Treatment of Charcot Ankle Arthropathy
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Level of Evidence: Current recommendations based primarily on retrospective case series
(Level IV and V)

I. Nonoperative treatment
A. Total contact casting for minimal deformity Eichenholtz Stage I still probably considered gold std.
   o No consensus on how much offloading is optimal
   o Potential for contralateral limb Charcot – protection needed?
   o Protected weightbearing in TCC may be best compromise
   o Prefabricated walking brace may be equal to TCC in selected cases
B. PTB pattern-bottom caliper suspension orthosis in stage I to allow crutch free ambulation with NWB to foot. Then progress to PTB/AFO/CROW
C. Bisphosphonate treatment for Stage I shown to decrease pain and urinary markers of bone turnover
   ……………….Does it change the natural history?
   Strong evidence to support, not FDA approved.
D. AFO/Shoe or CROW for stage III deformities well recognized

II. Operative Treatment
A. Indications:
   1. Late stage fixed deformity if non braceable/non shoeable
   2. Acute stage if:
      • significant deformity (esp. coronal malalignment)
      • Gross instability/bone loss- precluding cast immobilization
B. Methods:
   1. Ankle fusion with screws with/without hybrid ex-fix,
   2. Retrograde IM nail for ankle fusion or TTC fusion – multiple authors
      • proximal stress riser, pain, stress fracture at nail tip have all been reported
      • Consider longer nail (femoral retrograde nail) to stress relief tibial shaft
   3. TTC fusion with blade plate
   4. Small wire external fixation
   5. Use of adjunctive bone stimulator reported – small series, no consensus

III. Acute Ankle Fx. Management to Prevent Ankle Charcot Arthropathy
A. Careful preop eval – hx. of peripheral neuropathy or Charcot significant risk factors
   (Saltzman)
B. Goal: Maintain stability of the ankle with the talus underneath the tibia
C. Consider adjunctive fixation to augment or replace traditional ORIF:
   • Transarticular retrograde pins
   • Multiple syndesmotic screws
   • Small wire ext fixator
   • Retrograde tibio-talo-calcaneal rod
   • Closed reduction and percutaneous screw fixation
D. Post op management:
   • Prolonged nonweightbearing immobilization (double the time?)
   • Use of AFO as transition device for 3-12 months after casting ended to prevent late failure

Hockenbury R; Gruttadauria, M; McKinney I: Use of implantable Bone growth stimulation in Charcot ankle arthrodesis. Foot Ankle Int. 28: 971-976.


Kile, TA; Donnelly, RE; Gehrke, JC; Werner, ME; Johnson, KA: Tibiotalocalcaneal arthrodesis with an intramedullary device. Foot Ankle Int. 15:669 – 673, 1994.


Moore, TJ; Prince, R; Pochatko, D; Smith, JW: Retrograde intramedullary nailing for ankle arthrodesis. Foot Ankle Int. 16:433 – 436, 1995.

Myerson, MS; Alvarez, RG; Lam, PW: Tibiocalcaneal arthrodesis for the management of severe ankle and hindfoot deformities. Foot Ankle Int. 21:643 – 650, 2000.

Noonan, T; Pinzur, M; Paxinos, O; Havey, RM; Patwardhan, AG: Tibiotalocalcaneal arthrodesis with a retrograde intramedullary nail: a biomechanical analysis of the effect of nail length. Foot Ankle Int. 26:304 – 308, 2005.


Pinzur, MS; Noonan, T: Ankle arthrodesis with a retrograde femoral nail for Charcot ankle arthropathy. Foot Ankle Int. 26:545 – 549, 2005.

Pinzur, MS: Current Concepts Review: Charcot Arthropathy of the Foot and Ankle. Foot Ankle Int. 28 952-959.

Pitocco, D; Ruotolo, V; Caputo, S; et al.: Six-month treatment with alendronate in acute Charcot neuroarthropathy: a randomized controlled trial. Diabetes Care. 28:1214 – 1215, 2005.


Trepman, E; Nihal, A; Pinzur, MS: Current topics review: Charcot neuroarthropathy of the foot and ankle, Foot Ankle Int. 26:46 – 63, 2005.