

Zimmer® Trabecular Metal™ Total Ankle System Varus Deformities

Introduction

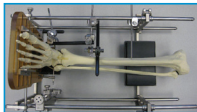
Total ankle cases with varus deformities may involve any of a variety of conditions, from soft tissue deficiencies that lead to tilt of the ankle joint, to severe bony erosions. Depending on the clinical situation and the cause of the malalignment, the maneuvers required to achieve proper joint alignment will vary.

A medial release is typically indicated for a longstanding varus deformity. It is recommended that, whenever possible, the release be limited to the superficial area of the deltoid. However, if the deformity is severe, a direct release of the deep deltoid may be indicated.

Aligning the Joint

After addressing osteophytes and other bony problems, and performing the fibular osteotomy, the Calcaneus Pin is inserted in an eccentric position parallel to the dome of the talus. Then, by pulling on the medial aspect of the Calcaneus Pin, the gap on the lateral side can be reduced until neutral alignment of the ankle joint and the hindfoot is restored. This is accomplished by attaching the Calcaneus Pin Hook on the medial side, and turning the thumb screw to apply an inferior-directed force that will pull distally on the pin. Using the same technique, minimal compression is also applied to the lateral aspect of the pin to ensure that overall stability of the foot is maintained.

If any varus is still observed, the placement of the talar neck pin can be used for additional correction. Under fluoroscopic guidance, the talar neck pin is inserted parallel to the varus deformity. Initially, this pin may be proximal to the superior aspect of the Talar Pin Connector, but applying distal traction to the pin will bring it to a position directly over the connector. With the alignment fully corrected at the level of the ankle joint, the talar neck pin is locked into position on the Talar Pin Connector.



Carbon Fiber Rod.

To further stabilize the corrected alignment, a laminar spreader can be placed into the medial aspect of the joint until the tibial pins are inserted in the standard configuration 5cm and 20cm above the joint line, and the standard Carbon Fiber Rod is placed between the distal tibial pin and the lower medial longitudinal frame rod. This Carbon Fiber Rod should be placed more medially so it is closer to the frame, allowing an additional Carbon Fiber

Rod to be placed between the distal tibial pin and the talar neck pin to help maintain the alignment. This additional tibia-talus connection will add significant stability to the construct. Some surgeons may prefer to add this additional Carbon Fiber Rod in all cases, even those without any remaining deformity.

The additional Carbon Fiber Rod can also be used to correct any remaining malalignment. This is accomplished by placing an additional Pin-to-rod Clamp on the Carbon Fiber Rod between the distal tibial pin and the talar neck pin. With the distal tibial clamp and the accessory clamp securely tightened to the Carbon Fiber Rod, both talar neck clamps are loosened. A laminar spreader is then positioned between the accessory clamp and the talar neck clamp, allowing additional distraction force to be applied to the talar neck pin to further correct the joint alignment.

In a case where the deltoid is distracted and the surgeon prefers not to release the deltoid, it may be advisable to remove some tibial cartilage or bone with a chisel before placing the leg in the frame. This will allow alignment of the ankle joint while preserving the deltoid.

Case Study

Case 1

This case involves a 68-year-old patient with a rotatory deformity and 20E of varus at the ankle, but minimal bone loss and no significant involvement of the subtalar joint. Osteophytes were visible on the lateral radiograph, and there was slight A/P translation. The surgeon preferred to avoid releasing the deltoid.

The foot was placed in the Alignment Stand in 15E of plantar flexion. An attempt was made to use leverage on the medial side to align the joint, but the lack of lateral soft tissue structures caused the lateral side of the talus to move in conjunction with the medial side. Applying distraction to the talar neck pin allowed the alignment to be corrected within approximately 2E of neutral. A Carbon Fiber Rod was placed between the talar neck pin and the distal tibial pin to help secure the alignment. A thicker component was then implanted and the lateral ligaments were repaired.



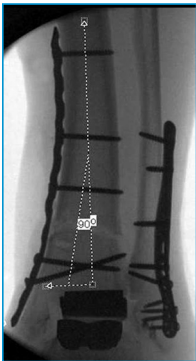
Anterior (left image) and Lateral (right image) x-ray of an ankle joint with a varus deformity.

Postoperative radiographs revealed that the tibia was still in approximately 5E of varus. At three days postoperatively, the patient returned to the OR for a supramalleolar tibial wedge osteotomy. This resulted in a neutral alignment, and reduced the likelihood of failure due to accelerated wear.

Reviewing the circumstances of this case, the surgeon acknowledged that if he had recognized the issue intraoperatively, he would have reset the talar neck pin more horizontally to allow a greater range of correction. He then would have slightly overcorrected the talus, and reset the proximal tibial pin to perform the osteotomy. This may have resulted in a more accurate bone resection. The point is to anticipate the degree of correction that will be necessary so the talar pin placement will allow an appropriate amount of manipulation.



Anterior x-ray of the ankle joint replaced with the Zimmer Trabecular Metal Total ankle prosthesis.



Anterior x-ray of the ankle joint replaced with the Zimmer Trabecular Metal Total Ankle prosthesis following a supramalleolar tibial wedge osteotomy.