

Our Technique	Hypothesis for Failure	Rationale for Our Technique	Results from Our Experience <sup>1</sup>
Intramedullary marrow clearance	Rejection/Resorption <sup>7</sup> : Cellular marrow in allografts, although sterilized by irradiation, may still be an immunological cause for graft rejection, resorption or even higher infection rates.	Curets and Intramedullary reamers are used to clear the marrow contents without reaming away the structural endosteal bone or altering the integrity of the allograft	Overall allograft survival: 84.8% No resorption or graft rejection was seen in our series.
Antiseptic triple wash • povidone iodine/saline solution • hydrogen peroxide • bacitracin saline solution	Infection: Allografts, even after irradiation, may act as vectors for microbial organisms. Marrow fat droplets that are subject to treatment with freezing, irradiation etc are nonviable and may add to infection potential if retained	This serial wash technique utilizes 3 discrete antiseptic modalities and has been used historically at our institution with low rates of allograft infection	Infection rates: 8.7% (up to 17% reported in literature)
Intramedullary antibiotic cement	Mechanical: Inadequate junctional healing and revascularization across the ends of the allograft leading to resorption may lead to fatigue failures or graft fractures.	Mechanical failures are extremely challenging to salvage. A mantle of antibiotic-cement pressurized into the majority of the intramedullary cavity of the allograft adds mechanical as well as antimicrobial properties to the construct.	Graft Fractures: 4.3% (7 to 30% reported in literature)
Junctional cancellous autograft	Nonunion <sup>8</sup> : Allografts have poor intrinsic healing potential which can be made worse following irradiation. Patients undergoing adjuvant local and systemic therapies for their malignancies have further altered healing potential and immune status affecting their host bone.	While a large structural allograft on its own has only osteoconductive properties, the addition of autograft cancellous bone adds to the osteogenic and osteoinductive properties at the allograft-host bone junctions.	Nonunion: 6.5% (15 to 55% reported in literature)
Compression plate fixation	Motion across osteotomy sites resulting from structural instability leads to nonunion, more frequently in diaphyseal junctions, and fractures	We achieve serial dynamic compression across junctions with dual plating for lower extremity reconstructions to provide additional stability and reduce hardware or implant failures	No plate or screw breakages were reported in our series.