Revision Total Ankle Arthroplasty

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KEYWORDS

• Ankle surgery • Total ankle arthroplasty • Revision TAA • TAA complications

KEY POINTS

- Total ankle arthroplasty (TAA) is a difficult procedure with a high learning curve.
- Revision TAA is even more demanding and requires experienced surgeons to undertake.
- The principles for revision are as follows: ensure infection is eradicated; ensure alignment; fill resultant defect with a combination of implant, bone graft, and possibly cement to provide stability to revisional implant; and to correct cause of failure.

INTRODUCTION

Over the past 2 decades, improvements in total ankle implant design, materials, and surgical technique have led to better functional outcomes. However, known complications inherent to total joint replacement remain that may require revisional surgery. Glazebrook and colleagues[1] found 9 main complications in the literature: intraoperative fracture, postoperative fracture, wound healing problems, deep infection, aseptic loosening, nonunion, implant failure, subsidence, and technical error. They proposed a classification system based on the rate of failure for a given complication. Intraoperative bone fracture and wound healing problems are considered low grade and very unlikely to cause failure. Technical error, subsidence, and postoperative bone fracture are classified as medium-grade and lead to failure less

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than 50% of the time. Deep infection, aseptic loosening, and implant failure are considered high grade and lead to failure of total ankle arthroplasty (TAA) more than 50% of the time.

In total ankle surgery, it is generally accepted that revision constitutes manipulation of one or more of the metal components.[2–4] Henricson and colleagues[2] reviewed the literature to provide a consensus on the definition and defined revisional TAA as exchange or removal of one or more of the components except incidental exchange of the polyethylene meniscus. In their study on the Agility total ankle, Knecht and colleagues[3] differentiated major revisions from secondary procedures. They considered major revisions as any procedure requiring removal or replacement of one or both of the metal components. Secondary minor procedures included any procedure of the foot and ankle related to the total ankle replacement, such as calcaneal osteotomies, subtalar fusions, and ankle ligament augmentation. In the primary author's experience with 400 Agility total ankle arthroplasties with 1-year to 6-year follow-up, the major and minor complication rate was 8% and 14%, respectively.[5]

With TAA, documented complications can be categorized chronologically into intraoperative, postoperative, and late complications. Factors such as patient selection, surgeon experience, implant features, and prosthetic device selection can influence functional outcomes as well as incidence of complications. Even with impeccable surgical technique and optimal patient selection, complications that require revision may still arise and the most common complications with revision solutions are discussed in this article.

INDICATIONS

There are few outcome studies regarding revision surgery and there are a limited number of surgeons who have performed enough revisions to contribute to the literature. Consequently, indications for revision surgery are not well established. Factors that should be considered include the following: symptoms, pain, subsidence, alignment, bone stock, infection, and component integrity.[6] The most common early complications are ligament imbalance or component: malpositioning, subsidence, and/or impingement. Any of these situations may necessitate revision surgery to reduce the risk of premature TAA failure. Typically, late complications are due to wear of the polyethylene liner either from normal wear or from malalignment, aseptic loosening/osteolysis usually from polyethylene debris, or recurrent and or progressive frontal plane deformity. Early recognition of these complications will lessen the complexity of the revision surgery necessary to yield a functioning prosthesis.

When a failing or failed total ankle is encountered, a surgeon is faced with considering a complex revision arthroplasty versus salvage procedures that include the following: conversion to fusion, cement block interposition, and amputation.[7] With significant bone loss, conversion to arthrodesis is difficult because of loss of structural bone support and inability to place adequate fixation. This can be further complicated by nonunion and progressive arthritis of adjacent joints.[8–10] If standard components are not sufficient, a different prosthesis or larger components can be used in conjunction with bone graft.[7,8] Custom components also can be ordered to better fit the anatomic constraints of revision. Historically, custom components were ordered to better fit the anatomic constraints of revision. The authors have used many stemmed talar components in the past with excellent results in an otherwise very difficult revision. Manufacturers have decreased production of stemmed and custom components due to increased restrictions and more stringent Food and Drug Administration