

Intramedullary Fibular Strut Grafting For Revision IM Rodding

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Purpose

To evaluate the efficacy of an intramedullary (IM) fibular strut graft during revision surgery for failed tibio-talo-calcaneal (TTC) fusions using an intramedullary nail during the index procedure.

Literature Review

Tibio-talo-calcaneal (TTC) fusion has been well established as an effective means of treatment for severe post-traumatic arthritis, significant acquired deformity, and limb salvage in the neuropathic and diabetic populations. Intramedullary (IM) nails have been shown to be a safe and effective means of fixation for joint fusions in the lower extremity (1-3). Unfortunately, interlocking IM nail fixation failure has been seen in approximately 5% of cases involving the lower extremity (4). Using the fibula as an IM strut graft has gained popularity as a revision for failed IM nailing. This was first described by Lexer in 1906 using a cadaveric fibula in 1915 (5). Albee then modified Lexer's original method by harvesting the fibula from the ipsilateral extremity (6). More recently, several studies have been published showing good results using autogenous fibular strut grafts for TTC fusions. Jeong et al. performed a TTC fusion with autogenous intramedullary fibular graft in combination with external fixation in the revision of a failed Charcot reconstruction case (7). Ebraheim et al. had successful results in four patient who underwent TTC fusions using IM fibular grafts for the treatment of severe post-traumatic ankle arthritis following pilon fractures (8). Successful autogenous intramedullary fibular graft with supplemental internal fixation has been accomplished to revise infected TTC nails in two cases reported by Monaco et al (9). And a case series performed by Shah et al. with 16 patients showed 81.2% union rate using fibular intramedullary nailing with supplemental fixation (10).

Case Series

Four patients, 3 males and 1 female, with an average age of 62.3 years, previously diagnosed with peripheral neuropathy (1 DM, 3 idiopathic) were included in this study. Each patient underwent intramedullary fibular strut grafting, with additional internal and/or external fixation, to revise a failed TTC fusion with IM nail. Fifty percent of subjects included in the present series had a history of Charcot neuroarthropathy at the ankle joint. All four subjects included had a normal pre-operative Vitamin D level (>20ng/ml). Successful outcome was defined by joint consolidation on CT and return to weightbearing in over-the-counter shoe gear.



Results

All four subjects went on to osseous fusion of the ankle joint. Three subjects went on to osseous fusion of the subtalar joint. Average time to weightbearing after surgery was 120.5 days (+/- 39.5). Three complications were noted during follow-up. One subject experienced asymptomatic pseudoarthrosis of the subtalar joint. One subject developed a superficial dehiscence, which resolved with local wound care. One subject developed a superficial infection, which was treated with oral antibiotics and resolved without complications. No revisions were necessary within the study group as of 12-month follow-up visits.

Analysis/Discussion

Non-union following IM nailing is a common complication in the neuropathic population, and revision can be difficult. Intramedullary fibular strut grafting appears to be a successful revision method for failed TTC fusion with IM nail, with acceptable fusion rates within the ankle and subtalar joints and excellent results in regards to returning patients to weightbearing in over-the-counter shoe gear.

References

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