INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

Cervical Collar Transcutaneous Stimulation System for Post-Operative Pain Control

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Medical Devices
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Inventor
Andrew Chang
Jacob Joseph
Jaes Jones
Johan Lee
Noor Alesawy

Further information
Aparna Bubna
abubna@umich.edu

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OVERVIEW

TENS unit incorporated into a cervical collar for post-operative pain

- Optimizes probe placement to decrease discomfort and spare incision site
- Stimulation can be controlled by healthcare provider or the patient, themself

BACKGROUND

Cervical collars are often used in the post-operative setting following neck or cervical spine surgery. The intent of the collar is to provide immobilization and support to prevent pain and further injury. Still, neck pain during the postoperative setting can be difficult to manage, and oral pain medications are imperfect with regards to aiding discomfort and minimizing side effects. Transcutaneous electrical nerve stimulation (TENS) is a non-invasive technique often used to provide pain relief through the delivery of low-voltage electrical impulses to the area in pain. The likely underlying mechanism for TENS units successfully diminishing pain involves stimulation of non-painful nerves to block transmission of pain signals from involved nerves. TENS units are versatile, and the intensity, frequency, and duration of the electrical impulses delivered can be adjusted over time. Given the common use of cervical collars and potential benefits of TENS units in controlling pain, a need exists for a means to combine these two important post-operative interventions.

INNOVATION

Researchers have created a device that incorporates a TENS unit into a hard cervical collar to allow for electrical stimulation of nerves and muscles of the neck in the post-operative setting.

The invention optimizes the placement of the TENS electrodes such that a patient may safely place and the utilize the device without other clinical oversight. The design takes into account the protection of the healing surgical incision through placement of the electrodes away from the midline and following a pathway posteriorly and laterally. The wires connect to the TENS device from which stimulation can be controlled by the clinician or patient. The posterior padding of the cervical collar is formed in a manner that ensures excellent skin contact with the electrodes, and the padding may be easily removed or replaced as needed. The device is meant to be reused a number of times, but when replacement is required the padding-electrode-wire system can simply be unplugged from the TENS device and replaced.