knee at 30° of flexion and the patient was able to participate in sports activities without pain or recurrent patellar instability. Twelve months after the operation, the patient had favorable results, and the patient had returned to sports with no pain and no instability.

DISCUSSION

The main finding of the present case report was that patellar stability of the knee was restored with our surgical procedure. After fracture fixation and MPFL reconstruction, the patient returned to sports without any episodes of recurrent dislocation or subluxation and no pain at the most recent follow-up. Patellar dislocation usually leads to a torn MPFL and/or an osteochondral injury. Different methods have been described for surgical treatment of patellar osteochondral fractures. Sutures or screws have been the common mode of fixation for fractures, whereas MPFL repair or reconstruction has become a good procedure for restoring patellar stability. Most techniques for patellar fixation during MPFL reconstruction use patellar bone tunnels, interference screws, soft tissue sutures, or suture anchor fixation. In the present case, the patellar instability was associated with a large medial vertical patellar fracture. Traditional patellar bone tunnels, interference screws, soft tissue sutures, or suture anchor fixation may have been unsuitable for this case.

The case presented here illustrates an instance of chronic patellar instability in a patient sustaining a medial vertical patellar fracture. In this patient, we used a novel technique for fracture fixation simultaneously with MPFL reconstruction. This technique provided secure fixation for medial patellar fracture and MPFL reconstruction. Two cannulated screws were passed transversely from the medial side to the lateral side through each fragment to fix the medial vertical patellar fracture. The 4.0-mm partially threaded cannulated screws were used instead of bone tunnels for MPFL reconstruction. To the best of our knowledge, there have been no published reports of a similar treatment method in the English literature. This case adds a rare occurrence to the literature. At the 12-month follow-up, our patient had favorable results, and the patient had returned to sports with no pain and no instability.

CONCLUSION

This novel technique for fracture fixation and MPFL reconstruction was successfully used for treating a rare case of a...
large vertical patellar fracture combined with recurrent patellar dislocation.

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