

## Technical Considerations and Early Results of Magnetic Compressive Intramedullary Nailing for Tibial and Femoral Shaft Nonunions

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**Purpose:** Tibial and femoral shaft fractures nonunions are relatively common complications following surgical fixation. However, few studies have evaluated the outcomes and complications of following treatment with compressive magnetic intramedullary nailing (mIMN). This study aims to report early results of compressive mIMN for femoral and tibial shaft nonunions.

**Methods:** We conducted a retrospective case series at a Level I trauma center in patients undergoing compressive mIMN of their femoral or tibia nonunion over 5 years (2017-2021). Patient demographics, injury characteristics, treatment methods, radiographic union, and postoperative complications were recorded.

**Results:** 13 patients undergoing mIMN of the tibia or femur were identified. Eight patients, with a mean age of  $38 \pm 15$  years and mean follow-up of  $16.5 \pm 8.5$  months, underwent compressive mIMN. Five patients had open fractures at the initial injury, and each underwent prior fixation procedures prior to undergoing mIMN. 6 of 8 patients went on to union, with 1 patient going on to an above-knee amputation for infection and another having persistent nonunion of a segmental fracture. The nail length used ranged from 305 to 375 mm. Four patients received biological augments such as autograft, cancellous allograft, or tricalcium phosphate. Bone transport was performed on another patient. 3 of 8 patients encountered a complication. One patient had a subsequent infection and underwent above-knee amputation, and another underwent subsequent reoperation for a nail recharge.

**Conclusion:** Compressive magnetic intramedullary nails are a viable solution for tibial and femoral shaft nonunions, particularly in the setting of previously well-fixed fractures and those at risk of recalcitrant nonunion. However, comparative and prospective studies looking at union rates and secondary procedures are needed to define their role more clearly in treatment and assure their safety, given recent concerns regarding osteolysis at the nail modular junction.