Deltoid Ligament: The Triple is Good but the Ankle is Sagging – How do I Reconstruct the Deltoid Ligament?

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I. Predisposing Factors for Deltoid Ligament Insufficiency Following Triple Arthrodesis for Acquired Flatfoot Deformity

A. Unrecognized Stage IV AFFD
   1. failure to perform weight bearing AP radiograph of ankle

B. Late attritional deltoid insufficiency secondary to malunion of triple arthrodesis


II. Methods of Deltoid Ligament Reconstruction

A. Repair of host tissue
   1. When deltoid has isolated tear from acute injury but not stretched or lax, primary repair of midstub substance tears performed with suture. If tear at insertion, then bone anchor utilized. When ligament completely ruptured, augmentation with plantaris tendon graft (Hintermann, Valderrabano, Kundert. Foot & Ankle International, 1999)

B. Advancement of host tissue
   1. Advancement of a “deficient” tissue results in a failure

C. Autograft tendon transfer
   1. FHL (Bohay & Anderson. Foot & Ankle Clinics, 2003)
D. Allograft substitution of deficient ligamentous complex

1. Allograft semitendinosis to repair tibiotalar and tibiocalcaneal components of the deltoid ligament (Bluman & Myerson, Foot and Ankle Clinics, 2007)

2. Also described: plantaris graft to simulate trapezoidal shape of deltoid

3. Free EDL tendon graft from medial malleolus to medial cuneiform – cadaver model, no clinical results (Kitoaka)

III. Conclusions

A. Deltoid insufficiency is difficult to reconstruct
B. Little data to guide decision making
C. Graft substitution (allograft or autograft) is superior to primary repair or advancement in limited studies
D. Deltoid ligament reconstruction not recommended in isolation, but as combination procedure with bony realignment.
E. Anatomic hindfoot realignment critical to preventing deltoid insufficiency and reducing strain on deltoid reconstruction.

References