

Spinal Cord Stimulation in a Complex Case of Post-Traumatic Brachial Plexus Injury: Pain Relief and Functional Impact

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Abstract

Introduction: Traumatic brachial plexus injury may lead to chronic refractory neuropathic pain and severe motor deficits, requiring complex therapeutic approaches, including neuro-modulation. Spinal cord stimulation (SCS) has emerged as a promising alternative, with increasing evidence of its benefits in selected cases.¹⁻³

Clinical description: A 38-year-old male with chronic neuropathic pain and motor deficit in the right upper limb due to traumatic brachial plexus injury from a motor vehicle accident with root avulsion 7 years ago. He developed intense pain, weakness, and functional loss. In 2019, he underwent phrenic nerve transfer to the right biceps; in 2022, a sural nerve graft to the same limb. In 2021, two spinal cord stimulation electrodes were implanted, with partial symptom relief. Later, pain worsened—mainly in the right forearm—becoming refractory to morphine and associated with suicidal ideation. He was on Pregabalin, Chlorpromazine, Dipyrone, Clonidine, Lactulose, Methadone (with a history of opioid use disorder), and Mirtazapine. On neurological exam: global strength grade 5, except in the right upper limb (proximal grade 3, distal grade 4, and grade 0 in the hand), with hypotrophy, hypotonia (previous orthosis use), tactile hypoesthesia, and deep tendon reflexes 2+/4 globally, absent on the right upper limb. He was admitted for elective spinal cord stimulator generator replacement, maintaining previous programming (200 Hz; 350 µs; 4.0 mA) with electrode repositioning. Postoperatively, he had significant pain relief, improved quality of life and mental

state, with no suicidal ideation, remaining under outpatient follow-up.

Discussion: SCS has shown efficacy in reducing refractory pain, with good initial response in up to 86% of cases and sustained benefit in 69%, though it may decrease over time.¹ Recent reviews emphasize advances in mechanisms of action, including high-frequency stimulation and modulation of nociceptive pathways.² These reinforce the role of neuromodulation in chronic neuropathic pain.³

Conclusions: This case supports SCS as fundamental in selected cases of refractory neuropathic pain after brachial plexus injury,¹⁻³ especially with device revision. Multidisciplinary care and individualized selection are essential to optimize outcomes and quality of life.

References

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