

Statement of Purpose

We present a unique case of a blind loop procedure of superficial peroneal nerve to deep peroneal nerve via nerve conduit, and saphenous neurectomy to treat a painful midfoot nonunion.

Introduction

Revision after failed midfoot arthrodesis can lead to significant morbidity. Symptomatic nonunions are treated conservatively via injections, shoe modifications, bracing/casting, and bone stimulators¹. When conservative treatment fails, a revision may be warranted. Nonunion revisions of the foot and ankle are treated with bone autograft or allograft and increased fixation with possible internal bone stimulators¹. When multiple midfoot revisions fail, there is limited research to suggest the next best treatment. Small case series have shown pain relief for treatment of midfoot and tarsometatarsal joint pain using neurectomy².

Case Report

A 46-year-old healthy female initially underwent first tarsometatarsal joint (TMTJ) arthrodesis and akin of right foot for bunion deformity. She had continued pain and swelling with inability to ambulate in regular shoe gear. She was diagnosed with a malpositioned and non-united 1st TMTJ. She subsequently underwent two additional revision surgeries including use of allograft and subsequently autograft harvested from the iliac crest and additional metatarsal phalangeal joint arthrodesis. Approximately 5.5 months later the patient began experiencing medial dorsal cutaneous neuritis as well as symptomatic nonunion. Conservative management including Gabapentin, Cymbalta, topical compound, a short course of opioids, and prednisone taper failed to improve the patient's pain. Sequential diagnostic injection to the deep peroneal nerve (DPN), superficial peroneal nerve (SPN) and saphenous nerves (SN) relieved the patient's pain and she was able to ambulate without pain. She was consented to undergo hardware removal, revision of nonunion of first TMTJ with application of injectable bone graft substitute, anastomosis of the DPN to SPN, and saphenous neurectomy.



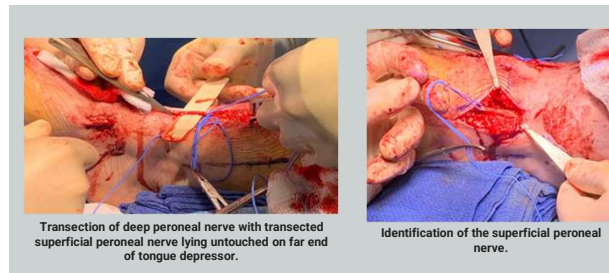
Left: post-operative incisions. Right: post-operative radiograph.

Procedure

The patient was placed on the operative table in the supine position. She was prepped and draped via standard technique. Added fixation was applied to the failed fusion site along with bone marrow stimulation.

Next, a 5 cm incision was made 4 cm above the level of the ankle overlying the course of the SPN. The SPN was identified and tagged with a vessel loop. A 6 cm incision was then made in the anterior distal leg just lateral to the tibial crest. The deep fascia and superior extensor retinaculum were sharply excised, exposing the deep peroneal nerve. The deep peroneal nerve was transected at the most distal aspect of the incision and passed to the lateral incision deep to the anterior muscle compartment. Next, the superficial peroneal nerve was transected distally and the nerves were anastomosed using an extracellular matrix nerve conduit and 8-0 nylon.

Lastly, attention was directed to the anterior medial aspect of the leg approximately 4 cm above the level of the ankle, where a 5 cm incision was made. The saphenous nerve was identified and transected distally. It was then buried in the deep posterior muscle group. A layered closure was then performed.



Transsection of deep peroneal nerve with transected superficial peroneal nerve lying untouched on far end of tongue depressor.

Identification of the superficial peroneal nerve.

Results

Pre-operatively, AOFAS score was 22 with VAS score of 10. VAS score improved to 0 after diagnostic block. Post-operative AOFAS and VAS scores improved to 95 and 0, respectively at 3 months and was maintained through 1 year follow-up.

Discussion

Revisions after failed midfoot fusions can be challenging. Recent research has shown promising results with deep peroneal nerve to superficial peroneal nerve anastomosis to alleviate foot pain³. We present a unique case that provides a revision option for multiple symptomatic failed tarsometatarsal fusions. The patient underwent revision fusion with increased hardware and bone graft, superficial peroneal to deep peroneal nerve anastomosis via nerve conduit, and saphenous neurectomy. This was performed to desensitize the dorsum of the foot, as this was the location of chronic neuritis. The patient's functional status was assessed using the American Orthopedic Foot and Ankle Score (AOFAS), which improved from 22 pre-operatively to 95 post-operatively. The patient's subjective pain was assessed via the Visual Analog Scale (VAS), which improved from 10 pre-operatively to 0 post-operatively. Overall, the patient was very satisfied with the results of the procedure and acknowledged pain relief along with improvements in functional status at 1 year follow-up.

Conclusion

We present a case report with novel technique for revision of multiple failed midfoot fusions. The patient was able to return to her original baseline function of daily activities in regular shoe gear with no pain and no restrictions.

References

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2. Blackledge DK, Masadeh SB, Lyons MC 2nd, Miller JM. A preliminary review of the use of deep peroneal neurectomy for the treatment of painful midtarsal and tarsometatarsal arthritis. *J Foot Ankle Surg*. 2012 Jul-Aug;51(4):464-7. doi: 10.1053/j.jfas.2012.02.011. Epub 2012 Mar 16. PMID: 22425071.
3. Bibbo, Christopher & Rodrigues-Colazzo, Edgardo & Finzen, Adam. (2018). Superficial Peroneal Nerve to Deep Peroneal Nerve Transfer With Allograft Conduit for Neuroma in Continuity. *Journal of Foot and Ankle Surgery*. 57. 514-517. 10.1053/j.jfas.2017.11.022.