Peripheral neuropathies are relatively common clinical conditions which may be classified as compressive, or entrapment and non-compressive neuropathies. Nerve entrapment is considered when there is compression of a nerve as it passes through an anatomic structure, most commonly a fibro-osseous tunnel or fascial opening.[1] Common peroneal nerve (CPN) entrapment is a common EN of lower extremity because of its location but SPNEN is a relatively rare cause of entrapment. In a study of nearly 500 patients with chronic leg pain, it was found that only 3.5% had entrapment of the SPN.[2] SPN arises from CPN at the level of fibular neck and descends in the lateral compartment of the leg. In the mid-to-distal third of the leg, SPN is sandwiched between peroneus brevis and extensor digitorum longus and the intermuscular septum which separates the anterior and lateral compartments of leg. The nerve is below the CF at this location and gradually ascends into a superficial location before eventually piercing the CF approximately 10 cm proximal to the lateral malleolus.[3] One of the common sites of SPN entrapment is the place where nerve pierces the CF to become superficial; however, this is variable.[4] Localized trauma or injury of the limb is the common cause SPN
Other causes include repeated ankle sprain, overstretching of the leg from repetitive activity, ankle arthroscopy, hypertrophy of peroneal muscles and peroneal exertional syndrome.

Case Report

A 33-year-old man presented to our pain clinic with 10-months history of severe pain over his right lateral mid-to-distal leg. He had a superficial cut-injury over the affected leg around 1-year back which was sutured. He attributed that injury as a trigger for pain. His pain became severe for last 6 weeks which he described as sharp, burning, tingling and stabbing in nature. On a numerical rating scale (NRS: 0 meaning no pain, 10 meaning worst imaginable pain), he described his average pain to be 6, whereas worst pain as 9 which occurs on walking.

On physical examination, he located the healed cut-injury area as the source of pain with significant tenderness and hyperalgesia over that area. He described radiating tingling pain up to lower lateral leg on pressing that area. There were no colour or hair changes, sweating, trophic changes with intact sensory and motor function. A bedside US examination revealed a swollen superficial peroneal nerve (SPN) just below the crural fascia (CF) and probe pressure elicited pain. We made a diagnosis of SPN Entrapment neuropathy (SPNEN) and put him on a short course of tramadol 37.5 mg with acetaminophen 325 mg combination three times daily and gabapentin 300 mg at bedtime with slow titration by 300 mg every 5–7 days till a dose of 1200–1800 mg in 3 divided doses or as tolerated.

Patient returned to us in 2 weeks time with persistent pain as medication provided around 30% relief, but he experienced dizziness from gabapentin. We planned a diagnostic block and hydrodissection of SPN under ultrasound (US)-guidance after an informed consent. A linear high frequency probe was used (M Turbo, Sonosite, Fujifilm Sonosite India) and 21 G 5 cm needle (Stimuplex®360, B Braun Melsungen AG, Germany) was inserted from posterior to anterior targeting the SPN below CF (Fig. 1). The nerve was hydrodissected from fascia using 4 ml of 2% lidocaine, 4ml normal saline and 40 mg methylprednisolone acetate (Fig. 2). Patient reported complete pain relief after the procedure which lasted for around 3 weeks. As pain returned back to baseline by 1-month, we planned for PRF neuromodulation of SPN. This time under US-guidance, a 10 cm RF cannula with 10 mm active tip (Cosman Medical, LLC, Burlington MA, USA) was inserted targeting the top of the nerve. Sensory stimulation was done at 50 Hz when patient reported concordant pain and paresthesia at 0.4 volt. Following that PRF was done at 42° for 6 minutes and another cycle of PRF below the nerve. At the end, we injected 4 ml 1% lidocaine with 40 mg methylprednisolone acetate. The procedure was uneventful and patient did not report any immediate complication. We followed him at 1, 3
and 6 months interval where he reported around 80 percent pain relief and better quality of life.

**Discussion**

Clinical presentation of SPNEN is variable, depending on the site of entrapment. Classically, pain is localized to the mid-to-distal third of the lateral leg with radiation to the dorsum of the foot. Night pain and pain at rest are not uncommon, although symptoms are commonly aggravated by activity. Most of the times, local examination of the foot reveals no specific motor weakness or sensory loss. Although deep palpation of the nerve at the site of exit at CF may lead to positive Tinel’s sign, this is not true in all patients.[1]

SPNEN is mainly diagnosed on the basis of clinical symptoms. Often electrodiagnostic studies help in detecting the abnormalities in conduction velocity, latency and amplitude and aid in diagnosis. But, neuro-muscular US in recent times has helped to accurately locate the nerves, and the site of impingement as the nerves are bigger just proximal to the entrapment. US also help in accurately depositing local anesthetic (LA) and/or steroid in the vicinity of the nerve, which is often considered as a diagnostic and therapeutic intervention in entrapment neuropathy.[5–7]

There is lack of guidelines on management of EN. Earlier surgical decompression or neurolysis was done in patients who had failed conservative treatment. But in recent times, US-guided injections, hydro dissection and PRF are being increasingly done.[7,8] PRF is a recent treatment modality with good benefit in occipital, post-herpetic and inguinal neuralgia.[9] SPN PRF has been reported to provide pain relief in mechanical allodynia in CRPS patients which was even resistant to lumbar sympathetic neurolysis.[10]

In conclusion, we present a case of severe pain from SPNEN which finally got relieved with PRF. Bedside US looking for possible entrapment, and diagnostic LA and/or steroid injection helps in confirming the diagnosis and planning for future treatment.

**Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.**

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**References**

1. Flanigan RM, DiGiovanni BF. Peripheral nerve entrapments of the lower leg, ankle, and foot. Foot Ankle Clin 2011; 16: 255-74.
2. Styf J, Morberg P. The superficial peroneal tunnel syndrome: results of treatment by decompression. J Bone Joint Surg Br 1997; 79: 801–3.
3. Chin KJ. Ultrasound visualization of the superficial peroneal nerve in the mid-calf. Anesthesiology 2013; 118: 956–65.
4. Matsumoto J, Isu T, Kim K, Iwamoto N, Yamazaki K, Isobe M. Clinical Features and Surgical Treatment of Superficial Peroneal Nerve Entrapment Neuropathy. Neurol Med Chir 2018; 58: 320–5.
5. Chang KV, Mezian K, Naňka O, Wu WT, Lou YM, Wang JC, et al. Ultrasound Imaging for the Cutaneous Nerves of the Extremities and Relevant Entrapment Syndromes: From Anatomy to Clinical Implications. J Clin Med 2018; 7: 457.
6. Norbury JW, Nazarian LN. Ultrasound-guided treatment of peripheral entrapment mononeuropathies. Muscle Nerve 2019; 60: 222-31.
7. Chang KV, Wu WT, Özçakar L. Ultrasound imaging and guidance in peripheral nerve entrapment: hydrodissection highlighted. Pain Manag 2020; 10: 97-106.
8. Byrd D, Mackey S. Pulsed radiofrequency for chronic pain. Curr Pain Headache Rep 2008; 12: 37–41.
9. Chang MC. Efficacy of Pulsed Radiofrequency Stimulation in Patients with Peripheral Neuropathic Pain: A Narrative Review. Pain Physician 2018; 21: E225-E234.
10. Chae WS, Kim SH, Cho SH, Lee JH, Lee MS. Reduction in mechanical allodynia in complex regional pain syndrome patients with ultrasound-guided pulsed radiofrequency treatment of the superficial peroneal nerve. Korean J Pain 2016; 29: 266-9.