National Resource Center
jpanlener@sbaa.org
1-800-621-3141 x800
Hablamos español

Transcutaneous Spinal Cord Stimulation in Spina Bifida

August 2022

Various types of electrical stimulation have been used for many years in people with disabilities, including Spina Bifida, to decrease pain and discomfort and to improve muscle strength and movement. The most commonly used methods are Transcutaneous Electrical Nerve Stimulation (TENS) and Functional Electrical Stimulation (FES). TENS is used primarily to help address nerve pain, while FES is used most commonly to stimulate muscle strengthening in certain muscles that have become weakened for reasons such as after surgery or prolonged hospitalization.

A more recent modality which is being utilized in people with motor disabilities is Transcutaneous Spinal Cord Stimulation (TSCS). With TSCS, electrical stimulation is provided at the lumbar spine to elicit a motor response in muscles that are paralyzed. This has been studied most vigorously in people with spinal cord injury. To date, there have been two reviews of the literature related to TSCS in spinal cord injury.[i,ii] They note that while the most recent studies have identified some potential benefit from this modality in spinal cord injury, more research needs to be done in well-controlled clinical trials.

At the time this material was written, there was only a single case report in the medical literature related to TSCS in Spina Bifida.[iii] The authors note that there are significant differences between individuals with Spina Bifida and those with other conditions (for example, individuals with cerebral palsy and acquired spinal cord injury) in whom TSCS is being studied. The authors of the case report suggest that TSCS could be helpful in three ways:

- There was improved sensation, though the authors note this to be “slow and spotty.”
- Benefit in circulation so that the extremities, which were generally cold, were now more often warm.
- Improvement in spontaneous movement of muscle groups that would not have been expected to function. However, the authors added that the “movements without stimulation continue to be intermittent throughout the day, but not used purposefully for function.” They also noted no particular adverse effects during the intervention period.

At present, TSCS in Spina Bifida should be considered experimental. Evidence is lacking for its routine use as an appropriate therapeutic modality. The Spina Bifida Association supports the idea that well-designed research be done regarding this modality before it can be considered an evidence-based treatment intervention.

For parents of children with Spina Bifida who wish to consider proceeding with this intervention, we recommend that participation be done in a research study setting. Those choosing to participate outside of a research protocol should be aware that negative or adverse events which are not yet known might occur. Individuals should tell their health care team that they are undergoing this experimental treatment so that the team can help monitor for both potential positive and negative outcomes.

This information does not constitute medical advice for any individual. As specific cases may vary from the general information presented here, SBA advises readers to consult a qualified medical or other professional on an individual basis.

[i] Megía García A, Serrano-Muñoz D, Taylor J, Avendaño-Coy J, Gómez-Soriano J. Transcutaneous Spinal Cord Stimulation and Motor Rehabilitation in Spinal Cord Injury: A Systematic Review. Neurorehabil Neural Repair. 2020 Jan;34(1):3-12. doi: 10.1177/1545968319893298. Epub 2019 Dec 20. PMID: 31858871.

SPINA BIFIDA ASSOCIATION

National Resource Center
jpanlener@sbaa.org
1-800-621-3141 x800
Hablamos español

Transcutaneous Spinal Cord Stimulation in Spina Bifida

August 2022

[ii] Taylor C, McHugh C, Mockler D, Minogue C, Reilly RB, Fleming N. Transcutaneous spinal cord stimulation and motor responses in individuals with spinal cord injury: A methodological review. PLoS One. 2021 Nov 18;16(11):e0260166. doi: 10.1371/journal.pone.0260166. PMID: 34793572; PMCID: PMC8601579.

[iii] Motavalli G, McElroy JJ, Alon G. An Exploratory Electrical Stimulation Protocol in the Management of an Infant With Spina Bifida: A Case Report. Child Neurol Open. 2019 Mar 29;6:2329048X19835656. doi: 10.1177/2329048X19835656. PMID: 31259192; PMCID: PMC6589948.

August 2022