

## **Autograft versus Allograft in the Treatment of Long Bone Nonunions: A Multicenter Study**

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**Purpose:** Nonunion of long bone fractures remains a challenge for orthopaedic surgeons with a prevalence of up to 20%. The current dogma on the use of bone grafting for long bone nonunion postulates that autograft is superior to allograft. Common sources of autograft include iliac crest bone graft and reamer-irrigator-aspirator (RIA). Concerns of donor site morbidity, blood loss, and pain have led to a growing interest in the use of allograft. The primary purpose of this study is to compare clinical outcomes in patients who received autograft, allograft, or both during long bone nonunion surgery.

**Methods:** This was a multicenter retrospective review of adults with long bone nonunions that were treated with either autograft, allograft, or both. Autograft included iliac crest, RIA, and local graft. Patients who received bone morphogenetic protein (BMP) or with follow-up <180 days were excluded. Patient demographics, injury characteristics, surgical details, complications, and outcomes were collected. The primary outcome was the rate of persistent nonunion. Secondary outcomes were rates of overall complication, reoperations, and length of stay (LOS).

**Results:** Overall, 811 patients (humerus = 221, femur = 246, tibia = 344) met our inclusion criteria with a median follow-up time of 347 days. 88 patients received allograft, 597 received autograft, and 126 patients received both. Injury characteristics showed that the allograft group had fewer segmental gap defects (3.4% vs 17.3% vs 16.7%;  $P = 0.0007$ ), and fewer cases of infected nonunion (6.8% vs 13.6% vs 17.5%;  $P = 0.046$ ). The allograft group had the lowest rate of persistent nonunion compared to the autograft group and the combined group (6.82% vs 15.6% vs 19.1%;  $P = 0.021$ ). The allograft group had the lowest overall complication rate (27.3% vs 42.6% vs 38.1%). The allograft group had lower LOS ( $P = 0.0001$ ) and a lower readmission rate (9.1% vs 23.2% vs 20.1%;  $P = 0.064$ ).

**Conclusion:** In this large retrospective review, we found higher rates of persistent nonunion, all complications, readmission, and increased LOS in patients receiving autograft. Although these data are subject to susceptibility bias between the cohorts, our results suggest that allograft may be a good option in nonunion surgery. A randomized controlled study would be valuable in further guiding clinical decision-making regarding graft selection.