

Tibiotalar calcaneal arthrodesis using proximal femoral nail- A report of two cases from a low-resource setting.

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Abstract

Tibiotalar-calcaneal arthrodesis is reserved as a salvage procedure for acute and chronic ankle pathologies. It can be performed using external or internal fixation. Among internal fixation techniques, hind foot nails are popular as they are more stable and minimally invasive. But hind foot nails are expensive and it is not available in all centres. We describe two patients with two different chronic ankle pathologies treated with ankle arthrodesis using a proximal femoral nail in a low-resource setting in 2015. In that period, hind foot nails were not available in Sri Lanka. Both patients recovered uneventfully and started to work after a long waiting period. The proximal femoral nail is one of the possible options to fuse the ankle in a low-resource setting.

Keywords:

Ankle arthrodesis, neglected ankle fracture, proximal femoral nail ante rotation

Introduction

Tibiotalar-calcaneal arthrodesis (TTCA) is a time-tested procedure. It has been performed using many devices. Recently, nails have become popular as they provide increased stability and a low infection rate. But it is expensive. In needy situations, alternative implants for the hind foot nails might be challenging. We would like to present two cases of TTCA using proximal femoral nails with good results. This case report has been reported according to the CARE guidelines (1).

Case-01

A 34-year-old ex-serviceman presented with a painfully deformed right ankle for a 2-year duration following an

untreated chronic ankle fracture. He had a road traffic accident and developed an open ankle fracture (Gustillo-Anderson classification II). Which was initially managed with an ankle-spanning external fixator, and he lost the follow-up. He was treated by traditional bone-settlers 02 years ago. The deformity and disability were worsening over time (Figure 1). His visual analogue score (VAS) was 9 out of 10, and his AOFAS score was 4 on presentation. Tibiotalar calcaneal fusion was planned and performed using a proximal femoral nail, as there was no available hind foot nail for arthrodesis in Sri Lanka (Figures 1C and D). The patient has been followed up since 2015, and he became asymptomatic in 07 months. Tibiotalar-calcaneal fusion was confirmed during the follow-up. The prominent implant on the heel was noticed, and the patient refused to adjust it, but he was happy with the outcome. (Figure 1F)



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Figure 1 shows pre-operative, immediate post-operative, and follow-up images of radiographs and a 3-year follow-up clinical photograph of patient 1. Figures 1A & 1B are pre-operative radiographs of the right ankle, which show deformity with a deformed talus, residual medial malleolus, lateral malleolus, and ankle subluxation. There was no distal articular part of the tibia visible in the radiographs. Figure 1C&D shows immediate post-operative images of the ankle after TTCA showing good position of the ankle, and the medial lateral malleoli were excised and used as a bone graft. Figures 1E and 1F show evidence of fusion at the tibiotalar-calcaneal joints and a proud implant at the sole. Figures 1G and 1H show clinical photographs at a two-year follow-up.

Case-02

A 64-year-old female presented with a severely painful, swollen right ankle for a 5-year period. Ankle pain, swelling, and deformity are worsening over time. She has rheumatoid arthritis, causing multiple joint involvements, including the right ankle (Figures 2A and B). Her VAS was 7 to 10 and varied with disease activity and exertion. Her AOFAS was 4 on presentation. She had undergone tibiotalar calcaneal arthrodesis using a proximal femoral nail due to the unavailability of a hind foot nail in Sri Lanka (Figures 2C and D). The patient

has been followed up since 2015, and she gradually became asymptomatic in 07 months. During the rest of the follow-up, she was asymptomatic, and ankle bony fusion was confirmed during the subsequent visits.

Discussion

The goal of tibiotalar calcaneal arthrodesis (TTCA) is to create a painless, stable, and plantigrade foot (2, 3). Tibiotalar-calcaneal arthrodesis (TTCA) has been performed with several implants since 1906, starting with a boiled allograft (3). Implants that had been used for TTCA were boiled allografts, Steinmann pins, external fixators, plates, and screws (3). Modern intramedullary nails have multidirectional screws to hold the cancellous bones in the foot better and show good stability against torsional forces (2). Intramedullary nails have been shown to be superior to multidirectional screws as they are load-sharing devices and early mobilization is possible (2, 3).

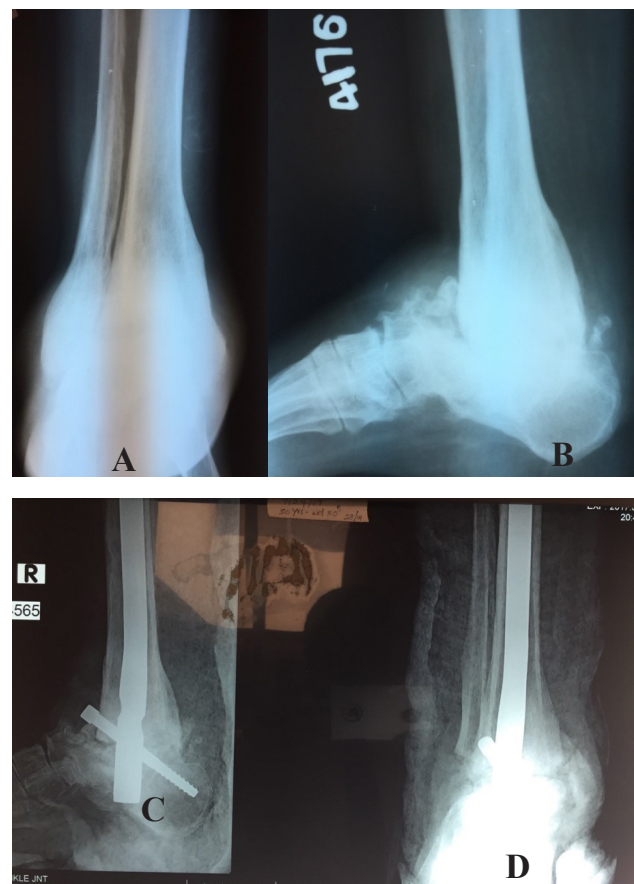




Figure 2 shows a collection of images of radiographs and clinical photographs of the patient 2. Figures 2A and 2B show pre-operative radiographs of the ankle with severe degeneration of the ankle, complete lysis of the talus, and severe secondary osteoarthritis. Figure 2C&D shows immediate post-operative radiographs with good reduction and compression at the fusion sites. Figure 2E shows good fusion at 02 years. Figures 2F&G show clinical photographs at 02 years with a painless plantigrade foot.

The retrograde hind foot nails are expensive, and they are not available in every center. In Sri Lanka, it was introduced in 2016 (Matrix-Meditec ankle arthrodesis nail). Before the arrival of these nails, TTCA's were performed with other means, mainly using plates and screws. These implants were load-bearing implants, which need non-weight-bearing mobilization after the surgery, unlike nails, and they carry a high risk of wound-related complications.

These patients with two different pathologies involving tibiotalar and subtalar joints were well fused with short PFN, and their functional scores were improved. There are two case reports available in the literature. In those Charcot ankle arthropathy cases, retrograde femoral nails (4) and expert tibial nails (2) were used as

implants. There is an original article about TTCA using retrograde femoral nails that showed good outcomes in patients with osteoarthritis, rheumatoid arthritis, and secondary arthritis following traumatic avascular necrosis of the talus. They concluded that retrograde femoral nails are cost-effective and produce results similar to those of other intramedullary devices (5). There is another outcome study carried out by Powers *et al.* on TTCA using femoral nails, showing similar outcomes and limb salvage rates compared to the other methods available (6).

There are no reports available in the literature on TTCA using proximal femoral nails. The proximal femoral nail is wider than the tibial and other femoral nails, and their screws are wider and longer too. The proximal nail has provided a stable fixation, and these two patients have achieved fusion. Proximal femoral nails may be a good choice for TTCA in low-resource settings.

Conclusion

Tibiotalar-calcaneal arthrodesis is a time-tested procedure. Intramedullary hind foot nails are better than other modes of fusion, considering minimal invasiveness and post-operative infections. Proximal femoral nails are a viable alternative to intramedullary hind foot nails for needy patients, especially in developing countries.

References

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