

**Δ Reamer-Irrigator-Aspirator (RIA) versus Autogenous Iliac Crest Bone Graft (AICBG) for the Treatment of Nonunions: A Multicenter Randomized Trial**

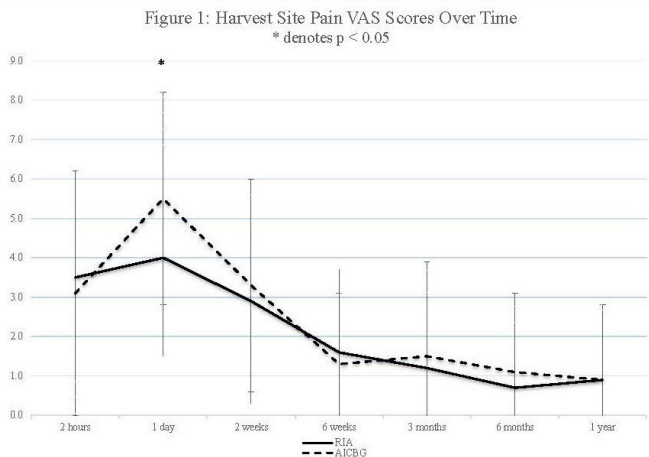
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**Purpose:** Autogenous iliac crest bone graft (AICBG) remains the current gold standard of care for nonunions and bone defects. There has been significant interest in the use of the reamer-irrigator-aspirator (RIA) for harvesting bone graft from the intramedullary canal with potential benefits cited including decreased pain, a lower rate of harvest site complications, larger graft volumes, and potential biologic superiority. However, prospective comparison to AICBG has been limited. We performed a multicenter, randomized control trial (7 Level I trauma centers) of AICBG versus RIA bone graft for the treatment of long bone nonunions. We hypothesized that RIA bone graft would demonstrate a clinically significant reduction in postoperative pain and harvest site complications, while maintaining equivalent union rates.

**Methods:** Patients aged 18-65 years with a long bone nonunion or bone defect requiring bone grafting were eligible for the study. Patients were randomized to receive either RIA bone graft or AICBG for the treatment of their nonunion. Our primary outcome was the visual analog scale (VAS) score for pain at the harvest site. Secondary outcomes were union rates, functional outcomes, complications, reoperations and graft volume obtained.

**Results:** 93 patients were randomized over a 9-year period (RIA = 44 patients, AICBG = 49 patients). Harvest site pain was significantly lower in the RIA group versus the AICBG group at 1 day post-surgery, but equivalent at all other time points (see Figure 1). There was no difference in radiographic union rates at 1 year (RIA = 76%, AICBG = 63%), reoperation rates for nonunion (RIA = 17%, AICBG = 14%), overall reoperation rate (RIA = 26%, AICBG = 22%), number of major complications (RIA = 14, AICBG = 15) or functional outcomes. Complications at the graft harvest site were rare in both groups (RIA = 2, AICBG = 2) and overall minor. Graft volume obtained was significantly higher in the RIA group vs the AICBG group (RIA = 37.8 mL, AICBG = 19.3 mL, P<0.001).

**Conclusion:** The use of RIA bone graft reduces early harvest site pain and results in larger volumes of graft obtained relative to AICBG, while resulting in equivalent union rates, complications, and functional outcome. Both graft options result in a high rate of success for the treatment of nonunions or bone defects with a low rate of harvest site complications.



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