

My technique for tibiotalar arthrodesis (with loss of bone stock)

Oliver Michelsson

Indications

- a. Failed total ankle prosthesis
- b. Aseptic necrosis of talus
- c. Post traumatic bone loss

Most cases with severe bone loss comprise patients with failed ankle prosthesis. In these cases we convert the TAA to a fusion of the ankle joint. In Finland the most used ankle prosthesis has been the Ankle Evolutionary System (AES), and it has been reported to lead to quite severe osteolysis (1). Thus, most likely these types of cases will increase in the future. In order to avoid a shorter extremity, I use an allograft to restore the length of the leg.

Contraindications

Acute systemic, local infection and acute Charcot foot. Relative contraindications are ASO, diabetes, Charcot and smoking.

Technique

Before operation a CT is performed for a better evaluation of the bone loss. An anterior opening between tibialis anterior and EHL tendon (ankle prosthesis opening) is used. This anterior opening is ideal with cases of failed ankle prosthesis; prosthesis of course has to be taken out. Then I remove if left the cartilage and all necrotic bone. We drill holes to the subchondral bone with 2 mm k wire or 2 mm drill. Cysts are drilled and filled with cancellous bone (autograft or allograft). Then the allograft is formatted (femoral head) to fill the space (see picture). Also some holes are drilled into the allograft with 2mm k wire. Right size allograft is hammered to fill the place.

Tibia, talus and allograft are fixed with 2 anatomically formed anterior plates (Integra); some screws are drilled through the allograft to talus (or if subtalar joint has been fused, all the way to calcaneus). I put extra care to close the retinaculum and close the skin with very loose sutures (mattress sutures).

Special Risks

Anterior opening has more risks than rational lateral opening and partial resection of fibulae. Risk for wound necrosis or infection is higher. The wound might also be more challenging to close because of swelling and there is a slightly bigger risk for nerve or arterial complications.

Results

I have operated about 10 cases; all have healed and ossified during the normal clinical follow-up. The first patient was operated about 4 years ago. Berkowits (2) reported a series of 12+12 ankles and Plaas (3) reported 29 cases (13 with allograft), both results show that this is a reliable method to achieve solid tibiotalar or tibia-calcaneal arthrodesis even in ankles with difficult conditions (such as loss of bone stock). No method or technique has been shown to be superior to others. In a cadaver study anterior plates have been reported to have more primary stability and stiffness of the constructs (4) than traditional screws, which is of great importance in these salvage procedures with allograft. We need to follow these cases carefully to see the long time results of the allograft. Some literature supports my method of choice.

References

1. Koivu H, Kohonen I, Sipola E, Alanen K, Vahlberg T, Tiusanen H: Severe periprosthetic osteolytic lesions after the Ankle Evolution System total ankle replacement. *J Bone Joint Surg Br.* 2009;91-B(7).
2. Berkowitz M, Clare M, Sanders R: Salvage of failed total ankle arthroplasty with fusion using structural allograft and internal fixation. *Foot Ankle Int.* 2011;32(5):493-502.
3. Plaas C, Knupp M, Barg A, Hintermann B: Anterior double plating for rigid fixation of isolated arthrodesis. *Foot Ankle Int.* 2009;30(7):631-639.
4. Espinaso et al: Primary Stability and Stiffness of Ankle Arthrodesis Techniques – Crossed Screws vs. Anterior Plating. Paper presentation American Academy AAOS 2012.