Corrective Osteotomy with Subtalar Fusion for Malunited Calcaneal Fracture-Dislocations

Presenting: Stefan Rammelt, MD, PhD - nothing to disclose

Additional Author: Hans Zwipp, MD, PhD - nothing to disclose

Summary:
Corrective osteotomy along the former fracture plane with subtalar fusion and bone grafting is a powerful procedure to restore hindfoot alignment and achieve partial functional rehabilitation after malunited fracture-dislocations of the calcaneus with lateral shift of the tuberosity and fibulocalcaneal abutment. Correction of the deformity is accompanied by substantial reduction of pain.

Abstract:
A staged protocol has been developed for the correction of painful malunions after calcaneal fractures. For type I with posttraumatic subtalar arthritis but without malalignment, an in situ-arthrodensis is carried out. Type II, with additional varus- or valgus of the hindfoot and type III with additional loss of height and talar inclination are treated with a subtalar bone block distraction arthrodensis, sometimes with additional osteotomy of the tuberosity.

Type IV represents an additional lateral translation of the calcaneal body after malunited fracture-dislocations. In addition to the above mentioned, this causes severe hindfoot valgus and an abutment of the posterior facet towards the lateral malleolus. The peroneal tendons are regularly dislocated. This type needs a calcaneal osteotomy through the old fracture surfaces (modified after Romash) using bilateral approaches and frequently a femoral distractor. The exceptionally rare type V represents an additional talar tilt out of the ankle joint. Therefore, an additional anterior approach to the ankle joint is necessary to realign the talus in the ankle mortise.

Over a 10 year period, 20 patients with a mean age of 42 years (range 22 to 61 years) have been treated for malunited calcaneal fractures at an average of 36 months (range 4 months to 18 years) after the injury. 19 patients had a type IV malunion, while one patient had a type V malunion. 6 of the patients had a partial or complete non-union along the former fracture line because of the wide separation of the fragments. Two patients had a partial necrosis of the calcaneus. All patients were treated with a corrective osteotomy along the former fracture plane followed by a subtalar fusion with additional bone grafting. In cases of non unions or partial necrosis of the calcaneus, the pseudarthrosis or necrotic bone was debrided before realignment. The peroneal tendons were rerouted behind the lateral malleolus and the superior peroneal retinaculum reconstructed.

Three postoperative complications occurred, two of them requiring revision (10%). One superficial wound edge necrosis was seen. Two patients had to be revised because of a postoperative hematoma. No deep soft tissue infection or calcaneal osteomyelitis were observed. The average time to union was 11 weeks. At an average 2 years after the correction, 12 patients could be reevaluated clinically and radiographically. Subjectively, 2 rated the result as excellent, 6 as good, 3 as fair, and 1 as poor. The average score with the AOFAS Hindfoot Scale improved from 19 preoperatively to 76 postoperatively (p<0.001). 11 patients stated, that given the same circumstances, they would undergo surgery again. The radiographic parameters (talocalcaneal height, talar declination angle, cuboid-floor distance) could be improved substantially and corrected close to the values of the uninjured side.