Total Ankle Replacements in Mal-aligned Ankles

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Performing ankle replacement in mal-aligned ankles can be complicated. In addition to knowing the ankle replacement system with which you are working, a variety of other complementary surgeries are often needed to complete the task. Hence, being adept at distal tibial osteotomies, simultaneous subtalar and talonavicular arthrodeses, ligament reconstructions and releases, gastrocnemius and achilles lengthening and calcaneal osteotomies is important. Using a modular ankle with the ability to extend the length of the tibial stem when necessary has become an important part of ankle replacement when the osteotomy is planned simultaneously with the ankle replacement.

The INBONE TAA is a fixed-bearing two-component design with a modular stem system for both tibia and talar components. The tibia is inset into the tibial metaphysis, but does not resurface the malleoli. The talar component entirely replaces the superior aspect of the natural talus, after a flat dome resection. Multiple modular segments may be added to the tibial stem, depending on the surgeon’s determination of how much stability is needed or how much the stem should pass beyond a simultaneous supramalleolar osteotomy performed for tibial malunion. The talar component’s stem comes in either a 10 or 14 mm length. The new INBONE II is now available and provides for increased medial and lateral stability by adding a sulcus and corresponding “V” shaped polyethylene component that matches the talar component. The talar component stability is enhanced with two anterior prongs and a longer AP version of the tibial base plate is available. Unique to the INBONE total ankle system is the alignment guide placed after the ankle is exposed via an anterior approach. The device demands simultaneous alignment of the talus with the tibia. Once that is achieved, a drill is passed from the plantar foot through the calcaneus, just anterior to the posterior facet, through the center of the talar body into the center of the tibial metaphysis; much like the guide pin for a retrograde ankle arthrodesis nail. While many argue that it is undesirable to violate the subtalar joint when performing TAA, the designers of the alignment guide maintain that if the device is alligned appropriately, the drill safely negotiates the subtalar joint between the arterial anastamosis on the inferior talar neck and the posterior facet’s articulation with the inferior talus. Because of the alignment system with the leg pinned to a metal stand and with the aid of lamina spreaders tensioning the concave side of the ankle, significant varus and valgus deformities can be corrected with orthogonal bone cuts.

The ankle is opened identical to the other ankles between the tibialis anterior and the EHL. The leg is then placed in the leg holder and the rotation of the ankle aligned parallel to the medial mortise. The calcaneus is fixed with two pins and the foot and lower leg secured to the leg holder with elastic wrap. The large fluoroscopic C-arm is guided into place and the anterior-posterior aiming sites are aligned confirming center location of the guide over the talus and the tibia. Then the lateral aiming site centering is accomplished with the C-arm in the lateral view. The AP view is then obtained with proper centering and the cutting guide applied so that the medial cut does not violate the medial malleolus. The plantar calcaneal heel pad is opened, a canula locked into position through the soft tissue and the talus and tibia drilled. Alignment of the cutting guide is accomplished under flouroscopy and the guide pinned into position. The antirotation drill is used to create a hole in the tibia and the tibia and talus are cut through the saw guide. The saw guide is removed and the bone extracted. The tibia is reamed by applying the reamer into the open anterior ankle onto the reaming rod inserted up through the calcaneaus and talus. The ankle is then plantar flexed and the hole for the talar stem drilled. Then the cone portion of the prosthesis is inserted into the tibia followed by two additional cylinders, then the cylindrical base. The Morse taper tibial component is then tamped into place. Next, the talar component is slid into place with the stem attached. Finally, the polyethylene component is inserted and locked in place. Similar to the other ankles, the wound is closed in layers. A well-padded cast or splint is now applied.