

## Distal Tibial Nonunion Treated with a Tibial Nail Using Distal Angular Stable Locking Screws: Reliable and Patient-Friendly

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**Purpose:** Distal tibial nonunion after failed primary surgical treatment of distal tibial fractures is a challenging problem in which the best surgical treatment is not well established. Stability of the construct is a key principle for successful outcome. Our hypothesis is that intramedullary nailing using distal angle-stable screws is an effective operative technique with a low rate of soft-tissue complications allowing immediate weight bearing.

**Methods:** This is a case series of consecutively collected patients with distal tibial nonunion treated by a single surgeon with the expert tibial nail during the period from 2010 to 2019. Patients were allowed to immediately fully weight-bear. Failure is defined as need for revision surgery to obtain bridging callus. Postoperative radiographs and postoperative complications were recorded.

**Results:** 18 patients met the criteria, of whom 7 patients could be analyzed (3 F, 14 M). Average age was 46 years (range, 22-66). Among initial injuries were 11 open fractures and 4 had involvement of the pilon. 12 patients were primarily treated with plates, 3 with nails, and 2 with external fixation. 8 developed infection. Nonunion level was between 2 and 10 cm. Average follow-up was 19 months (range, 6-62 months). Full weight bearing was possible after an average time of 2 weeks (range, 3 days-5 weeks). Radiographic bridging callus was achieved in all patients at an average time of 16 weeks (range, 12-36 weeks). Grafts were applied in 9 cases, of which 8 autograft and 2 allograft bone chips were impregnated with vancomycin. There were no secondary displacements. 3 needed removal of the nail due to continuing infection, 1 correction of malrotation, and 1 addition of autograft.

**Conclusion:** The use of an expert tibial nail with distal angular stable locking screws in a distal tibial nonunion is a very effective method to achieve bony union even in periarticular located tibial nonunions and in the presence of an active infection. The high stability of the construct allows immediate weight bearing with minimal risk for secondary displacement.

