

## Autogenous Iliac Crest Bone Grafting Revisited: The Most Reliable Solution for Tibial Nonunions

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**Purpose:** Tibial nonunion remains a considerable burden for patients and the surgeons who treat them. The purpose of this study was to evaluate the efficacy of autogenous iliac crest bone graft in the treatment of tibial shaft nonunion.

**Methods:** 46 patients who underwent autogenous bone graft in the treatment of tibial shaft fracture nonunion were identified from a trauma research registry. All patients presented with persistent nonunion and were indicated for autogenous iliac crest bone grafting (ICBG). The operative approaches used were posterolateral (PL), anterolateral (AL), or direct medial (DM). Surgical treatment was similar and consisted of bone grafting with or without supplemental fixation. All patients adhered to a standardized postoperative protocol requiring non-weight-bearing for 6 weeks and then partial weight-bearing until radiographic healing. Demographic data were recorded at baseline encounters and patients were scheduled for follow-up at standard intervals for a minimum of 1 year. Achieving union, time to union, postoperative pain assessed via the visual analog scale (VAS), and functional outcomes via the Short Musculoskeletal Function Assessment (SMFA) were evaluated for the entire group and then compared based on the surgical approach used for graft implantation.

**Results:** The mean age was 42.8 years (range, 19-71). 34 patients (73.9%) had initially sustained open fractures. 39% of patients had intramedullary nails, 39% had plate fixation, and 22% were definitively treated with dynamic external fixation at their initial surgery. The mean follow-up time was  $19.9 \pm 13.4$  months. Surgical approach included 50% PL, 17% AL, and 33% DM. Bony union was achieved by 96% (44/46) of patients, including 3 patients who underwent secondary ICBG. The mean time to union for all patients was  $7.9 \pm 5.4$  months and there was no significant difference among the 3 groups (PL = 7.7 months, AL = 8.8 months, DM = 7.9 months;  $P = 0.88$ ). Pain scores improved 49% from preoperative values (mean =  $4.9 \pm 3.6$ ;  $P = 0.89$ ) to final follow-up values (mean =  $2.5 \pm 2.9$ ;  $P = 0.55$ ). Mean SMFA at final follow-up was similar among all 3 groups across all indices of the SMFA ( $P = 0.29$ ; Figure 1). Overall, there was a 17.4% complication rate at the nonunion site and this was similar among groups. In addition, there were three iliac donor site complications (6.5%), one hematoma, and two abscesses requiring wash-out.

**Conclusion:** Autogenous iliac crest bone grafting is the most effective intervention in the management of persistent tibial nonunions regardless of approach. This treatment paradigm is not without risks, but has proven to be highly efficacious and remains the gold standard for complex tibial nonunions.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.

**Figure 1.** SMFA function and bothersome indices at baseline versus final follow-up based on surgical approach.

