

Prophylactic Sural Neurectomy with a Closed End Conduit Following Calcaneal Fractures: A Retrospective Case Study

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Statement of Purpose

The purpose of this study is to report on findings following the use of a prophylactic sural neurectomy with closed end conduit use following a calcaneus fracture.

Introduction

Calcaneal fractures are severe life-altering injuries caused by high-energy axial trauma, often a fall from a height. This debilitating injury pattern may cause patients to experience secondary complications such as soft tissue damage, compartment syndrome, peroneal tendon tears, neuromas, and nerve compression injuries.¹ Current literature focuses on the prevention and management of soft tissue wound complications. However, there is limited literature exploring the management of pain and neuritis following these high-impact injuries. To date, there is limited evidence on the use of prophylactic neurectomies in orthopedic settings.

Chronic pain following high-energy traumas is costly to the healthcare system and it has been reported that calcaneal fractures specifically, lead to the greatest amount of absenteeism from work in comparison to other fracture types. Current goals for the healthcare system focus on the reduction of opiate use and multimodal methods for pain management.²

This study aims to report on the postoperative outcomes of a patient who had a prophylactic sural neurectomy with a closed-end conduit during open reduction internal fixation of their calcaneal fracture.

Case Study

Patient is a 51 yr old male who fell from a height of 30 ft and was seen immediately at an Emergency Department at an outside facility. Patient has a history which is pertinent for tobacco use. It was determined that he sustained a closed highly comminuted and intra-articular calcaneus fracture to the right foot, following xrays and CT scan. Patient was treated with a Jones compressive dressing. Patient then presented to our clinic 10 days later. Upon evaluation, due to the intra-articular nature and severe comminuted nature of the fracture pattern the plan was for the patient to have a delta frame applied immediately with the plan for ORIF in the future.

Delta frame remained intact for 6 weeks prior definite surgery. At this time the patient had the delta frame removed, ORIF of calcaneus fracture and sural neurectomy with application of closed conduit and burial into muscle.

At 3 months following the sural neurectomy that patient reported 3/10 in pain which then improved to 2/10 in pain at 6 months following the surgery. At one year following the surgery the patient reports 1/10 in pain. On physical exam patient has decreased sensation along the sural nerve distribution to the foot with 10 gram monofilament.

Additionally, patient also reports that they are able to ambulate without pain and complete activities of daily living without limitation. Patient has been able to return to work as a labourer.

Results

The patient reported improved VAS scores at their 3-month, 6-months, and one-year post-operative visits and reports continued numbness along the distribution of the sural nerve, as expected following a sural neurectomy with closed-end conduit use. Additionally, patient had improvement in AOFAS hindfoot score from 5/100 preoperatively to 71/100 post operatively.

Discussion

Calcaneal fractures, especially those which are intra-articular and associated with comminution are associated with higher levels of pain postoperatively. Commonly, these fractures require the lateral extensile approach to surgically correct them, which is known to be related to higher levels of neuritis.

This case study highlights on the successful use of a prophylactic sural neurectomy with closed conduit use. The patient reported both improved VAS and AOFAS scores pre to post operatively.

More evidence would be needed to fully assess the use a prophylactic sural neurectomy following calcaneal fractures, especially related to the types of surgical incisions used.

Conclusion

Due to the high energy impact of calcaneal fractures, the incidence of chronic pain following the injury and surgical intervention is high. A prophylactic sural neurectomy with closed end conduit use is a viable treatment option that should be considered for the management of pain and prevention of opiate overuse with calcaneal fractures.

References

- Watson, T. S. (2007). Soft tissue complications following calcaneal fractures. *Foot and Ankle Clinics*, 12(1), 107–123. <https://doi.org/10.1016/j.fcl.2006.12.003>
- Simske, N. M., Hermelin, M. J., & Vallier, H. A. (2021). Impact of psychosocial and economic factors on functional outcomes after operative calcaneus fractures. *Journal of Orthopaedic Trauma*, 35(11). <https://doi.org/10.1097/bot.0000000000002082>
- O'Hara, N. N., Isaac, M., Slobogean, G. P., & Klazinga, N. S. (2020). The socioeconomic impact of orthopaedic trauma: A systematic review and meta-analysis. *PLOS ONE*, 15(1). <https://doi.org/10.1371/journal.pone.0227907>

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Figure 1.



Surgical dissection for sural neurectomy

Figure 2.



Application of closed end nerve conduit following sural neurectomy