Patellar Dislocation With Genu Valgum Treated by DFO

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abstract

Congenital habitual patellar dislocation is a rare condition of the knee where the patella dislocates during flexion and relocates during extension. The congenital form is permanent, irreducible, and presents at birth. It is characterized by a short quadriceps and a major patellofemoral dysplasia and short height.

This article presents a rare case of a 27-year-old woman with recurring bilateral habitual dislocation of the patella after a failed previous proximal and distal realignment procedure. Clinical examinations of both knees revealed genu valgus knees and lateral joint pain that recurred after several previous operations.

Radiographs of both knees showed patellar dislocation and genu valgum associated with patellofemoral dysplasia and osteoarthritis of the lateral compartment. Long-leg standing radiographs showed an anatomic tibiofemoral angle of right 13° and left 6° valgus and a mechanical tibiofemoral angle of right 8° and left 2° valgus and weight-bearing line of 65% on the right and 48% on the left.

The authors performed a distal femoral closing wedging osteotomy to correct the valgus deformity, and then percutaneous lateral release and medial reefing were performed to stabilize the patellas of both knees simultaneously.

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Congenital habitual dislocation of the patella is a rare condition and can be isolated or associated with other congenital deformities. This condition is usually detected within the first decade of life. Various surgical techniques have been introduced to treat the pediatric population, and few have been reported in the adult population. These techniques include proximal soft tissue realignment procedures that relocate the patella medially, distal realignment procedures that transfer the tibia tuberosity medially, or total knee arthroplasty (TKA). The authors present a rare case of a 27-year-old woman with bilateral congenital habitual dislocation of the patella with lateral osteoarthritis in genu valgus knee, associated with patellofemoral dysplasia, that was treated using a medial closing distal femoral osteotomy followed by percutaneous lateral release and medial reefing. The clinical and radiological outcomes of the treatment were successful.

CASE REPORT

A 27-year-old woman (height, 141 cm) presented to the authors’ hospital and reported pain in both knee joints. She stated that her right knee was more painful than the left knee and that the pain had persisted for few years. In childhood, her stature was short and both patellae were dislocated bilaterally, but no other abnormality was observed in her hips, spine, and hands. She was previously diagnosed with an atypical form of spondyloepiphyseal dysplasia.

The patient had a history of operations for her knees. At age 16 years, she underwent soft tissue procedures that included lateral release and medial plication for patellar dislocation and tibia lengthening using ilizarov for her short stature. At age 23 years, due to patellar redislocation of both knees that occurred immediately after the first operation, a modified Fulkerson operation combined with a lateral release and medial reefing on both knees, was performed. However, both patellae dislocated immediately after the last operation, but she did not report any pain. Five years after the last surgical procedure, the patient presented to the authors’ hospital with pain at the lateral compartments in both knees. Both patellae remained dislocated.

On physical examination, the knees had 15° of valgus deformity (Figure 1), moderate instability to valgus stress, complete lateral dislocation of the patellae, absence of palpable patellofemoral sulcus, and tenderness at the lateral joint line. Range of motion was 5° flexion contracture to full flexion. She could not fully extend either knee.

During radiographic examination, the standing knee radiograph (Figure 2A) showed moderate arthritic changes on the lateral compartment of the right knee that were not observed on the left knee. The long-leg weight-bearing standing radiograph showed a 13° valgus on the right knee and 5° valgus on the left knee with depression of the lateral tibia plateau and a mechanical axis passing outside the lateral compartment (Figure 2B). The anatomical lateral distal femoral angles of the right and left knees were 73° and 75° (normal value, 81°±2°), respectively; the mechanical lateral distal femoral angles were 82° and 81° (normal value, 88°±3°), respectively; the medial proximal tibial angles were 99° and 102° (normal value, 87°±3°), respectively; and the joint congruence angles were 5° and 3° (normal value range, 0°-2°), respectively. This confirms valgus deformities of both knees. A skyline radiograph showed complete lateral dislocation of the patella and shallow femoral trochlea on both knees (Figure 3).

The authors performed a medial closing distal femoral osteotomy with medial reefing to correct valgus deformity, treat lateral osteoarthritis, and relocate and stabilize the patellae.
Surgical Technique

First, a medial closing wedge osteotomy of the distal femur was performed. A longitudinal skin incision was made beginning 10 cm above the patella and extending to the apex of the patella distally. Using a subvastus approach, the muscle fascia was incised and the vastus medialis muscle was stripped from the intermuscular septum and retracted proximally. A blunt retractor was passed over the femur to expose the anteromedial aspect of the supracondylar area of the femur. The intermuscular septum in the metaphyseal area of the femur was carefully incised longitudinally, close to the bone. The vessels beneath the intermuscular septum were preserved.

The oblique osteotomy begins in the medial supracondylar area and ends within the lateral femoral condyle. The starting point for the distal osteotomy at the medial femur was marked with electrocautery after temporary application of the plate. A guide pin was inserted under the fluoroscopy, and the osteotomy was created using an oscillating saw, followed by osteotomes. The osteotomy was created up to 10 mm before the lateral cortex, preserving a lateral femoral cortex and creating a medially based wedge of the bone that was removed. Residual bone fragments were removed from the osteotomy. The osteotomy was carefully closed by applying consistent pressure. The alignment of the axis of the leg was evaluated by fluoroscopy.

The osteotomy was stabilized using a TomoFix MDP plate (Synthes, West Chester, Pennsylvania). After firm stabilization of the osteotomy, a percutaneous lateral release was performed, and approximately 1 cm of the medial retinaculum was reefed. The patellofemoral alignment was checked throughout the full range of motion, and lateral dislocation of the patella was no longer observed. The same procedure was performed for the left knee. One week postoperatively, leg raising exercises with gradual flexion exercises were started while the patient was using a controlled brace. Full range of motion was obtained with no evidence of patellar instability at postoperative week 4. Partial weight bearing was gradually permitted, and full weight bearing was permitted at postoperative week 6.

Postoperative long-leg weight-bearing radiographs and simple radiographs showed correction of the valgus deformity (Figure 4) and no evidence of patellar subluxation or dislocation (Figure 5). She was free of pain and had no patellar dislocation. At 1-year follow-up, her Kujula score was 95, indicating an excellent clinical result.

Discussion

Congenital habitual dislocation of the patella is a well-known but rare condition. The causes of congenital habitual dislocation of the patella are still debated, but they can be present as an isolated incident and are sometimes associated with other lower-limb malformations or part of the other congenital syndromes, such as Down’s syndrome, nail-patella, and epiphyseal dysplasia. Most patients are diagnosed and treated at an early age; however, treatment for late presentation of congenital dislocation of the patella in adults is controversial.

Various surgical methods have been used, such as lateral retinacular release, medial reefing, medial patellofemoral ligament reconstruction, modified Fulk-
erson osteotomy, and TKA. The current patient was a young adult with unicompartamental osteoarthritis who underwent a distal femoral osteotomy rather than a TKA. Osteotomy can be performed using an opened or closed technique, but the former has been associated with an increment of patellofemoral contact pressure, use of bone grafts, and collapse due to breakage of the far cortex. Medial patellofemoral ligament reconstruction needs a soft tissue, autograft, or allograft for the reconstruction, which is a complicated surgical procedure.

Similar incidences of adult congenital habitual dislocation of the patella in various conditions have been reported. Purushothaman et al reported posttraumatic chronic patellar dislocation treated by a distal open-wedge femoral osteotomy and a medial patellofemoral ligament reconstruction. Shen et al reported a combined proximal soft tissue and distal tibia tuberosity realignment procedure to treat habitual dislocation of the patella in adults. Kumagi et al reported a congenital dislocation of the patella with advanced valgus osteoarthritis that was treated with TKA with relocation of the patella using soft tissue procedures.

The current patient had a bilateral congenital habitual dislocation of the patella with advanced lateral compartment osteoarthritis in genu valgus knees associated with femoral trochlear hypoplasia that recurred after transfer of the tibia tuberosity and several other soft tissue procedures; she was treated by the current authors with a medial closing wedge distal femoral osteotomy combined with a medial reeving and lateral release. The surgical procedure has resulted in a successful outcome.

**CONCLUSION**

There are several advantages of this treatment method for congenital dislocation of the patella with genu valgus knee. Varus osteotomy in a valgus knee reduces a loading pressure by medicalization of the mechanical axis of the lower limb, which effectively controls osteoarthrosis of the lateral compartment. Varus osteotomy may help decrease the risk of patellar redislocation for the realigned patella because a valgus knee creates a strong lateral vector causing dislocation of the patella. The patient’s patellofemoral joint may seem more stable due to correction of the valgus moment of the femur. Medial closing femoral osteotomy and medial reeving can be performed through a single incision, which is more cosmetic than the lateral open wedge osteotomy with medial reeving, which needs 2 incisions.

The limitation of this study is that it reports only 1 patient who was followed for a short period of time. More primary cases with longer follow-up periods are needed to assess the efficacy of this procedure. Medial closing distal femoral osteotomy combined with medial reeving is a viable treatment option for patients with bilateral congenital patella dislocation with osteoarthritis in genu valgus knee associated with femoral dysplasia.

**REFERENCES**