Peripheral Nerve Stimulation for Refractory Upper Extremity CRPS and Neuropathic Pain: A Case Series

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AIM

- Peripheral nerve stimulation (PNS) is increasingly used for peripheral neuropathic pain, yet evidence supporting its use in upper extremity complex regional pain syndrome (CRPS) and upper extremity neuropathies remains limited.
- This case series aims to add to this sparse literature by describing outcomes of ulnar, median, and/or radial nerve PNS in six patients with refractory upper extremity CRPS and neuropathic pain. All of them achieved significant pain relief.

Material and Methods

- Retrospective series: 6 adults, one academic pain clinic, 2024–2026,
- Included upper extremity CRPS type 1 or peripheral neuropathic pain following trauma, surgery, or amputation
- Failed physical therapy and medications (± blocks or Decompressive surgeries)
- Ultrasound-guided percutaneous PNS, temporary 60-day lead
- Response = ≥50% drop in numeric pain score
- Response was defined as ≥50% pain relief, based on patient-reported improvement and/or change in numeric pain scores documented at follow-up.

Discussion

- This case series demonstrates that ultrasound-guided PNS targeting the ulnar, median, and radial nerves can provide clinically meaningful, ≥50% pain relief in patients with refractory upper extremity CRPS and post-traumatic neuropathic pain, including phantom limb pain.
- PNS is a viable, reversible option when conservative care fails
- Provides symptom relief plus a functional trial before any permanent implant
- No major adverse events; 2 patients exploring permanent implantation

Case	Pt	Condition	Clinical symptoms	Nerve	Relief by end of treatment	Comments
C1	46 F	CRPS-1, 1st MCP joint fusion in 2021 & repeat crush injury of left thumb and surgeries	Constant burning pain dorsum of thumb, dysesthesia, swelling, color change, weak grip	Radial	**≈60%**	Improved thumb sensation
C2	49 F	CRPS-1, after ulnar decompression with transposition at elbow	Elbow tightness and burning, allodynia, forearm radiation, weakness, intermittent finger numbness	Ulnar	**50–60%**	Better dextrity and elbow flexion
C3	69 F	CRPS-1, Had total elbow arthroplasty secondary to commuted distal humerus fracture after a fall in 2023	Constant stabbing hand pain, allodynia, cold intolerance, shiny skin, restricted motion	Ulnar	**≈60%**	Less allodynia, better hand function. Improved symptoms of medial neuropathy as well
C4	27 M	work crush injury of right hand and wrist in 2024. Sustained non-displaced 4th metacarpal head fracture and RCL tear, underwent RCL repair in Jan 2025	Constant ring finger pain radiating to palm and shoulder, numbness, weak grip, swelling	Median + ulnar	**50%**	Relief while stimulator was active. Exploring permanent implantation
C5	60 M	CRPS-1, h/o RA after right elbow arthroplasty in May 2023 and Ulnar decompression and transposition in Nov 2023	Burning and sharp forearm, ring and little finger pain, numbness, allodynia, weakness	Ulnar	**>50%**	Relief while stimulator was active. Exploring permanent implantation
C6	35 F	Phantom limb pain, Left index finger amputation with disarticulation at MCP joint	Bilateral throbbing, burning phantom pain with “zaps,” worse with use limiting everyday activities	Radial	**60%**	Back to yard work

MCP- Metacarpophalengeal joint, RCL- radial collateral ligament, RA – Rheumatoif Arthritis

Limitations

- The series is small, retrospective and uncontrolled, so placebo effect and selection bias cannot be excluded.
- Follow-up was limited to the 60-day trial, so durability of relief is unknown.
- Relief was based on self-reported pain scores and was not recorded in a standardized way across patients.

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