

## **Tibial Bone Transport with a Single Implant All-Internal Bone Transport Nail: A Case Series with 12-Month Follow-up**

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**Purpose:** Historically, bone transport via circular external fixation has provided a treatment strategy for addressing critical bone defects in tibia fractures, although due to poor tolerance and a high complication profile, alternative strategies have been sought. The implementation of a single implant all-internal magnet-driven bone transport intramedullary nail (BT Nail; NuVasive Specialized Orthopaedics, Inc) has recently been introduced as an alternative treatment method versus circular external fixation. The authors present the largest known case series utilizing this implant to date.

**Methods:** All tibial BT Nails performed by the authors were included. All patients underwent bifocal transport (3 antegrade, 1 retrograde). Transport was initiated following a 7 to 14-day latency period. Transport rate varied between 0.66 mm/day and 0.99 mm/day and was adjusted relative to radiographic appearance of the regenerate. Once transport was complete, all patients underwent debridement and bone grafting of the docking site and conversion to a standard trauma intramedullary nail. Patients were allowed foot-flat weightbearing during the transport phase through nail exchange and advanced to weightbearing as tolerated after noting callus formation at the docking site.

**Results:** Four patients (3 males, 1 female) underwent tibial bone transport for diaphyseal defects (3 traumatic, 1 post-infectious) using the BT Nail. Average patient age was 27 years (range, 19-44 years). Average defect length was 72 mm (range, 50-128 mm). Patients were followed for a minimum of 12 months (average 16.18 months, range 12.9-22.8 months). Three patients united at the docking site uneventfully with an average healing time of 43.53 weeks (range, 29.29-57.43 weeks). One case of asymptomatic docking site nonunion was noted. Bone healing index for the united fractures averaged 41.4 days/cm (range, 31.41-54.82 days/cm). One patient undergoing treatment of a 128-mm defect required 1 interim surgical procedure for intercalary segment interlocking screw exchange and nail recharge as the defect surpassed the standard transport capacity of the nail. No evidence of peri-implant osteolysis was noted. One patient sustained a superficial wound dehiscence and suture abscess that was managed with oral antibiotics. One patient lacked 5° of full knee extension at final follow-up while the remainder had full symmetric knee range of motion. All patients progressed to ambulation without assistance.

**Conclusion:** A single implant all-internal bone transport intramedullary nail demonstrates the potential to be a reliable tool in the treatment of segmental tibial bone defects without the need for circular external fixation.