The Salvage of Failed Total Ankle Arthroplasty with Conversion to Ankle or Extended Hindfoot Fusion: Results and Techniques for Managing Massive Talar Bone Defects

Presenting:

Mark Jacob Berkowitz, MD
Tampa, Florida

Additional Authors:
Arthur Walling, III, MD
Roy W. Sanders, MD
Michael P. Clare, MD

Summary:
The current study reports our experience, techniques, and complications encountered treating cases of failed total ankle arthroplasty with conversion to ankle and extended hindfoot arthrodesis using internal fixation and massive structural bone graft.

Introduction:
When revision total ankle arthroplasty (TAA) is not possible or practical, the treatment of failed TAA may require either isolated ankle fusion or combined ankle and subtalar fusion (extended hindfoot fusion). These cases frequently present difficult technical challenges in part due to the significant bone void remaining after removal of the total ankle implants. The current study presents our experience with salvage of failed TAA to fusion using internal fixation. We also describe strategies for addressing large talar bone defects, including the use of femoral head allograft prepared with acetabular reamers.

Materials and Methods:
The surgical case logs were evaluated and all cases involving TAA’s from 1999 until 2009 were identified. All patients undergoing removal of a failed TAA and conversion to either ankle or extended hindfoot fusion were included. The charts and radiographs of these patients were then retrospectively reviewed. Standard demographic data was collected. Additional data points included time from primary TAA, the type of failed TAA, the type of implants used for fusion, number of joints fused, and type of bone graft used. All complications associated with the fusion procedure were also recorded. Both pre- and post-operative outcome instruments were also recorded when available including the SF-36, AOFAS Ankle-Hindfoot Score, and the Maryland Foot Score.

Results:
Twenty-four patients underwent conversion of a failed TAA to fusion. The average age was 61.7 (40-82) years. The average time from primary TAA was 52.2 (7-192) months. Follow-up averaged 49.5 (6-115) months. Explanted total ankles included 15 Agility, 7 S.T.A.R, and 2 Buechel-Pappas models. Twelve total ankles were converted to isolated ankle fusions and twelve converted to extended hindfoot fusions. The most common form of internal fixation was the anterior plate (15), followed by an intramedullary nail (6), and a combined plate/nail construct (3). Large cannulated screws were also employed in twelve patients. All patients received some form of bone graft. Twenty-three subjects required use of structural allografts, including 11 fresh-frozen femoral head allografts prepared with acetabular reamers for treatment of large bone defects at the arthrodesis site. Fourteen (58%) patients experienced complications, including 3 subtalar nonunions, 1 ankle nonunion, two deep infections, and one case of ischemic gangrene requiring transtibial amputation. All cases excluding the amputation eventually achieved successful union. Average preoperative SF-36, AOFAS Ankle-AHS (0-100), and Maryland Foot Scores (0-100) were 34.7, 49.2, and 57.5 respectively. Average postoperative scores were 37.4, 65.4, and 68 for these same surveys respectively.
Conclusion:
The current study suggests that the majority of failed total ankles that are not amenable to revision can be successfully converted to either ankle or extended hindfoot fusion using massive structural bone grafting and aggressive internal fixation. However, these are technically challenging procedures with a substantial overall complication rate, particularly nonunion. Additionally, the outcome scores for these patients remain depressed suggesting persistent deficits in overall function despite successful union.