Soft Tissue Reconstruction After Total Ankle Arthroplasty

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KEYWORDS

• Ankle replacement • Soft tissue complications • Wound complications • Flap

KEY POINTS

- Soft tissue management of total ankle replacements begins in the operating room with the use of preventative measures for wound complications.
- Soft tissue and wound complications should be managed with a team approach including the orthopedic surgeon, a plastic surgeon, and perhaps a vascular surgeon or wound care specialist.
- A methodical approach should be taken to managing wound complications following total ankle replacement, with the use of a variety of possible flaps as needed.

INTRODUCTION

End-stage ankle arthrosis is known to cause chronic disability due to its severe impact on pain, health-related quality of life, and function.[1] Although ankle arthrodesis was previously considered the gold standard for treatment, total ankle arthroplasty (TAA) has emerged as a viable alternative treatment. TAA has been performed in selected patients with end-stage ankle arthritis secondary to idiopathic, traumatic, and inflammatory etiologies.

Since the release of the first-generation TAA design in the 1970s to the current day third- and fourth-generation designs, TAAs have seen a reduction in complication profile. However, significant risks still apply. Wound healing problems of the anterior

Disclosure Statement: The authors have nothing to disclose.
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Foot Ankle Clin N Am 22 (2017) 391–404
http://dx.doi.org/10.1016/j.fcl.2017.01.008
1083-7515/17/

incision can be seen in up to 28% of patients undergoing a TAA.[1,2] Outcomes from a recent meta-analysis showed that the highest risk of TAA failures was with the following complications: deep tissue infection, aseptic loosening of hardware, and implant failure.[3,4] Failures were salvaged with revision of the TAA in the majority of ankles (62%), whereas amputations were rare. Factors that have shown to result in a statistically significant increase in complications include a patient history of diabetes mellitus and smoking, whereas factors that are associated with an increased trend in complications included female sex, history of corticosteroid use, and an underlying inflammatory arthritis.[3,4]

Advancements in soft tissue reconstructive techniques have revolutionized the treatment of traumatic foot and ankle injuries and improved success in limb salvage.[5–7] The collaboration of plastic surgeons and orthopedic surgeons has exponentially improved the treatment of complex foot and ankle problems. A recent retrospective review by Cho and colleagues[8] demonstrated TAA accounting for 22% of all elective orthopedic foot and ankle procedures requiring plastic surgery intervention, with dorsal ankle wounds accounting for 36% of all postoperative referrals for soft tissue management. With the ability to transfer both local and free tissues, salvage of soft tissue complication is often successful and durable.

PREVENTATIVE MEASURES

Although managing soft tissue complications is of importance in patients with TAA, preventative measures have tantamount value. As a preventative strategy, patient selection is critical in minimizing complications. Avoiding higher risk patients with poorly controlled diabetes, peripheral neuropathy, vascular compromise, current smoking, and immunocompromise is advisable, as these have been shown to increase wound complications in foot and ankle surgery.[2] In a retrospective study of 106 TAAs, there was a significant association between inflammatory connective tissue disease, diabetes, and corticosteroid use in patients with wound complications.[9] A patient's medical history must be considered in its entirety before making the judgment as to whether they are a suitable candidate for TAA, and when planning for the proper postoperative care in patients who may be more predisposed to suffer from wound healing complications. Even with attention toward patient selection, the complication rate of TAA still varies between 20% and 28%.[10] Current literature shows revision rates between 14% and 32% at 5 years.[10] While the most common reasons for revision of TAA are aseptic loosening, osteolysis, and talar collapse, deep infection and wound healing problems have also been implicated in failure of TAA.[4]

Meticulous surgical technique in skin closure in conjunction with adjunctive measures designed to minimize wound tension and edema can potentially help reduce the need for postoperative plastic surgery consultation. The authors routinely use a continuous external tissue expander (CETE) in conjunction with negative pressure wound therapy at the time of primary arthroplasty in an attempt to reduce the frequency of wound complications following TAA (**Fig. 1**).

Continuous External Tissue Expander

The goal of this device is to help facilitate wound closure through a more accurate approximation of the skin tissue edge, while also relieving tension from the incision line. A previous study described the use of the Dermaclose CETE (Wound Care Technologies, Incorporated, Chanhassen, Minnesota) as a prophylactic measure to manage surgical incisions of the ankle following TAA.[11] The authors of this study employed the use of CETE in patients who were deemed to be at an increased risk