



Management of Distraction Subtalar Arthrodesis

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Abstract

Mobility may be limited in the presence of decreased calcaneal body height, calcaneofibular abutment, flattening of the longitudinal arch, impingement of the tibiotalar neck and loss of ankle dorsiflexion. These conditions may arise as late complications of intra-articular calcaneal fractures. If the calcaneal height is maintained, symptoms may include pain due to post-traumatic arthritis of the subtalar joint. In such cases, isolated subtalar arthrodesis will usually bring relief. Similar symptoms may occur after failed subtalar arthrodesis, with collapse and avascular necrosis (AVN) of either the talus or calcaneus, or as late sequelae of club foot. Primary and late subtalar bone block distraction arthrodesis has been described for treatment. Subtalar distraction arthrodesis (SDA) was developed as a means of treating the symptoms of subtalar arthritis. Subtalar bone-block distraction arthrodesis using structural autograft carries the risk of donor site morbidity. Recent reports suggest that structural allograft may be an attractive alternative to structural autograft in subtalar arthrodesis. Despite almost 30 years of research in this field, many controversies still exist regarding SDA.

Keywords: Distraction Subtalar Arthrodesis, varus, valgus, hindfoot.

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1. Introduction

Conservative management, including activity modification, shoe wear modification, rocker-bottom shoes, orthoses, injections, bracing, functional rehabilitation, and pain medications are the mainstays of initial treatment [1]. The final step in conservative management, because of its heavy nature, is typically a double-upright or Arizona brace (Arizona Inc, Mesa, AZ). This brace reduces the motion of the ankle and subtalar joints and can provide some pain relief and patient satisfaction [2]. Patients who fail these conservative measures and are medically fit are candidates for surgical intervention. The surgical options include lateral wall decompression, in situ subtalar arthrodesis, subtalar distraction arthrodesis, corrective calcaneal osteotomy with arthrodesis, and triple arthrodesis [3].

Preferred technique:

Patients who are considered for this reconstructive technique have a calcaneal malunion with symptomatic subtalar arthritis and anterior ankle impingement caused by a loss of calcaneal height and a horizontal talus. Radiographically these patients have a decreased talar declination angle, loss of Bohler angle, subtalar joint arthrosis, and anterior ankle joint impingement with the corresponding osteophytes on the talus or tibia [4]. Criteria similar to those proposed by Myerson and Quill [5]. They found that loss of more than 8 mm of calcaneal height, compared with the uninjured side, and a

talar declination angle of less than 20 degrees was an indication for bone-block arthrodesis [5]. The importance of preoperative determination, as described in detail earlier, of the exact cause of a patient's pain or functional limitation is critical in determining the correct operation for a patient. Preoperative weight-bearing radiographs and a CT scan help assess the deformity and the amount of correction that is needed [6]. Lateral wall widening, adjacent joint arthrosis, and the peroneal tendons, in the soft tissue windows, can be assessed with CT imaging. However, the imaging findings must be correlated with the patient's physical examination findings to determine whether distraction or in situ arthrodesis is indicated [7]. Patients are counseled preoperatively about the importance of tobacco cessation and its impact on subtalar arthrodesis [8].

They are also counseled on the postoperative recovery and prolonged period of non-weight bearing. Personal and family history risk factors for deep venous thrombosis and pulmonary embolism are assessed [2].

Operative technique:

The patient will have either general or spinal anesthesia. The patient will be placed in the lateral decubitus position with a beanbag. A thigh tourniquet is placed. The ipsilateral anterior or posterior iliac crest and the operative leg from the knee down are prepped and draped. The operative approach is influenced by any previous incisions.

Some investigators have recommended the extensile lateral approach, particularly if the patient has retained hardware [9]. After the joint is adequately distracted, the joint surfaces are cleaned of any residual cartilage and prepared for arthrodesis. In cases of severe or long-standing deformity, medial-sided contracture may prevent complete correction. This deformity can be released with an angled curette or periosteal elevator from the lateral side [10]. Care must be taken to avoid injury to the structures on the posteromedial side of the hindfoot, including the neurovascular bundle. Lateral fluoroscopy is necessary to determine the amount of distraction that is needed for complete correction of the deformity [11]. After the deformity is fully corrected, the size of the graft that is needed can be assessed. Use anterior or posterior iliac crest autograft, depending on the size needed. A tricortical graft is harvested [11].

If there is significant sagittal plane deformity, Zwipp and Rammelt [12] used 2 separate grafts placed side by side in order to correct varus/valgus malalignment. After the graft is selected, it is shaped into a trapezoid with the lateral aspect of the wedge being slightly shorter than the medial side to avoid varus malalignment. Distraction is released and the varus/valgus correction is assessed clinically and fluoroscopically. In some cases, the tuber is displaced so far laterally that a medializing osteotomy is also needed. The need for this additional osteotomy is best evaluated on the axial heel view. If the correction is acceptable then any residual voids are filled with cancellous autograft, or excised lateral wall autograft [12]. Fixation of the subtalar joint will be done using any hardware or using only an external cast without any hardware if the arthrodesis is stable [12]. Adequate correction is confirmed again with AP and mortise fluoroscopic images of the ankle along with lateral and AP images of the foot and axial view of the heel [12]. The wounds are closed in layers and a plaster splint is applied with the patient in a plantigrade position with neutral sagittal alignment [12].

Postoperative care

The patient is made non weight bearing and is in a cast or splint for 6 to 8 weeks. If radiographs at that time are acceptable, then the patient is placed into a walking boot and begins a progressive weight-bearing regimen that is supervised by physical therapy. Once the patient can fully weight bear in the walking boot without pain and there are adequate radiographic signs of healing on the 12-week postoperative radiographs, the patient is then allowed to transition, as swelling allows, into a regular shoe [2].

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