Chronic patellar dislocation is a rare condition where the patella remains dislocated throughout knee range of motion during flexion and extension. In adults, the delayed presentation of this condition is often due to symptoms caused by the onset of severe secondary osteoarthritis. To the authors’ knowledge, all of the cases reported in the literature have been treated by patellofemoral or total knee replacements depending on patient age and the extent of the arthritis.

This article describes a rare case of a 22-year-old woman who sustained a traumatic chronic patellar dislocation for 5 months. Clinical examination revealed a valgus deformity of the left leg secondary to childhood injury and that the patella lay lateral to the lateral femoral condyle throughout flexion and extension. Radiographs of the knee revealed patellar dislocation. Long-leg radiographs of the left leg showed an anatomic tibiofemoral angle of 17° valgus. The anatomical (74°) and mechanical (80°) lateral distal femoral angles were abnormal, whereas the medial proximal tibial angle (87°) was normal, confirming that the valgus deformity was due to the abnormal distal femur. The authors performed a distal femoral osteotomy to correct the valgus deformity. Medial patellofemoral ligament reconstruction using a hamstring autograft was performed to stabilize the patella.
Chronic patellar dislocation is a rare condition where the patella remains dislocated throughout knee range of motion (ROM) during flexion and extension. In adults, the delayed presentation of this condition is often due to symptoms caused by the onset of severe secondary osteoarthritis. To the authors’ knowledge, all of the cases reported in the literature have been treated by patellofemoral or total knee arthroplasty (TKA), depending on patient age and the extent of arthritis.

This article describes a rare case of a 22-year-old woman who sustained traumatic chronic patellar dislocation for 5 months, which was successfully treated by a distal femoral osteotomy and a medial patellofemoral ligament reconstruction.

**Case Report**

A 22-year-old woman with a body mass index of 38 kg/m² was evaluated at the local emergency department after injuring her left knee while dancing earlier that day. Although anteroposterior and lateral radiographs of her knees (Figures 1A, B) were obtained, the patellar dislocation remained undiagnosed. Three weeks later, the patient presented again reporting continued pain and weakness during knee extension. Skyline radiographs obtained at 30° and 60° of flexion confirmed lateral patellar dislocation (Figure 1C). Attempts to treat the patellar dislocation by closed reduction at the local hospital failed.

Four months following injury, the patient presented to the senior author’s (M.D.) clinic with pain, limited ROM, and clicking in the knee. In addition, the patient’s medical history included a left knee injury at age 12 years that resulted in a valgus deformity of the knee, which was confirmed when the left knee was compared with the normally aligned right knee (Figure 1D). Further examination and palpation of the left knee revealed that the patella lay lateral to the lateral femoral condyle throughout flexion and extension, with ROM ranging from 30° to 70°, and radiographs were used to diagnose lateral patellar dislocation. Long-leg radiographs of the left leg showed an anatomic tibiofemoral angle of 17° valgus and a mechanical axis passing outside of the lateral joint compartment (Figure 1D). The anatomical lateral distal femoral angle was 74° (normal value = 81° ± 2°), the mechanical lateral distal femoral angle was 80° (normal value = 88° ± 3°), the medial proximal tibial angle was 87° (normal value = 87° ± 3°), and the joint line congruence angle was 0.5° (normal value = 0°-2°). This confirmed that the valgus deformity, which is a risk factor for patellar dislocation, was due to the abnormal distal femur.

The authors performed a distal femoral osteotomy to correct the valgus deformity using a correction angle of 13° calculated from the long-leg radiographs. A medial patellofemoral ligament reconstruction using a hamstring autograft was performed to stabilize the patella.

**Surgical Technique**

First, a lateral opening wedge osteotomy of the distal femur was performed as described by Van Heerwarden et al. A lateral skin incision was made starting at the lateral epicondyle extending proximally, and the fascia lata was split, allowing for the anterior retraction of the vastus lateralis. The level of the osteotomy was then identified using X-ray Image Intensifier and the TomoFix lateral distal femur plate (Synthes, West Chester, Pennsylvania). A guidewire was inserted into the desired osteotomy level under radiograph control, and the osteotomy was created using a saw, followed by serial osteotomes. The TomoFix plate was then applied and secured with locking screws.

A lateral release was performed to medialize the patella into the trochlear sulcus. The medial patellofemoral ligament reconstruction was performed using a semitendinosus autograft as described by Panagopoulos et al. The procedure was
completed with imbrication and medial reefing of the vastus medialis obliquus. Postoperatively, the patient was given a 3-panel splint for comfort and was allowed nonweight-bearing mobilization with 2 elbow crutches the following day.

Phase I of the rehabilitation protocol required inpatient physiotherapy, including teaching the patient static inner range quadriceps and straight-leg raises to promote quadriceps strength. Phase II involved outpatient physiotherapy, which was aimed at achieving full active and passive knee ROM. The patient was introduced to exercises on a low-resistance static bike, as well as manual therapies, such as the Maitland and Mulligan mobilizations and proprioceptive neuromuscular facilitation. The patient was started on partial weight-bearing mobilization during the second week and progressed from 2 crutches to 1. Phase III of rehabilitation began in the third week of outpatient physiotherapy and focused on building muscle strength through increased static bike resistance and distance and the introduction of speed intervals.

The patient was allowed full weight bearing and walking on varied surfaces (ie, uphill, downhill, and slopes) from week 4 and was also taught change-of-direction activities. Follow-up radiographs and long-leg alignment radiographs of the knee were obtained. At 1-year follow-up, she had achieved full pain-free knee ROM and reported no patellar dislocation. Radiographs also showed a correction of the valgus deformity to a neutral anatomic femorotibial angle (Figure 2), and she was pleased with the correction of the valgus deformity (Figure 3).

**DISCUSSION**

Chronic patellar dislocation is a rare congenital or acquired condition. The congenital form is permanent, irreducible, and present at birth. It is characterized by relative stiffness, a short quadriceps, and a major patellofemoral dysplasia. The condition manifests immediately after birth, with a flexion contracture of the knee, genu valgum, and external tibial torsion. However, acquired chronic dislocation can develop as a result of different causes, such as trauma. The risk factors for patellar dislocation include a shallow patellofemoral articular groove, patella alta, excessive Q angle, valgus knee, or generalized ligamentous laxity.

In the few reported cases, diagnoses in adults were delayed until they had developed significant joint osteoarthritis. Consequently, TKA has been the only treatment option, and it has been supplemented with realignment of the extensor mechanism. The first case of bilateral staged TKA for chronic patellar dislocation associated with osteoarthritis was reported by Marmor. His patient had an excellent outcome at 4 years. Marmor had not realigned the extensor mechanism because it would have required extensive soft tissue release, resulting in stiffness. However, other authors have reported good outcomes with realignment of the extensor mechanism at TKA. Hau and Newman reported a series of 15 knees in patients with symptomatic osteoarthritis secondary to chronically dislocated extensor mechanism, where 11 of them underwent patellofemoral replacements. Of this subgroup, 7 also had extensor mechanism realignment in the form of a tibial tubercle transfer or vastus medialis obliquus advancement.

The current patient sustained an acute patellar dislocation, which was not fully reduced. However, due to the damage done to the medial stabilizers at initial injury, with genu valgum as a predisposing factor, the patella subsequently dislocated without significant trauma. Long-leg alignment radiographs revealed a valgus deformity of 17° with a normal medial proximal tibial angle and an abnormal mechanical lateral distal femoral angle. A computed tomography scan of the distal femur performed to visualize the distal femoral anatomy revealed no significant trochlear dysplasia; therefore, the authors corrected the valgus deformity.
Valgus knee deformities can be corrected by a proximal tibial or a distal femoral varus osteotomy. A tibial varus osteotomy can be used to correct valgus angulations up to 12°. Angulations beyond 12° create a varus or medial tibial joint line leading to lateral shear forces, which cause the femur to subluxate medially on the tibia during gait. For this reason, a distal femoral varus osteotomy has been the procedure of choice for the correction of valgus knee deformities in cases where the valgus angulation has been greater than 12°. Varization osteotomies of the distal femur can be performed using a medial closed-wedge or lateral open-wedge technique. Incomplete open-wedge osteotomies with a lateral approach have gained increasing acceptance due to the development of spacer plates. However, this technique was thought to result in disturbed bone healing and symptoms at the lateral aspect of the femur due to friction caused by the iliobibial tract moving over the plate. More recently, the TomoFix MDF (Synthes) was developed in collaboration with the Knee Expert Group of the AO. Also, a technique for a medial closing-wedge osteotomy of the distal femur and the application of a TomoFix MDF internal plate fixator has been described by Van Heerwaarden et al. Because the current senior author had more experience with lateral opening-wedge osteotomies of the distal femur, this technique was chosen to correct the valgus deformity.

The medial patellofemoral ligament contributes significantly to static stability by acting as a check rein to lateral translation of the patellofemoral joint, providing up to 60% of the medial restraining force. Moreover, cadaveric studies have shown the medial patellofemoral ligament to have a tensile strength of 208 N. Isolated sectioning of the medial patellofemoral ligament, despite the presence of other intact medial stabilizers, significantly increases the lateral shift of the patella during 20° to 90° of flexion. On immediate surgical exploration, 100% of the medial patellofemoral ligaments were injured in patients with acute patellar dislocation. In addition, medial patellofemoral ligament avulsions at the femoral attachment have been a significant risk factor for further dislocation. Therefore, patients whose magnetic resonance imaging scans showing such findings should be considered for surgical treatment.

Primary repair of the medial patellofemoral ligament has been associated with significant redislocation rates. In a prospective, randomized study by Christiansen et al., delayed primary repair of the medial patellofemoral ligament by use of an anchor-based reattachment to the adductor tubercle without vastus medialis obliquus did not reduce the risk of redislocation (17% in the operative group vs 20% in the conservative group). The medial patellofemoral ligament reconstruction using a semitendinosus autograft through the medial intermuscular septum has been promising. Consequently, the current patient underwent medial patellofemoral ligament reconstruction using a semitendinosus autograft through the medial intermuscular septum to stabilize her patella.

CONCLUSION

Distal femoral osteotomy combined with dynamic medial patellofemoral ligament reconstruction using a semitendinosus autograft is a viable treatment option for patients with a valgus deformity and chronic patellar dislocation.

REFERENCES

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