

Combinatorial Transcutaneous Spinal Cord Stimulation and Training is Safe for Patients with Ventilator Dependent Spinal Cord Injury

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Objective

To demonstrate the safety and feasibility of transcutaneous spinal cord stimulation (TSS) paired with training in children with cervical spinal cord injury and ventilator dependence.

Background

TSS is a non-invasive neuromodulation technique used to increase central excitability and unmask latent voluntary function. Evidence for its safety and utility is ever expanding; however, people who require respiratory support continue to be excluded from most research evaluating the benefits of TSS paired with training. This retrospective review aimed to discover how TSS is already being used with this population clinically and evaluate the safety and feasibility.

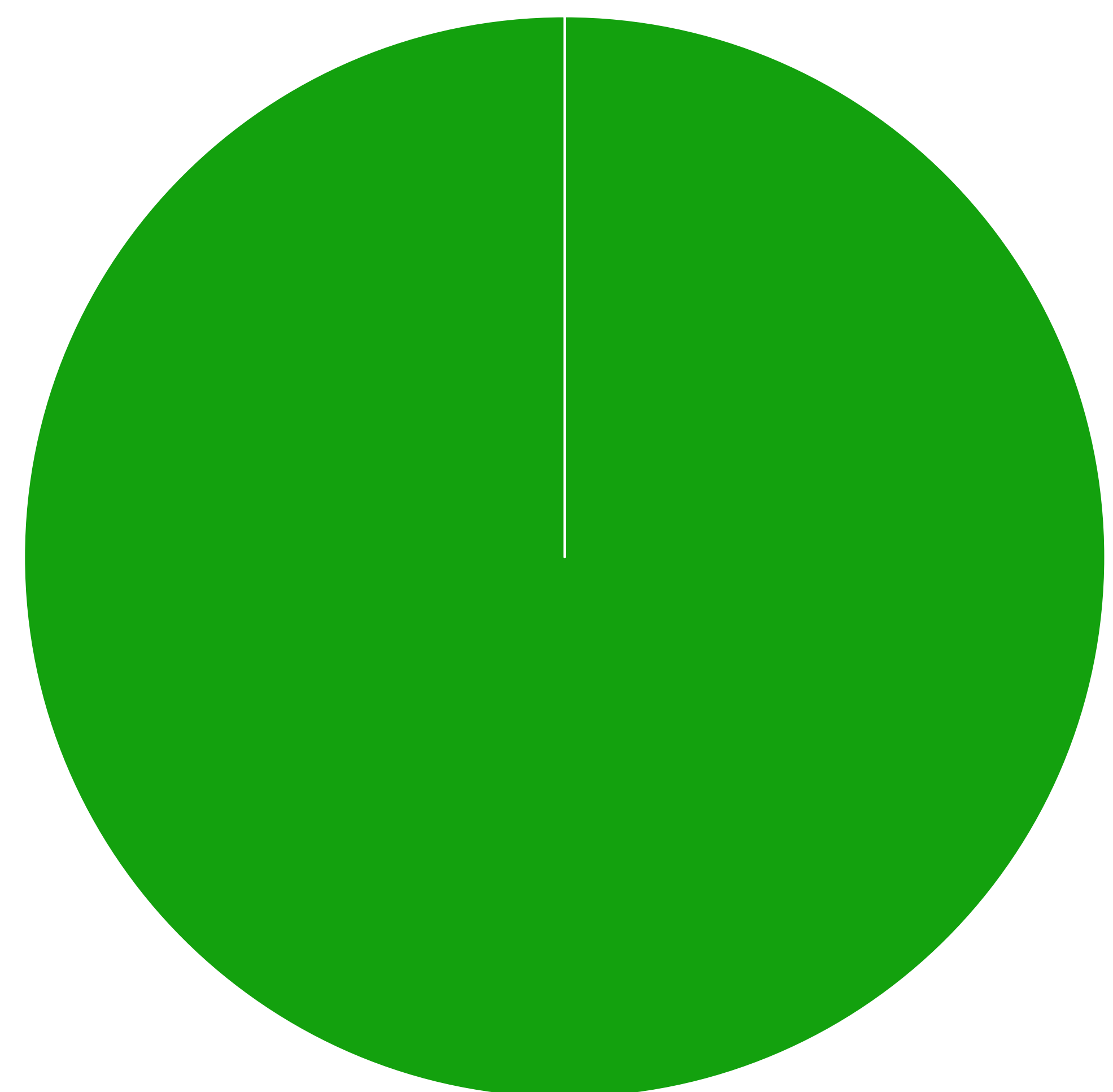
Methods

A retrospective review was conducted of patients with respiratory insufficiency who received intensive inpatient therapy at the International Center for Spinal Cord Injury at Kennedy Krieger between 2023 and 2024. It was determined that a total of 23 patients who required mechanical ventilation were seen during this timeframe, of which 15 received TSS paired with training during their admission. These 15 patients are the focus of this review.

AFM	Traumatic SCI	Spinal Stroke
5	4	3
TM	Encephalitis	Cancer
1	1	1
Average Age	Range of Time Since Injury	ASIA classification
12.27	3 months-14 years	AIS A-D

TSS with training resulted in 0 adverse events in children who use ventilators.

Adverse Events



■ Pain ■ Increased respiratory support ■ Respiratory disruption ■ Autonomic Dysreflexia ■ None



Documented Benefits

- Improved Head Control
- Improved Posture
- Improved Prehension
- Improved Stance Control
- Improved Voluntary Contraction
- Improved Tone