Pediatric Supramalleolar Osteotomy for a Distal Tibial Fracture Malunion

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Statement of Purpose

The purpose of this case is to present a pediatric patient who sustained a malunited Salter Harris II distal tibia fracture and subsequently underwent an anterior opening wedge supramalleolar osteotomy to realign the ankle mortise.

Case Study

A 13 year old patient presented with right ankle pain for about 1 month. They reported an injury around 1 month prior in which the patient landed on the right foot and jammed it when doing a long jump. The patient was seen at a local urgent care and was given air cast, brace and crutches and was advised to follow symptomatic care. The patient followed the conservative care that gave some mild benefits, however there was continued pain. Of note, they had a previous ankle fracture that was sustained 2 years prior. The patient was noted to have anterior ankle impingement with pain on the anterior ankle and tenderness along the ankle joint lines and gutters. The patient had pain with ambulation and push-off.

Prior radiographs showed a prior Salter-Harris II distal tibia fracture with angulation and anterior translation, as well as a fibula fracture. The fracture was treated prior with immobilization and the patient developed a malunion in the sagittal plane. The anterior distal tibial angle was 70 degrees. An MRI was performed for full evaluation which demonstrated intact articular cartilage, closed physeal and malunion.

Given the deformity, an anterior opening wedge tibial osteotomy was recommended to realign the ankle mortise and weight bearing surface.

Case Study continued

Pertinent anatomic structures were marked at the right ankle. An anterior incisional approach was made between the tibialis anterior and EHL tendon by taking care to blunt dissect down and identify the neurovascular bundle and it was retracted laterally. The distal tibia and ankle joint were then identified. An arthrotomy was performed to expose the ankle joint. Using C-arm guidance throughout the procedure, anterior to posterior osteotomy cut was made near the CORA, which is the apex of the deformity and was 1.5 cm above the joint. The posterior cortical and periosteal hinge was left intact for stability purposes.

Under fluoroscopic guidance, lateral and AP views using a distractor, the osteotomy was opened and the position of the foot as well as the anterior distal tibial angle was identified and noted to be close to 80 degrees. The lateral process of the talus also bisected the tibia. No translation was needed with the osteotomy. At this time, using the 6 mm wedge plate, this was placed in the osteotomy site. It was secured with 3.5 mm screws x4. Filling of the osteotomy defect was performed with Pro Dense injectable 5 mm. This was allowed to cure. It was monitored to note that it stayed within the osteotomy site. The correction as well as fixation and final imaging appeared to be anatomic as well as good secure fixation.

Analysis & Discussion

Supramalleolar osteotomies are commonly used to treat angular deformities in the adult population. In the pediatric population, it is commonly used for a number of congenital deformities. In this case, a pediatric patient sustained a malunited distal tibia fracture from a prior Salter-Harris injury 2 years prior, and an anterior opening wedge supramalleolar osteotomy was performed to realign the ankle mortise and redistribute ankle joint pressures. Proper alignment of the ankle joint is imperative for anatomic function and decreasing the risk of early arthritis. This is extremely important in the pediatric population.

When performing these surgeries, the clinician must perform a thorough exam clinically and radiographically to fully evaluate the deformity and the proper surgical correction.

This case illustrates the effectiveness of a supramalleolar osteotomy for a distal tibia malunion in the pediatric population.

References


Literature Review

Supramalleolar osteotomy (SMO) has become a popular technique to treat angular deformities of the ankle to decrease the risk of ankle arthritis. Children can suffer from a number of congenital deformities including physeal growth arrest, tibial torsion, paralytic deformities like poliomyelitis or myelomeningocele, or sequelae from clubfoot (1,2).

SMO is indicated to treat many deformities above, at, or below the level of the ankle causing a multplanar deformity resulting in the alteration of the weight bearing axis of the tibia through the ankle joint (1). A distal tibial osteotomy can be made in such a way to correct the deforming force and realign the weight bearing axis of the tibia and center it through the ankle and subtalar joints (1).

Little has been written about the use of supramalleolar osteotomies in the pediatric population.