

Review Study on the Effect Surface Spinal Stimulation on Autonomic Nervous System in Spinal Cord Injury Patient

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Abstract

Background: Spinal cord injury is a disabling condition can lead to various autonomic disturbances of thermoregulatory dysfunction, autonomic hyperreflexia, vasomotor dysfunction, and bowel and bladder dysfunction. Different treatment techniques have been used for its management. In the present study, surface spinal stimulation has been used to find the effect on bladder, on skin resistance and skin temperature through comparing pre and post- treatment on a male with spinal cord injury.

Method: A 29-year-old-male suffered complete spinal cord injury at level D12 during a car accident. The case was diagnosed and treated for compression fracture of D11-D12 with paraplegia with bowel and bladder dysfunction. The subject was administered surface spinal stimulation with a carrier frequency of 2500 Hz, beat frequency 20 Hz applied continuously for 45 min with two adhesive rectangular electrodes of size (4.5x 9cm) placed on each side of supine 5cm apart over T10- L2 level paravertebrally. **Results and Conclusion:** The present study found that surface spinal stimulation with medium frequency current of beat frequency 20 Hz was effective in improving detrusor pressure, bladder sensations, infused fluid volume and bladder capacity of the patient with spinal cord injury. Electrical stimulation over the paravertebral region also demonstrated improvement in the skin resistance, but had no significant effect over skin temperature.

KEY WORDS: Surface spinal cord stimulation, Autonomic nervous system, Thermoregulation, Skin resistance, Bowel and bladder control.

Introduction

Spinal cord injury (SCI) is a global epidemic, and was considered as “untreatable ailment” decades ago. This disabling condition causes paralysis of voluntary musculature which leads to reduced mobility as well as impairment of vocational and self care activities. (Sunder, 2010). According to the Indian statistics, about 20 percent of all spinal injuries lead to neurological deficit in the form of paraplegia following thoracolumbar spine injuries, or quadriplegia following cervical spine injuries

(Maheshwari, 2006). The causes of injury could be direct or indirect spinal trauma which causes damage to the cord and the symptom may vary according the level of injury. Cord involvement following neurological lesion could be complete or incomplete. After spinal cord injury, patient presents with primary and secondary complications depending upon the level and type of injury. These complications could be musculo-skeleton and autonomic disturbances.