



# STROKE SPECIAL INTEREST GROUP

Academy of Neurologic Physical Therapy

## In this newsletter...

- **\*\*\*NEW\*\*\* Article review. *Aerobic Exercise and Cognitive Function After Stroke: A Systematic Review with Meta-Analysis***
- Student Corner question. Applying Rhythmic Auditory Stimulation in Stroke
- Time to consider being involved in the ANPT, Nominations are OPEN.



## STROKE SIG ARTICLE REVIEW

Academy of Neurologic Physical Therapy



**Completed by:** Daniel Dray, PT, DPT, NCS **THANK YOU for your time!**

**Summary topic title:** Aerobic Exercise and Cognitive Function After Stroke: A Systematic Review with Meta-Analysis

**Article reference:** Li X, Geng D, Wang S, Sun G. Aerobic exercises and cognitive function in post-stroke patients: A systematic review with meta-analysis. *Medicine (Baltimore)*. 2022;101(41):e31121. doi:10.1097/MD.00000000000031121

**Link to full article if available:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9575743/>

**Definition(s):** Light Intensity Exercise: 57-63% Maximal Heart Rate  
Moderate Intensity Exercise: 64-76% Maximal Heart Rate  
High Intensity Exercise: 77-95% Maximal Heart Rate  
(Per ACSM Guidelines)

**Purpose of article:** People experience cognitive impairment post-stroke at a rate as high as 38%, primarily with impaired executive function, memory, and attention. The objective of this systematic review was to investigate the effect of *aerobic exercise* on *cognitive function* post-stroke, and to identify specific interventions that would maximize cognitive benefits post-stroke.

**Methods:** According to the PRISMA principle, literature databases were searched to collect randomized controlled trial data of aerobic exercise effect on cognitive function post-stroke. To be included:  
an intervention of continuous aerobic exercise was required > 8 weeks, more than once a week.

Studies must also have included a validated neuropsychological test of cognition, results on overall cognitive ability, and specific cognitive domain.

**Results:** 11 studies that satisfied the association between aerobic exercise and cognitive function following stroke were included.

The intervention times were primarily 40-60 minutes. The intervention frequencies were 2-3 times/week. The intervention durations varied between 8 and 72 weeks.

Global cognitive ability was significantly improved after aerobic exercise intervention (0.51; 95% confidence interval [CI] 0.16-0.86;  $P = .004$ ).

Moderate intensity aerobic exercise had the largest effect size on improving global cognition ability (0.98; 95% CI 0.48-1.47;  $P = .0001$ )

Cognitive flexibility, working memory, selective attention and conflict resolution showed no significant difference from zero.

**Discussion:** The results of the meta-analysis showed that the combined effect of aerobic exercise significantly improved global cognitive ability.

Moderate-intensity aerobic exercise had the best effect ( $d = 0.98$ ), followed by low-intensity aerobic exercise ( $d = 0.49$ ). The effect size of high-intensity aerobic exercise was not statistically significant.

A theory to possibly explain this finding is that cognitive function improvements were concomitant with an increase in hippocampal brain derived neurotrophic factor (BDNF) level, but the high-intensity exercise provoked higher levels of stress-hormone, which might interfere with BDNF level in hippocampus (based on animal research).

In terms of the measurement method, a moderate effect was observed in the studies using the Montreal Cognitive Assessment (MoCA) ( $d = 0.69$ ), whereas the pooled effect sizes of the studies using the Mini Mental State Exam (MMSE) and Addenbrooke's Cognitive Examination-Revised (ACE-R) were not significantly different. This result indicates that MOCA may be a better choice when assessing cognitive gains.

In addition, this review found no significant effects of aerobic exercise on different cognitive domains such as cognitive flexibility, working memory, selective attention and conflict resolution. Considering the specific role of different cerebral cortex regions in these sub-components of executive function, this review suggests that the site of stroke may be an important regulatory variable.

**Additional references:**

-ANPT: *Locomotor Training CPG Resource Page*. This page has an abundance of information/resources for clinicians interested in implementing locomotor training that incorporates aerobic activity in their clinic. <https://neuropt.org/practice-resources/anpt-clinical-practice-guidelines/locomotion>

-ANPT *National Campaign: Intensity Matters*. Includes clinical resources and a summary of supporting evidence. [https://neuropt.org/practice-resources/best-practice-initiatives-and-resources/intensity\\_matters](https://neuropt.org/practice-resources/best-practice-initiatives-and-resources/intensity_matters)





**STROKE SIG**

**STUDENT CORNER**

Academy of Neurologic Physical Therapy



We had a question posed on the Stroke SIG Student Corner. Thank you!

What are some general guidelines/tips for rhythmic auditory stimulation use with post-stroke gait training?

You can find more great content at the [ANPT YouTube Channel](#). Stroke SIG has it's own content under Playlists



## Sign up NOW to run for ANPT Office!!

Serving in an ANPT or SIG leadership position is a great way to engage with the neuro community. Your involvement and leadership ensures ANPT will continue to grow and be innovative. Consider serving in one of the open positions and make note of the upcoming deadlines. As a member-driven Academy, we need you to help define our future!

### 2023 Open Positions and Descriptions

The ANPT and SIG Nominating Committees have created a [web page](#) to answer your questions about each of the open positions.

- Secretary
- Director of Communications
- Director of Practice
- ANPT Nominating Committee

For Special Interest Group open positions, visit the SIG pages for information on their activities [here](#).

Nominations are **due March 27, 2023**. Elections will be held April 10 - May 8, 2023. Three-year terms begin July 1, 2023. If you are interested in getting involved in a leadership position, please contact one of the members of the ANPT Nominating Committee:

- Leslie Wolf
- KateENZler
- Lauren Bilski

You can also reach out to each SIG nominating committee as listed on the specific SIG Leadership pages.

VISIT THE [STROKE SIG](#) ONLINE!



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