

Tibiototalcaneal Arthrodesis via a Nitinol Containing Intramedullary Nail: A Case Series

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Introduction/Purpose: Tibiototalcaneal (TTC) arthrodesis is a common procedure used in the management of foot and ankle pathologies. TTC fusions are frequently performed in patients with limited bone stock and poor vascular status. Adequate compression at the arthrodesis site is vital to successful fusion as even small amounts of bone resorption greatly increase nonunion risk. A recently designed hindfoot nail contains a built in nickel titanium alloy (nitinol) that has pseudoelastic properties which maintains compression across joint surfaces in the setting of bone resorption. The authors present a case series of patients who were managed with this nitinol containing intramedullary hindfoot nail system.

Methods: Patients treated by one board certified orthopaedic foot and ankle surgeon who were managed with the nitinol containing hindfoot nailing system were retrospectively reviewed over a two year span. Electronic medical records were reviewed to collect demographic information and details regarding the patient's procedure. Operative specifics collected included the data of the procedure and the preoperative diagnosis. Records were reviewed postoperatively as well to document the incidence of postoperative complications and functional outcomes. Proximal migration of the distal interlocking screw on lateral radiographs were measured in a standardized fashion at two, six, and twelve weeks to objectively assess additional compression obtained through the nitinol nailing system.

Results: Eight patients were included in the case series with an average follow up time of 7 months postoperative (minimum of 4 months for one patient). The most common preoperative diagnosis was posttraumatic arthritis ($n = 4$). One patient suffered from wound dehiscence postoperatively that required operative intervention within the first three months – this patient's wound healed by six months with no further complications. All patients were cleared for full weight bearing and activities as tolerated by six months, except only had four months of follow up available. The compression obtained through this nailing system increased at each follow up for all patients. The average compression obtained was 2.9 mm at two weeks, 3.8mm at six weeks, and 4.4 mm at twelve weeks.

Conclusion: Tibiototalcaneal arthrodesis can be an excellent procedure that provides significant pain relief and restores function. The patients in this case series all had excellent results with only one postoperative complication that ultimately did not result in any functional deficits. Furthermore, patients all demonstrated increased compression at each follow up radiographs which demonstrates the sustained compression obtained at the arthrodesis site through this hindfoot nail system. Further prospective work with a larger patient cohort is warranted to determine if this nailing system is superior to other TTC hindfoot nails.

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