

Can We Use Current to Treat Orthostatic Hypotension After Spinal Cord Injury?

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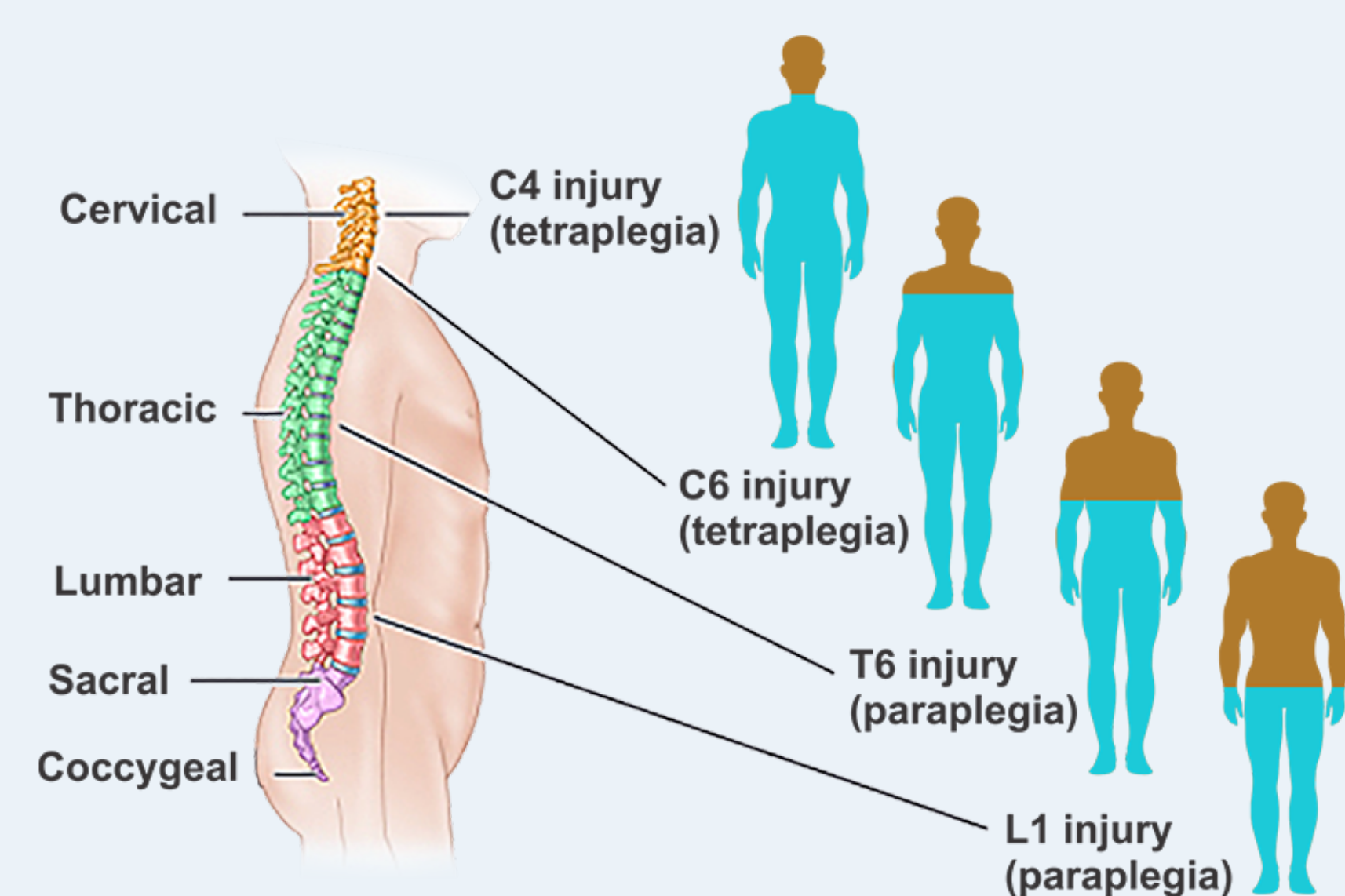
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Introduction

- 85,000 Canadians live with a Spinal Cord Injury (SCI). Many suffer from Orthostatic Hypotension (OH), a reduction in systolic blood pressure with posture change (Freeman, 2011). OH affects quality of life by decreasing independence, not allowing patients to sit up, drive or prepare meals because of the risk of losing consciousness.
- Functional Electrical Stimulation (FES) is the application of intermittent electrical stimuli to superficial skeletal muscles, with the objective of triggering a visible muscle contraction.

Objectives

- Evaluate the literature to understand the effect of Functional Electrical Stimulation (FES) or Neuromuscular Electrical Stimulation (NMES) in reducing OH in patients with Spinal Cord Injury.
- Perform a systematic review of the literature to understand any side effects of using FES or NMES to reduce orthostatic hypotension.



Methods

- A systematic review was conducted using five databases. Experimental studies assessing FES or NMES interventions to reduce orthostatic hypotension in SCI patients were included. All studies identified were reviewed by two people independently. Of the 227 studies, 15 met the selection criteria.
- Risk of bias assessment was obtained by using a combination of the Cochrane risk of bias tool and the PEDro scale.

Yes, current can be used to treat Orthostatic Hypotension in Spinal Cord Injury

Results

- Functional Electrical Stimulation was effective in preventing the onset of orthostatic hypotension in patients with Spinal Cord Injury in 90% of the studies reviewed. The remaining studies found no consistent effect.
- FES was the treatment that provided most consistent effects in reducing OH in comparison to alternate treatments tested.
- Functional Electrical stimulation is effective in attenuating the drop in blood pressure that occurs during head up tilt experiments.



Discussion

- Functional electrical stimulation is one of the only methods that can be used with minimum side effects to treat orthostatic hypotension in spinal cord injury.
- Functional electrical stimulation has immediate use and can be applied by individuals themselves without going to a provider.
- Unlike blood pressure pills, functional electrical stimulation has no lingering effects in the body, therefore being safer than other methods to treat orthostatic hypotension.
- FES is a noninvasive treatment that will improve a person's quality of life significantly.

Acknowledgements and References

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5 Awesome Applications of Electrical Stimulation. (2020, March 12). Retrieved from <https://myoipn.com/5-awesome-applications-of-electrical-stimulation/>
Freeman, R., Wieling, W., Axelrod, F. B., Benditt, D. G., Benarroch, E., Biaggioni, I., ... Dijk, J. G. (2011). Consensus statement on the definition of orthostatic hypotension, neurally mediated syncope and the postural tachycardia syndrome. *Clinical Autonomic Research*, 21(2), 69-72. doi:10.1007/s10286-011-0119-5
Lyons, S. (2019, May 13). New strides in spinal cord injury research - Children's Hospital Discoveries. Retrieved September 27, 2020, from <https://discoveries.childrenshospital.org/spinal-cord-injury/>
Popovic, M. R., Masani, K., & Micero, S. (2011). Functional Electrical Stimulation Therapy: Recovery of Function Following Spinal Cord Injury and Stroke. *Neurorehabilitation Technology*, 105-121. doi:10.1007/978-1-4471-2277-7_7
What is Spinal Cord Injury? (n.d.). Retrieved September 20, 2020, from <https://www.neurogen.in/spinal-cord-injury>