Clinical evidence for a novel technique for failed decompression of sural nerve

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Abstract

The objective of this case study is to present clinical evidence for reset neurectomy, a novel technique for patients with pain from a non-transection nerve injury. Much of this case study correlates with, and reinforces the rational and surgical technique presented by, Eberlin et al.

These non-transectional nerve injuries present in the form of pain and sensory distribution with preservation of function. Based on history and physical exam, a local anesthetic block is performed proximal to the zone of injury and with successful pain mitigation warrants for surgery. Zone injury is defined as the site of injury where the nerve is injured based on diagnostic findings [1].

This retrospective study is aimed at understanding, diagnosing, and creating a treatment modality for failed nerve decompression.

Case Study

Our retrospective study includes 3 patients who underwent sural nerve reset neurectomies after single or multiple failed sural nerve decompressive surgeries. Pre-operative testing and analysis included nerve conduction velocity (NCV), electromyography (EMG) and local anesthetic block proximal to the zone of injury which resulted in pain relief which warranted surgery.

All conservative treatments, including physical therapy and pharmacotherapy, were exhausted with any symptomatic relief.

Preoperative nerve conduction velocity tests was performed in an inching fashion to assess the extent of damage to the nerve.

Intraoperative Images

Figure 1
- Incision was performed from the zone of injury to 5cm proximal to the injury

Figure 2
- Sural nerve was isolated from the scared tissue distally and healthy tissue proximally

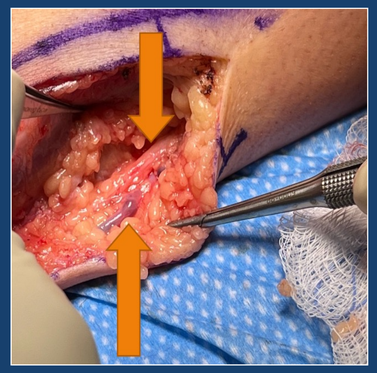

Figure 3
- The sural nerve was transected at the proximal incision site

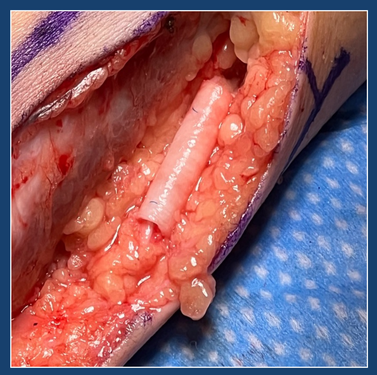

Figure 4
- A nerve matrix conduit/ allograft was placed between the nerve ends where the epineurium is sutured to the conduits

Case Study continued

The NCV and EMG studies findings were consistent with complex regional pain syndrome as well as entrapment of the distal sural nerve. Proximal block of the sural nerve resulted in near 100% pain relief for approximately 3 weeks.

Block of the superficial peroneal nerve at the level of the ankle resulted in about 30% pain relief for several days.

Surgically, incision was made from the zone of injury to 5 cm proximal to the injury.

Case Study continued

The sural nerve was transected 5cm proximal to the zone of injury. Nerve matrix conduit were placed in 2 patients and 1 allograft between the nerve ends and epineurium was sutured to conduits to act as channels for axonal growth and regeneration.

Conclusion

- We compared pre-operative findings and post-operative findings and noticed immediate relief post-surgically. Patients had nearly immediate relief from pain and expected dermatomal numbness in the sural nerve distribution.
- Patients were placed on multi-modal therapy including non-narcotic neuropathic pain medication to facilitate neurogenesis at the nerve matrix conduit
- These patients also worked with physical therapy to help with gait training, axonal regeneration, and overall improved range of motion
- Postoperatively all patients reported 0/10 pain as their sensation is diminished but not gone and function is preserved
- 12 months after surgery - exhibited protective sensation in her extremity without pain or hypersensitivity

Disclosures

The authors have no financial disclosures to report

References

1. Eberlin KR, Pickrell BB, Hamaguchi R, Hagan RR. Reset Neurectomy for Cutaneous Nerve Injuries. Plast Reconstr Surg Glob Open. 2021 Feb 15;9(2):e3401.