

The Use of a Cellular Bone Allograft Containing Multipotent Adult Progenitor Cells for Foot and Ankle Arthrodeses

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Introduction/Purpose: Arthrodesis procedures are commonplace in foot and ankle surgery. Unfortunately, nonunion rates have been reported to be as high as 40%. To combat nonunion, autograft bone is often used but has been associated with morbidity and poor cell quality. Therefore, the use of cellular bone allograft (CBA) has become commonplace. Traditional CBAs are osteoconductive, osteoinductive and the cellular component is typically osteogenic but not angiogenic. The added property of angiogenesis may be beneficial in achieving fusion. The purpose of this study was to determine the efficacy of a CBA composed of MAPC-class cells that have both osteogenic and angiogenic properties.

Methods: The CBA (map3, RTI Surgical, Alachua, FL) was used in 41 distinct foot and ankle arthrodesis sites in 37 consecutive patients with a mean age of 52 years (range, 19-88). In all cases the graft was interposed between the prepared bone surfaces prior to hardware placement. All patients were followed until fusion occurred or a revision procedure was performed in cases of nonunion. Successful fusion required >50% osseous bridging on CT scan and the presence of bridging bone without signs of nonunion on plain radiographs. Additionally, successful fusion required resolution of preoperative symptoms and maintenance of fixation across all treated joints.

Results: Overall, fusion was achieved in 88% (36/41) arthrodesis sites. There were 11 patients/sites of previous nonunion. In these revision cases, the fusion rate was 82% (9/11). There were no complications attributed to the use of map3.

Conclusion: Fusion rates using map3 were higher than or comparable to fusion rates with autograft that have been reported in the recent literature. Map3 was a safe and effective graft material to achieve fusion and may provide an effective autograft replacement for foot and/or ankle arthrodeses.

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