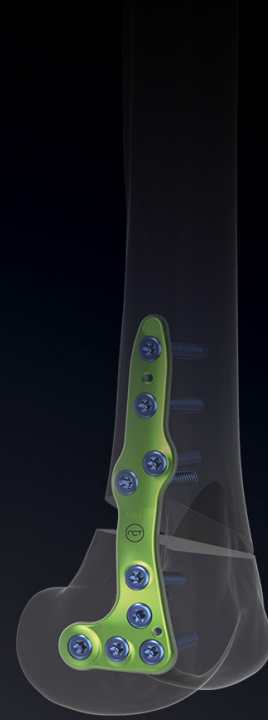


CASE STUDY

STAGED PROCEDURE FOR PATELLAR INSTABILITY: COMBINED DFO AND TTO, FOLLOWED BY CARTILAGE RESTORATION



PHYSICIAN PROFILE

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PATIENT HISTORY

The patient is a woman in her mid-twenties suffering from chronic patellar instability, demonstrated by a jumping J-sign with dislocation in full extension, which stabilized at 65° flexion as well as patellar & trochlear chondral loss. No prior surgical history and no comorbidities.

Radiographically, she has valgus malalignment and lateralized resting position of the patella.

SURGICAL TREATMENT

Treatment choice and surgical planning

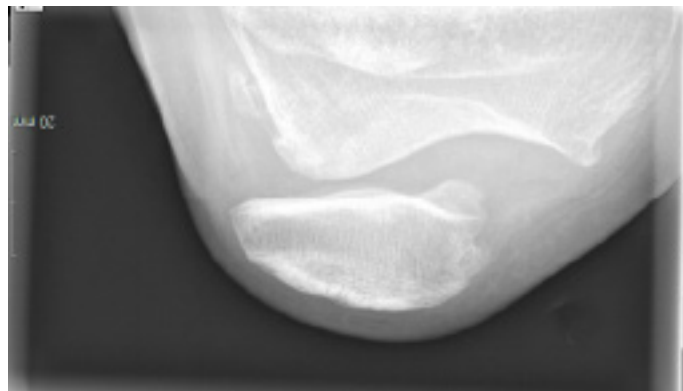
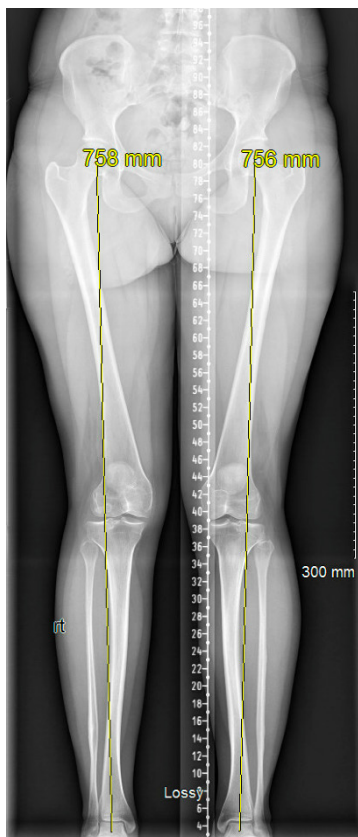
Given the complexity of the situation with patellar instability, significant deformity and high-grade chondral loss, the decision was made for a staged approach. Initial bony correction involved DFO & TTO with subsequent cartilage restoration and patellar stabilization.

Preoperative planning was done using a long leg standing X-ray, MRI, and CT-scan of the knee as well as a rotational profile.

Alternative procedures were evaluated, such as derotational osteotomy of the femur or tibia and trochleoplasty.

DFO: lateral opening with 6° correction to bring the mechanical axis just slightly past neutral and allow for MPFL fixation medially.

TTO: 45 deg cut to provide equal anteriorization & medialization, addressing both stability and offloading the lateral patellofemoral cartilage.



Material choice

The Activmotion S plate was particularly important given this procedure because of its contour, posterior polyaxial screw and the ability to reliably identify Schottle's point radiographically during the second stage. Given the patient's thin physique, the low-profile nature of the plate minimizes potential IT band irritation.

SURGERY

1st stage

DFO, TTO, arthroscopy with chondroplasty patella.

An arthroscopic evaluation of the joint was first performed to define the nature of the patellar and trochlear chondral lesions in planning for the second stage.

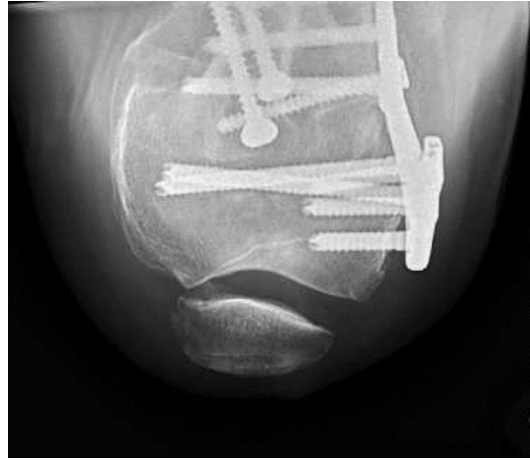
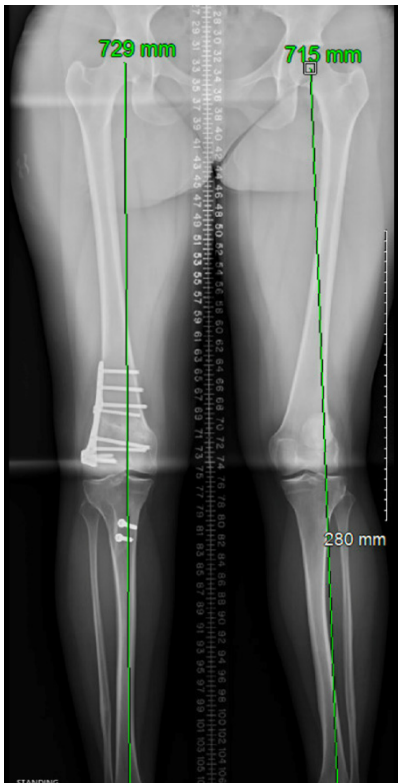
The patient was found to have a grade 4 defects of the central patella (22 mm diameter, contained) and superolateral trochlea (12 x 15 mm, uncontained). Dynamic evaluation of the patella demonstrated that it did not centralize until ~70 deg of flexion.

For the DFO, a standard approach to the lateral femur was utilized, and the osteotomy was performed under fluoroscopic guidance. Careful opening of the osteotomy was undertaken, and a 6 mm metal wedge was placed.

At this point, it was critical to get a perfect lateral view with fluoroscopy to ensure that the distal femoral segment was in neutral position (i.e., not flexed or extended) and that plate position was appropriate. In this case, it was also confirmed that radiographic identification of Schottle's point would be feasible during the second stage. The Activmotion S plate was then secured, and allograft bone was placed into the osteotomy.

TTO was then performed utilizing a 'coffin-shaped' shingle with care to leave the distal hinge intact. The osteotomy was shifted and provisionally fixated so that patellar stability and tracking could be evaluated dynamically. Fixation was then undertaken in lag-by-technique fashion with 4.5 mm cortical screws.

Final AP & lateral fluoroscopic views were obtained.



2nd stage

OCA patella, MPFL reconstruction, lateral soft tissue lengthening.

For cartilage restoration, we elected to address the patella only as the trochlear defect was relatively small and would be offloaded well with the TTO.

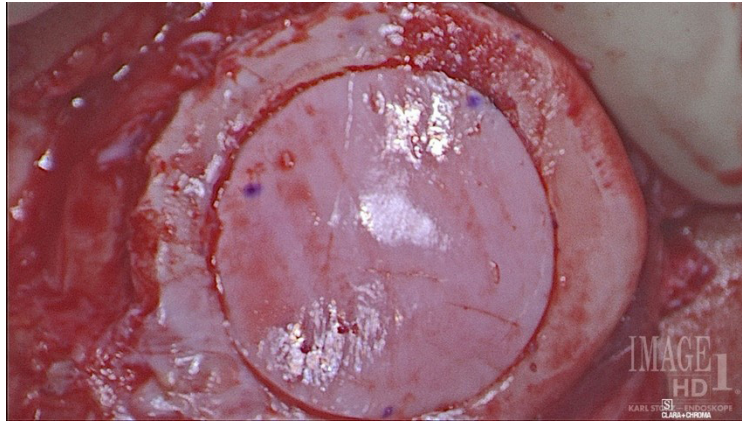
A midline incision was utilized, and the lateral retinaculum was dissected out for a lateral lengthening and then extended for an arthrotomy.

The patellar OCA was sized at 25 mm to get to healthy borders circumferentially. The defect was reamed, and a matching graft was harvested. Pulse lavage saline was used on the cancellous side, and the graft was soaked in bone marrow aspirate concentrate taken from iliac crest. The graft was placed and had a good match to the patient's native contour.

MPFL reconstruction with a gracilis allograft was then performed utilizing an on-lay technique with two all-suture anchors in the patella and one anchor in the femur. The femoral fixation point was evaluated both radiographically with Schottle's point and isometrically. Care was taken to avoid over-tensioning the graft

and translating the patella medially.

The knee was then placed at 30 deg of flexion, and the lateral soft tissue layers were sutured back together in a lengthened position. Final evaluation of stability and fluoroscopic films were conducted.



POSTOPERATIVE PROTOCOL

Following Stage 1, a hinged knee brace was used with initial NWB for 4 weeks and increased to WBAT by 8 weeks. The patient worked in physical therapy on regaining quad control and normalizing her dynamic stability with ADLs.

Stage 2 occurred ~3 months later with initial PWB (50%) and motion initially limited 0-30 deg with progressive increase each week. She continued PT throughout her recovery and progressed her level of loading and complexity of movement over time.

RESULTS

Given the complexity of the patient's situation, a multi-faceted approach was required to correct both her instability and chondral loss. Particularly with the instability, a dual osteotomy allowed for more reliable return to normal patellar tracking. For the DFO specifically, the Activmotion S plate was critical given its low profile and polyaxial posterior screw as this allowed for anatomic MPFL reconstruction during the second stage.

Her final outcome was excellent with no pain, radiographic union of both osteotomies and good patellar tracking without subsequent instability. Functionally, she was able to plyometric and change-of-direction activities without restriction.

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