2015 AOFAS Pre-Meeting

“My Aching Ankle”: Primary Ankle Arthrodesis

How I address deformity in ankle arthrodesis - just make it straight!

Jeffrey E. Johnson, MD
Professor
Chief, Foot and Ankle Service
Director, Foot and Ankle Fellowship Program
Washington University Orthopedics
St Louis, Missouri

I. Three keys to success with ankle fusion
   a. Pick/Prepare the “right” patient
   b. Get the ankle straight (slight valgus, external rotation, neutral sag plane)
   c. Get the fusion healed

II. Patient selection
   a. Pain localized to ankle – use differential injection if adjacent joint arthritis suspected
   b. Be aware of co-morbidities: smoking, idiopathic/diabetic peripheral neuropathy, chronic pain, psych
      i. This is an elective procedure – expect the patient to stop smoking and optimize psych, pain and any other medical issues preop
   c. Have complete discussion of the available options for treatment of ankle arthritis in your patient
      i. Arrive at decision for ankle fusion as the best option of many, rather than “settling” for it as a salvage
   d. Don’t sell it.
      i. Create realistic expectations for final result as well as each stage of recovery
      ii. Mention all major complications (nonunion 10%, nerve, longterm adjacent arthritis – radiographic, not usually debilitating)
      iii. Takes a “year” to recover
      iv. Patients with stiff hindfoot joints will notice loss of ankle ROM much more than patients with normal hindfoot ROM
      v. Arrange interviews with satisfied (age/activity matched) former ankle fusion patients as live testimonials for patients concerned about post fusion activity level.
III. Ankle fusion techniques

a. No/Minimal deformity – In Situ arthrodesis
   i. Mini/minimal open – minimize striping
      1. Anterolateral arthrotomy
      2. Anterior fibular resection
   ii. Arthroscopic- union rates high, technique driven
   iii. Distal tib fib and lateral gutter not fused

b. Moderate/severe deformity with anatomic joint surfaces
   i. Use joint architecture to create coapted fusion surfaces which will help
determine proper transverse plane rotation and coronal angulation –
them make sure ankle in neutral sagittal alignment
   ii. Extensile anterolateral arthrotomy
   iii. Possible oblique fibular osteotomy above joint line
      1. fusion lateral gutter
      2. use fibula as additional plate
   iv. Possible auxillary antero-medial arthrotomy (portal)
   v. Ankle distractor – pins, lamina spreader

c. Moderate /Severe deformity with loss of anatomic joint surfaces
   i. Use flat cuts with or without interpositional bone graft
      1. Adding bone to fill defect technically easier than flat cuts
      2. Adding bone avoids shortening, maintains soft tissue tension
      3. Limited data suggests fusion rate minimally affected with
         interpositional allograft bone graft (Kleiber, et al, 2011)
         a. 19 patients 89% union rate
         b. 9.5 mm avg. maximum graft width
   ii. Create stable surfaces on axial load
   iii. Significant talar bone loss requires TTC fusion
   iv. Careful attention to alignment since congruity of anatomic joint surfaces
        not able to guide the reduction
   v. Know when to perform TTC fusion vs. isolated ankle fusion
      1. Inadequate bone stock for appositional healing
      2. Inadequate bone stock for talar fixation
      3. Avascular talus with limited bone healing capacity

IV. Techniques to enhance fusion rate

a. Patient factors
   i. Quit smoking at least 1 month preop
   ii. Avoid NSAIDs until fusion healed
   iii. Non weightbearing compliance
   iv. Short leg cast rather than walker boot (at least first 6 weeks)
   v. Authors preference: 6 weeks Non WB cast, 4 weeks WB cast, then boot

b. Joint preparation
   i. Thorough debridement - maximize joint fusion surface area
   ii. Surface preparation: drilling (leave filings), osteotome feathering
1. Power tools can remove excessive bone and burnish or cause thermal necrosis
   iii. Slot graft technique for “spanning” fusion (Klein, et al 2011)
      1. Allograft bone impacted into “slot” prepared across fusion site
      2. May improve rigidity of construct
      3. May improve fusion rate (77% union in high risk group)

c. Joint fixation
   i. Compression lag screws in different planes (2-3)
   ii. Additional plate fixation
      1. Anterior plating increased construct stiffness by a factor of 3.5, 1.9, and 1.4 for the sagittal, coronal, and torsion modes, respectively. (Tarkin, et al 2007)
   iii. Avoid subtalar joint penetration with hardware
      1. Take multiple C-arm obliques intraop to confirm proper screw placement

d. Adjuncts for difficult cases
   i. Iliac crest bone marrow aspirate may help when added to cancellous allograft to fill voids when needed.
   ii. Autograft ICBG
   iii. BMP – off label usage

References

