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Statement of Purpose

Achieving frontal plane alignment of the ankle joint during total ankle replacement is essential for long-term success.¹⁻⁵ Varus ankle mal-alignment with absent peroneal tendon function is considered a contra-indication to performing a total ankle replacement.⁶ We present a case of an active middle-aged man with severe ankle varus and end-stage degenerative joint disease secondary to chronic complete rupture of both peroneal tendons from a prior traumatic injury treated with a fixed-bearing total ankle replacement and free semitendinosus tendon allograft modified Evans non-anatomic lateral ankle reconstruction. The purpose of this case study is to show an alternative reconstruction method in a patient with varus ankle instability who the authors believe would benefit from a total ankle replacement.

Literature Review

Prior publications describing a modified Evans⁷ non-anatomic lateral ankle reconstruction consist of technique descriptions only and involve transfer of the whole autogenous peroneus brevis tendon anchored to the anterior tibia beneath a plate and screw construct.^{8,9} In 2012 Hamel¹⁰ described the tibialis anterior being trasnfered to the intermediate or lateral cuneiform to control ankle varus in total ankle replacement surgery. He performed total ankle replacements on ankles with greater than 15 degree varus, at average follow up of 33.4-months, pateints had an average 85% decrease in pain with maintained correction of their varus deformity. To the authors knowledge this is the first case study involving free semitendinousus allograft for the modified Evans procedure to provide lateral ankle stability in conjunction with a total ankle replacement.

Case Study

A 59-year-old man presented with end-stage degenerative ankle joint disease with severe varus mal-alignment secondary to chronic rupture of both peroneal tendons. The patient had a varus left ankle on exam that was not fully reducible, with limited range of motion. Radiographs verified the varus deformity, as well as, end stage degenerative joint disease (Figure 1). He had failed extended courses of bracing, corticosteroid injections, and conservative care measures. His work requirements as a laborer and outdoorsman activities warranted maintaining sagittal plane ankle motion. Taking all this information into account, he ultimately underwent a fixed-bearing total ankle replacement with intra-muscular recession lengthening of the posterior tibial tendon with partial deltoid ligament release and corrective resection of the tibia and talus to achieve a neutral ankle in the frontal plane. Lateral ankle stabilization was achieved with a free semitendinosus allograft that was anchored to the base of the fifth metatarsal with the other end transferred into the ankle joint and, under maximum tension, secured to the anterior distal tibia under a plate to achieve frontal plane stability (Figure 2). The redundant tendon was advanced distally onto the talar neck to provide further ankle restraint against anterior subluxation. His healing was uneventful and he progressed to full return to activities. At 45-months follow-up, radiographs demonstrated the ankle corrected from 21 degrees incongruent varus to 0 degrees and his hindfoot alignment corrected from 26 degrees varus to 5 degrees varus (Figure 3).

Severe Ankle Varus with Chronic Complete Rupture of Both Peroneal Tendons Treated with a Fixed-Bearing Total Ankle Replacement and Free Semitendinosus Tendon Allograft Modified Evans Lateral Ankle Reconstruction Mitchell Thompson, DPM¹; Thomas S. Roukis, DPM, PhD, FACFAS²



Figure 1: From left to right; anterior-posterior, lateral and hindfoot alignment weightbearing radiographs demonstrating end-stage degenerative joint disease and varus alignment of the ankle and hindfoot





Figure 2: Intra-operative image of the total ankle replacement with semitendinosus allograft



Analysis and Discussion

Explained here is the use of a free semitendinosus allograft tendon as a modification of the Evans peroneus brevis tendon transfer to achieve a stable lateral ankle in a patient with end-stage degenerative ankle joint disease and severe varus deformity of the ankle. The use of plate fixation for securing the tendon to bone reliabily allows for stability in the frontal plane against varus stress. After verifying that the ankle is stable to inversion stress it is important to check for an anterior drawer which, when present, should be corrected by securing the remnant allograft tendon to the anterior talar neck as described⁹. When considering total ankle replacement for management of end-stage degenerative ankle joint disease, careful patient selection, proper surgical technique and creation of a stable ankle in all planes are mandatory to achieve consistently good outcomes. Whole transfer of the anterior tibial tendon¹⁰ was considered but not performed due to the need for static restraint, not active motion in this patient, and also to reserve it's use for future revision surgery should this become necessary. We were able to achieve a neutrally aligned ankle and hindfoot using the techniques employed and achieve normal function at 45-months post-operative. While the medium-term results are promising, long-term surveillance will provide additional insight into the efficacy of the above approach.

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