



STROKE SPECIAL INTEREST GROUP

Academy of Neurologic Physical Therapy

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- Reminder! Pre-Register for Pre-CSM Trivia Night February 8, 2024 7:30 pm EST



STROKE SIG ARTICLE REVIEW

Academy of Neurologic Physical Therapy



You can either read below, or listen to the audio version with
this [LINK](#)

Completed by: Alexia Rudofski PT, DPT, NCS

Thank you, Alexia!

Overseen by: Daniel Dray, PT, DPT, NCS

Summary topic title: Effective delivery of vagus nerve stimulation requires many stimulations per session and many sessions per week over many weeks to improve recovery of somatosensation

Article reference: Ruiz AD, Malley KM, Danaphongse TT, et al. Effective delivery of vagus nerve stimulation requires many stimulations per session and many sessions per week over many weeks to improve recovery of somatosensation. *Neurorehabil Neural Repair*. 2023;37(9):652-661. doi:10.1177/15459683231197412

Link to full article if available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10523825/>

Definition(s):

Vagus Nerve Stimulation (VNS): a novel treatment method used in combination with rehabilitative training to engage neuromodulator networks to enhance synaptic plasticity. In this study, a bipolar stimulating cuff electrode was placed on an isolated vagus nerve
Electrical stimulation parameters: consistent across groups. 0.5 second stimulation train

consisting of 0.8 mA, 100 ms biphasic pulses delivered at 30 Hz

Tactile training: individual touches to the ventral surface of the injured forepaw with a paintbrush

ISI: inter-stimulus intervals (seconds)

Mechanosensory withdraw testing: point at which paw withdrawal occurs when actuator applied to plantar surface of forepaw

No VNS group: tactile training with no VNS; 34-minute sessions, 4x/week, x4 weeks

Moderate daily VNS: tactile training + VNS @ ISI 10; 34-minute sessions, 4x/week, x4 weeks

Moderate weekly VNS: tactile training + VNS @ ISI 10; 34-minute sessions, 1x/week, x4 weeks

Intense weekly VNS: tactile training + VNS @ ISI 10; 134-minute sessions, 1x/week, x1 week

Rapid intense daily VNS: tactile training + VNS @ ISI 2; 27-minute sessions, 4x/week, x 4 weeks

Short daily VNS: tactile training + VNS @ ISI 10; 9-minute sessions, 4x/week, x 4 weeks

Rapid daily VNS: tactile training + VNS @ ISI 2; 7-minute sessions, 4x/week, x 4 weeks

Purpose of article: To understand the amount, intensity, frequency and duration of VNS therapy that provides optimal dosage to recover sensory loss. As a secondary benefit, the article mentions the goal of finding optimal dosage would be to broaden the clinical utilization of VNS therapy by making it more accessible to clinicians and patients if a less frequent, more intense option is found to be optimal.

Methods of interest: In rats, vagus nerve cuffs were implanted 9 weeks after median/ ulnar nerve transection (peripheral nerve injury). Rats were then placed in one of above seven groups dictating intensity and duration of VNS therapy. Mechanosensory withdraw testing was assessed before injury, before therapy, weekly during treatment, and 4 weeks after conclusion of therapy by blinded assessors.

Results of interest: There were no differences in withdrawal thresholds noted between groups prior to initiation of therapy. Moderate daily VNS showed significantly decreased withdrawal thresholds compared to no VNS, and these improvements were maintained up to 4 weeks after treatment ended. No other group showed significant difference with withdrawal thresholds when compared to no VNS.

Discussion, take home message: Timing and dosage of VNS therapy are important variables to consider following peripheral and central nerve injury. Moderate daily VNS therapy is the only group that showed a significant improvement in recovery. Therefore, this study suggests that total amount of VNS pairings alone is not the sole determinant in degree of recovery with VNS therapy. Unfortunately, these findings do not reduce the suggested overall therapy time as initially hoped, and instead points to suggesting daily repetition of VNS therapy over a longer period of time. The hope of this study was to find a more accessible option to decrease number of sessions required in clinic, however this hypothesis did not hold true. There is instead a minimum threshold of daily VNS pairings required to drive enhancement of recovery that is consistent with prior studies and suggests vaguely to “deliver multiple stimulations per session, conducting several sessions per week, and continuing therapy over several weeks.”

Additional references (outcome measures, videos that will help clinicians, etc.)

Plain language overview of vagus nerve stimulation: <https://www.mayoclinic.org/tests-procedures/vagus-nerve-stimulation/about/pac-20384565>

“Walking Adaptability after a Stroke and Its Assessment in Clinical Settings”: Episode 23

In this episode, host Marissa Moran, PT, DPT is joined by author (and current Stroke SIG Nominating Committee Member!) Dr. Chitra Balasubramanian, PT, PhD, CEEAA to discuss her research article titled “Walking Adaptability after a Stroke and Its Assessment in Clinical Settings”. Dr. Balasubramanian was awarded the Stroke SIG Research Award in 2022. Dr. Balasubramanian discusses the importance of walking adaptability within the realm of stroke recovery and why assessment of this construct matters.



Pre-Register for the Stroke SIG's Pre-CSM Trivia Night

February 8, 2024 7:30 pm EST

You are invited to a Zoom meeting.

When: Feb 8, 2024 07:30 PM Eastern Time (US and Canada)

Register in advance for this meeting:

<https://us06web.zoom.us/meeting/register/tZUsfuuvrj8iG9QWDHTa3GZxTy4n4FQqMvIE>

After registering, you will receive a confirmation email containing information about joining the meeting.

The first 10 people the pre-register and attend the event will win a pair of brain socks!



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