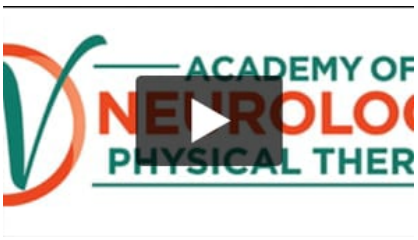
September 20th,, 2023

STROKE SPECIAL INTEREST GROUP

Academy of Neurologic Physical Therapy

In this newsletter...

- **NEW Article Review! See below for video link to listen!
- **Student Resources Exam Answer
- Call for ANPT annual conference poster reviewers!



You can either read below, or listen to the audio version with this LINK or by clicking the video above!

Completed by: Demiana Farag, SPT
Thank you, Demiana!

Overseen by: Daniel Dray, PT, DPT, NCS

Summary topic title: Effects of Dynamic Body Weight Support in Functional Independence Measures on Acute Ischemic Stroke

Article reference: Huber J, Elwert N, Powell ES, Westgate PM, Hines E, Sawaki L.

Effects of dynamic body weight support on functional independence measures in acute ischemic stroke: a retrospective cohort study. *J Neuroeng Rehabil*. 2023;20(1):6. Published 2023 Jan 16. doi:10.1186/s12984-023-01132-9

Link to the full article: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9843865/

Definitions:
Dynamic body weight support (DBWS) system: a system that helps unload body weight more consistently during dynamic movements, such as with movement-based therapies like gait training, climbing stairs, or transfers. This system also allows for real-time feedback created by sensory data that is taken during the movement and has a visual display. Additionally, this system has novel safety features associated with this system, including a fall detection and injury prevention mode.

Traditional BWS treadmill training may be less effective due to limitations in intensity, reduced errors occurring (required for motor learning) due to an excessive focus on perfecting movement kinematics, and limited saliency/translation to more real-world activities.

Purpose of the article: For neuroplasticity to occur, the intensity and repetitions of the rehabilitation exercises must be of sufficient dosage and progressed at a sufficient level. This leads to an issue with stroke rehab because the intensity levels, repetitions, and progression are usually limited due to a justified fear of falling (FOF) that patients have. This FOF is accommodated for by physical therapists, which can limit the amount of exercise, such as locomotion, that is implemented. The purpose of this article was to determine whether utilizing the DBWS with over-ground gait and balance training in inpatient rehabilitation, would lead to greater functional recovery after an acute ischemic stroke compared to standard of care (SOC).The underlying hypothesis for this purpose was based on utilization of DBWS to help alleviate a patient's fear of falling. This outcome was measured using the functional independence measure (FIM).

Methods of interest: This study was a retrospective cohort study from a rehab hospital partnered with the University of Kentucky. Inclusion criteria consisted of subjects with a first-time acute ischemic stroke with motor deficits requiring admission to an inpatient rehab facility and who had a length of stay between 10 and 35 days. Data from 52 patients was used in this study (26 each in DBWS and SOC groups). All patients received 3 hours of therapy 5 days per week. Physical therapists determined the rehabilitation provided. While some of the movements that were performed within the physical therapy session were described, the specifics of frequency or intensity were not mentioned. The primary outcome (FIM) was measured at admission and discharge.

Results of interest: The authors found that both groups had statistically and clinically significant increases in their FIM scores. Overall, there was a significantly greater increase in the total FIM gains in the DBWS group compared to the SOC group. However, the only significant difference between groups when looking at FIM subscores was for sphincter control, with all other FIM subscores showing no significant differences.

Discussion, take-home message: This study was successful in showing that using the DBWS system during balance and gait training leads to an improvement in overall functional ability, with further evidence of improved sphincter control. In addition to alleviating the fear of falling, the DBWS system also provides concurrent feedback by means of visual information, which may be helpful in certain motor learning processes. All these factors relate to improving the patient's level of neuroplastic change. The significant increase in sphincter control was hypothesized to be related to the relationship between movement and pelvic floor control found in previous studies. Additionally, the authors noted that further studies should be done to assess the impact of the DBWS system on other outcomes such as a return to community ambulation, an increase in balance and a reduction of falls, as well as an improvement in general quality of life.

Additional Resources from the ANPT

- Safety Considerations with High Intensity Gait Training: https://www.youtube.com/watch?v=VZKuUNxdVc0&ab_channel=AcademyofNeurologicPhysicalTherapy
- Unweighting System and Harness Options: https://www.neuropt.org/docs/default-source/cpgs/locomotor/unweighting-system-and-harness-options.pdf?sfvrsn=77625e43_2
- Justification for Overhead Harness System: https://www.neuropt.org/docs/default-source/cpgs/locomotor/justification-for-overhead-harness-system049f38a5390366a68a96ff00001fc240.pdf?sfvrsn=389d5e43_0

Exam Question Rationale!

A patient presents with right arm numbness, blurred vision, and speech deficits. Neurological examination findings included mild fluent aphasia with some word substitutions, difficulty seeing fingers on the right side, mild right pronator drift and absent graphesthesia/stereognosis of the right hand. Where is the most likely location of the lesion?

a. Left-sided injury to: postcentral gyrus, primary somatosensory cortex, and parietal cortex

b. Right-sided injury to: frontal lobe, primary somatosensory and primary motor

cortex

c. Right-sided injury to: lateral and caudal pons

d. Left-sided injury to: medulla and medial pons

Thought Process:
This patient presents with deficits on the right side of the body consistent with a stroke in the left cerebral hemisphere, so we can conclude that the stroke occurred in the left side of the brain. For that reason, answers b. and c. can be eliminated as they indicate a lesion on the right hemisphere. The answer d. is also incorrect, as the medulla regulates heart rate, respiration, vasoconstriction and vasodilation within the autonomic nervous system, and the pons is also involved in regulating respiration, not cortical signs as described in the case.

Answer A is correct! This patient presents with the following:

- Right arm numbness, which would indicate a lesion in the left primary motor area.
- The patient's speech is reported as fluent, which would also indicate that the left Broca's area is not affected, but this patient does occasionally have incorrect word substitution, which would be indicative of a lesion to Wernicke's area in the left posterior superior temporal gyrus (temporoparietal junction).
- The patient exhibits sensory deficits, including visual field deficits of the right visual field, indicating a lesion of the left occipital lobe, right pronator drift indicating a deficit in proprioception on the right side of the body, indicating a lesion of the postcentral gyrus of the parietal lobe, which contains the primary somatosensory cortex, and absent graphesthesia and stereognosis, which are cortical sensory deficits indicative of a lesion of the parietal secondary somatosensory cortex as well.

Reference: Lundy-Ekman, L. Neuroscience: Fundamentals for rehabilitation. 5 th edition. Elsevier; 2018.

Exam question and rationale completed by Stroke SIG Student Resource Co-Directors: Pamela Bosch, PT, DPT, PhD & Dana Kahl, PT, DPT, EdD

Call for ANPT Annual Conference Stroke SIG Peer Reviewers!!

Are you attending ANPT Annual Conference?

Would you be willing to do a peer review of posters or platforms?

If interested, email Margie Roos at mroos@sju.edu. If you know of others going to Annual Conference, let Margie know. The more the merrier!!

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