Current Concepts Regarding Total Ankle Replacement as a Viable Treatment Option for Advanced Ankle Arthritis: What You Need to Know

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KEYWORDS

• Ankle arthritis • Degenerative joint disease • Total ankle replacement
• Post traumatic ankle arthritis • Ankle arthroplasty

KEY POINTS

- The goal of any total ankle replacement (TAR) surgery is to improve function and decrease pain.
- Preoperative planning, including careful patient selection and exhaustive discussions with the patient regarding every aspect of the surgical treatment plan that includes possible complications and patient expectations regarding end results, is paramount to successful outcomes.
- Not all patients with end-stage ankle arthritis are candidates for a TAR procedure.
- Survivorship of TAR remains controversial; however, the newer generation, less constrained models are continuing to show improvement in reliability and functionality.
- TAR should no longer be considered a "fringe" or inferior procedure to ankle fusion but rather a viable alternative in the right patient population.

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INTRODUCTION

End-stage ankle arthritis can be an extremely debilitating pathology affecting a patient's ability to carry out activities of daily life when severe. Multiple mechanisms of action associated with the underlying cause of ankle arthritis exist, including but not limited to degenerative joint disease, posttraumatic changes, abnormal biomechanics, and ankle instability (Fig. 1). Traditionally, ankle arthrodesis has been the gold standard for surgical correction of ankle arthritis when conservative methods have failed. However, total ankle replacement (TAR), has only recently been accepted as a mainstream surgical option for end-stage ankle arthritis as improvement in postsurgical outcomes have been recognized. Newer generation devices have done a better job of incorporating ankle joint biomechanical principles in their less constrained designs, which has led to better surgical outcomes.

Much of the current literature suggests that TAR is no longer an inferior or fringe treatment for advanced ankle arthritis compared with ankle fusion, but rather a viable option for recalcitrant arthritic ankle pathology in the correct patient population.[1] In this article, current concepts associated with successful outcomes for TAR are discussed, with an emphasis on ankle joint anatomy and biomechanics, preoperative planning and patient selection, understanding pathomechanics (center of rotational angulation [CORA]) and soft tissue balancing, as well as the surgeon's learning curve.

ANKLE JOINT ANATOMY AND BIOMECHANICS

Much of the discussion regarding ankle joint anatomy and biomechanics as it relates to TAR center around the notion of triplanar movement and coupled motion, which has explained the failures in first-generation and second-generation total ankle devices. The earlier generation device's inability to account for triplanar rotational components of the tibiotalar joint, as well as relying on more constrained constructs, contributed to poor outcomes and an idea of inferiority to the gold standard ankle arthrodesis. However, newer models of TAR seem to have recognized this previous flaw, and adjustments have been made to accommodate biomechanical function.

The tibiotalar joint is stabilized by 2 ligamentous complexes. Laterally, the joint houses 3 ligamentous structures, including the anteroinferior tibiofibular ligament, the postero-inferior tibiofibular ligament, and the interosseous tibiofibular ligament, which is a continuation of the interosseous membrane. This structure, known as the lateral collateral ligament complex of the ankle, acts to allow the distal tibia and fibula to function as one unit when adapting to changes in ground reactive forces being applied. Medially, the ankle joint is stabilized by the deltoid ligament, with both

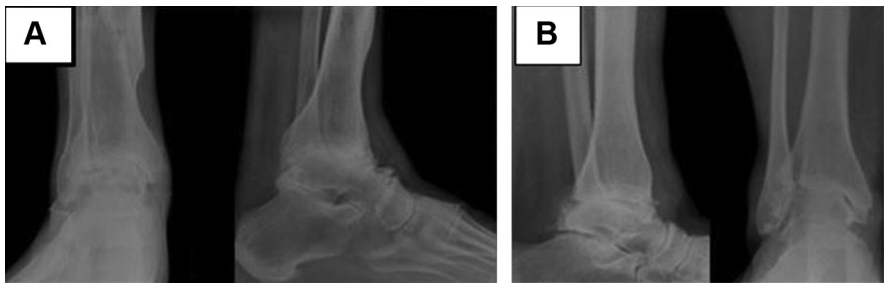

Fig. 1. Anteroposterior and lateral view of posttraumatic degenerative joint disease of the ankle (*A*). Anteroposterior and lateral views of primary osteoarthritis to the ankle (*B*).