The Place of Complete Division of the Deltoid Ligament in Total Ankle Replacement for Correction of Deformity

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Introduction
For a successful total ankle replacement, besides correctly sized and placed components, correct alignment and ligament balance are being increasingly recognised as essential. The medial deltoid ligament is vital for ankle stability and its sectioning leads to medial instability with talar shift and valgus tilt in most instances. However, the severely arthritic ankle with a significant varus deformity maybe an exception to the rule. We know that significant pre-operative deformity in the coronal plane is a risk factor for TAR failure if not adequately corrected because of altered mechanics and edge loading. We therefore proposed the hypothesis that a fixed varus deformity of the hindfoot has a major soft tissue component in the deltoid ligament and the tibialis posterior tendon. This shifts the centre of rotation of the ankle medially. Therefore, division of the soft tissue should correct the varus, restoring the centre of rotation to the centre of the joint where it should normally lie. This should also assist in correcting ankle frontal plane deformity and allow a TAR to be undertaken, where previously an ankle fusion may have been the only option.

Methods
Of over 400 TAR’s performed by the senior author (SD) between 1998 – 2010, 255 of these were the Scandinavian Total Ankle Replacement (STAR). Since October 2005 the senior author has performed TAR’s in 156 patients using the Mobility (DePuy) prosthesis. 96 patients had some pre-operative varus deformity (24%). Of these, 56 had documented pre-operative varus of >10 degrees. 16 joints (in 15 patients) required full deltoid ligament release to correct varus. All had a varus deformity of >15 degrees. The remainder were adequately corrected by joint debridement and bony cuts. We retrospectively analysed our cases of complete release of the deltoid ligament, specifically to assess any resultant joint instability.

Results
Average follow up was 37 months (3-84). 12 ankles required further surgery to achieve a stable balanced ankle (7 lateral ligament reconstruction, 5 tibialis posterior tendon lengthening and 3 calcaneal osteotomy and tib post lengthening in addition). The average preop varus deformity was 26 degrees. Full correction of deformity was obtained in all cases. However, there was a mean residual hind foot varus of 7.5 degrees (0-15). The average FFI score was 39.5 (0-59). No ankle had any evidence of medial instability either clinically or on weight bearing radiographs. The residual hind foot varus was attributed to the subtler joint. All patients stated they were “happy” with the eventual outcome of their ankle replacement.
Conclusion
In severely deformed (varus) arthritic ankles, the deltoid ligament can safely be sectioned without risk of the ankle developing medial instability or/and a valgus deformity. In such ankles, a lateral ligament reconstruction is likely to be needed to achieve lateral stability. This is best done in a staged fashion in our view and it is now the senior authors standard practice to counsel patients regarding this. The usual stages are an extensive medial release and TAR in stage 1 followed 6 weeks later by hind foot deformity correction (calcaneal osteotomy/STJ fusion) and/or a lateral ligament reconstruction.