

Clinical and radiographic outcomes after hindfoot and ankle arthrodesis using cellular bone allograft augmentation

ABSTRACT

Introduction: Nonunion after ankle or hindfoot arthrodesis is associated with poor outcomes. Cellular bone allograft is an alternative to autograft for use in these procedures. The purpose of this study was to prospectively evaluate the efficacy and safety of cellular bone allograft use in hindfoot and ankle arthrodesis procedures.

Methods: 14 patients undergoing hindfoot or ankle arthrodesis supplemented with cellular bone allograft were prospectively enrolled. Computed tomography (CT) scans were obtained postoperatively at set timepoints and reviewed by three fellowship trained foot and ankle surgeons as well as one musculoskeletal radiologist. Primary outcome was CT verified union, defined as >25% of joint surface. Secondary outcomes were patient reported outcome measures, including Foot and Ankle Activity Measures -Activities of Daily Living- (FAAM ADL) scores and AOFAS hindfoot scores. Complications were recorded and revision procedures offered as indicated.

Results: CT verified union rate during the study period was 76.7% (23/30 joints). Union was 100% for the ankle joint (2/2), 50% for the talonavicular joint (5/10), 100% for the calcaneocuboid joint (8/8), and 80.0% for the subtalar joint (8/10). FAAM-ADL scores significantly improved across all timepoints (53.5 +/-18.9 preop, 61.1 +/- 23.8 3 months, 73.3 +/- 20.9 6 months, 80.7 +/- 18.7 1 year, $p = 0.006$), as did AOFAS hindfoot scores (48.9 +/-12.9 preop, 64.7 +/- 13.4 3 months, 69.4 +/- 21.9 6 months, 79.9 +/- 12.2 1 year, $p = 0.000$). 1 patient underwent revision fusion procedure and 1 patient underwent hardware removal during the study period. Interrater reliability in determination of radiographic union was only fair with overall $k = 0.40$.

Conclusion: Cellular bone allograft augmentation in hindfoot and ankle arthrodesis offers a safe alternative to autograft with comparable outcomes and without donor site morbidity. More study is needed in randomized controlled trials to compare to the gold standard of autograft.