

Refractory to Relief: A Medically Challenging Case Demonstrating the Impact of TENS on Cervical Pain Management

Introduction

Cervical radiculopathy, affecting 1 in 1000 people, is a chronic pain condition caused by nerve root compression from conditions like spondylosis or disc herniation. This leads to prolonged inflammation, glial cell damage, and neuropathic pain. While drug therapy is the first-line treatment, many patients experience limited or short-lived relief.¹ This case study examines a patient with medication-resistant cervical radiculopathy who achieved significant pain relief using a Transcutaneous Electrical Nerve Stimulation/Interferential Current (TENS/IFC) unit, highlighting its potential as an alternative pain management approach.

Materials and Methods

Patient's electronic medical record in Epic was reviewed from initial presentation on 7/25/2023 through his most recent office visit on 10/23/2024. Patient informed consent was obtained at last office visit after discussion with the patient following the successful in-clinic trial of a TENS/IFC unit. All progress, history of present illness, and procedure notes were evaluated to document the course of illness and changes in management plan. Literature search was conducted via PubMed to identify relevant articles in chronic cervical pain management and the development of TENS/IFC units for discussion.

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Case Description

A 63-year-old man with a history of AAA, alcohol abuse, and C1-C2 cervical fusion presented in July 2023 with severe neck pain radiating to his forehead, post-stroke gait instability, and left-sided low back and leg pain. Gabapentin was ineffective and reduced due to renal impairment. In August 2023, he received bilateral greater occipital nerve block injections, but by October 2023, he reported no relief and discontinued gabapentin and methocarbamol. In June 2024, after a cervical fracture, he continued to experience severe pain and left arm weakness. A July 2024 occipital nerve block was also ineffective. An August 2024 MRI showed mild ventral cord compression and a chronic C2 fracture, but neurosurgery advised against intervention. In September 2024, he underwent a C4-C6 medial branch block, yet pain persisted at 9/10. By October 2024, seeking alternatives to contrast-based procedures, he trialed a TENS unit, which reduced his pain to 5/10, leading to its integration into his treatment plan.

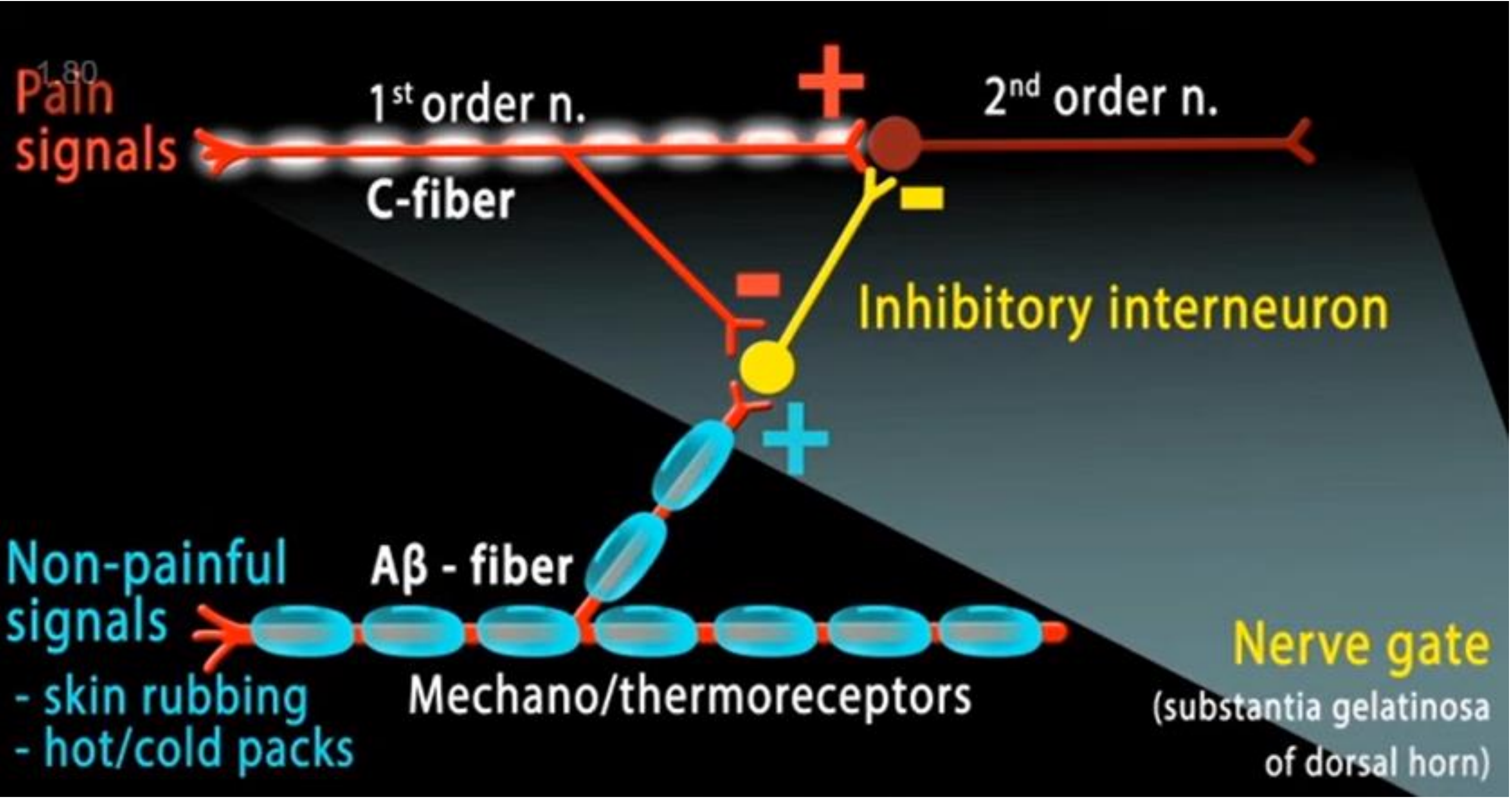


Figure 1. (Left) Combined TENS/IFC peripheral nerve stimulation unit. The Zynex Medical NexWav was the device specifically prescribed in this case (not sponsored). Photo credit: Zynex Medical

Figure 2. (Right) Simplified graphic of the Melzack and Wall Gate Control Theory of Pain nerve signaling. Stimulation of the large diameter mechanoreceptor neurons via nerve stimulation activate inhibitory neurons in the substantia gelatinosa in the spinal cord, prompting it to 'close' the gate and stop pain signal transmission to 2nd order neurons. Photo Credit: Alila Medical Media.

Discussion

Cervical radicular pain is often challenging to manage due to the refractory nature of neuropathic pain and the side effects or limitations of pharmacologic treatments. This case highlights the complexities of treatment, including drug intolerance, comorbidities, and the failure of multiple interventions. Ultimately, the successful trial of a TENS unit provided significant pain relief, underscoring the potential role of non-invasive neuromodulation in chronic pain management. Given its low-risk profile and ease of use, TENS therapy may serve as an effective adjunct or alternative to medications and invasive procedures, particularly for patients with contraindications to conventional treatments.

TENS units modulate pain through frequency-dependent mechanisms, affecting peripheral nerve transmission and central pain sensitization according to the Melzack and Wall's Gate Control Theory of Pain.^{2,3,4} While more high-quality studies are needed to establish definitive efficacy, this case suggests TENS may be a viable option for cervical radiculopathy, allowing rapid neuromodulation without the risks of spinal cord stimulators or steroid injections. Given the observed pain reduction, we recommend further research into TENS therapy and its integration into treatment protocols for chronic neuropathic pain.

References

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