

June 13th, 2022



STROKE SPECIAL INTEREST GROUP

Academy of Neurologic Physical Therapy

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- ANPT Launched a NEW Education Center
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Stroke Corner Article Review: Maintenance of Cardiorespiratory Fitness after Stroke: A Systematic Review

Thanks to Daniel Dray, DPT, NCS for reviewing this week's article

Maintenance of Cardiorespiratory Fitness in People with Stroke: A Systematic Review and Meta-analysis

Article reference: Machado N, Wingfield M, Kramer S, Olver J, Williams G, Johnson L. Maintenance of Cardiorespiratory Fitness in People With Stroke: A Systematic Review and Meta-analysis. Arch Phys Med Rehabil. 2022 Feb 13:S0003-9993(22)00209-X. doi: 10.1016/j.apmr.2022.01.151. Epub ahead of print. PMID: 35172177

Link to abstract: <https://pubmed.ncbi.nlm.nih.gov/35172177/>

Definition(s):

- **Cardiorespiratory fitness** refers to the “ability to transport and use oxygen” to carry out “large-muscle, dynamic, moderate-to high intensity exercise over a prolonged period of time.” Examples of cardiorespiratory fitness training modes include treadmill walking, cycling, outdoor walking, high-intensity interval training, elliptical training, and upper body cycling.
- Cardiorespiratory fitness can be expressed as **VO₂max** or **VO₂peak**. VO₂max indicates the maximum amount of oxygen that an individual can utilize during intense or maximal exercise. VO₂peak indicates the point at which oxygen uptake no longer increases (or increases only marginally) with an increase in workload. VO₂ peak was considered an outcome of interest given people with stroke rarely reach true VO₂max because of stroke-related impairments and fatigue.

Purpose of article: Cardiorespiratory fitness in people with stroke is 25%-45% less than age- and sex-matched adults without stroke. National and international clinical care guidelines recommend cardiorespiratory fitness training after stroke. The short-term benefits of cardiorespiratory fitness training for people with stroke at all stages of recovery are well established, and include improved modifiable risk factors for stroke (cardiovascular fitness, hypertension, obesity, dyslipidemia, sedentary lifestyle), improved cardiovascular function,

and improved neurologic impairment.

The purpose of this review was to determine if cardiorespiratory fitness is maintained after the completion of cardiorespiratory fitness interventions in people with stroke. This is an important question given higher levels of cardiorespiratory fitness are protective against secondary complications and vascular death. Further, the authors aimed to determine the impact of the type, intensity, duration, and details of follow-up on the maintenance of cardiorespiratory fitness.

Methods of interest: Two reviewers independently screened full texts and extracted data from medical literature databases. Studies included were randomized controlled trials and cohort studies including (1) people with stroke; (2) cardiorespiratory fitness interventions (individual or group based); (3) a direct measure of cardiorespiratory fitness (VO₂max or VO₂peak); (4) short- (0 to <3 months), medium- (3-6 months), or long-term (>6 months) follow-up data.

A lower limit of $-1.0 \text{ mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ was used to determine maintenance (ie, no change) of cardiorespiratory fitness. Any degradation of fitness greater than this was considered to be fitness that was not maintained.

Results of interest: Fourteen studies (N=324 participants) were included. The mean age was 68.7 years, and the mean time since stroke ranged from 14 days to 7.2 years. Participants completed cardiorespiratory fitness training 2-5 days per week over 4-13 weeks at

- moderate to high intensity (40%-70% heart rate reserve [HRR]; n=4 studies),
- high intensity (60% to <90% HRR; n=7 studies)
- intervals of high intensity (85%-95% peak heart rate or maximal heart rate; n=3 studies).

Most people with stroke did maintain cardiorespiratory fitness in the short- ($-0.19 \text{ mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ [95% CI, -1.66 to 1.28]), medium- ($-0.61 \text{ mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ [95% CI, -3.95 to 2.74]), and long-term ($0.00 \text{ mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ [95% CI, -2.23 to 2.23]) after completion of cardiorespiratory fitness interventions.

Discussion: Based on the results of this meta-analysis, it is evident that people with stroke can maintain cardiorespiratory fitness in the short-, medium-, and long-term after the cessation of a cardiorespiratory fitness intervention. However, these results should be interpreted with caution. Because there were only a small number of studies reporting long term maintenance of cardiorespiratory fitness, little is known about the impact of intervention (ie, type, dose) or participant (ie, stroke severity, age, sex, time post stroke) characteristics on long-term maintenance of cardiorespiratory fitness. Only 4 studies completed long-term follow-up, with the results suggesting mixed (combined with education/balance/strength training) interventions including high-intensity/high-intensity interval training of 10-12 weeks may be optimal for the long term maintenance of cardiorespiratory fitness. Two studies that included ongoing monitoring during the follow-up period were also able to demonstrate long term maintenance of fitness.

Given the importance of lifelong cardiorespiratory fitness, future research needs to target the factors that influence long-term engagement in cardiorespiratory fitness training and identify the long-term effects in people with stroke. Therefore, to determine the effect of the intervention on behavior change in people with stroke, future investigations should assess:

- (1) what model of care best supports long-term cardiorespiratory fitness maintenance (eg, group vs individual training, center vs home-based training),
- (2) the nature of the interventions (ie, cardiorespiratory fitness training alone or in combination with mixed interventions [ie, resistance or balance or stepping training] and/or education and/or ongoing monitoring),
- (3) what dose parameters of a cardiorespiratory fitness interventions optimize long-term maintenance of cardiorespiratory fitness (ie, intervention type, frequency, intensity, and

length), and

(4) long-term monitoring of risk factors, such as physical inactivity and low cardiorespiratory fitness.

Additional references:

ANPT: Locomotor Training CPG Resource Page This page has an abundance of information/resources for clinicians interesting in implementing HIT in their clinic.

<https://neuropt.org/practice-resources/anpt-clinical-practice-guidelines/locomotion>

Check out ANPT's NEW Education Center



The Synapse Online Education Center has moved to a new platform and has been rebranded as the [ANPT Education Center](#)! The new site will provide an improved user experience while offering access to interactive courses, recorded webinars, and podcasts.

Explore 40+ courses, 180+ podcasts, and enjoy new features, including:

- The ability to identify and search content using your own personalized areas of interest. This setting will notify you when new content is released.
- Links to companion ANPT resources on each topic to expand your learning.
- Easy compilation of CEU information into one transcript.

Notes:

All course content, registered users and completed CEU information has been transferred to the new site from the former ANPT Synapse Education Center. If you had an account on the old site, please use that email address and reset your password as private passwords did not transfer in the move. ANPT members who didn't previously have an account will use your APTA email and APTA ID number to log in. When you visit the site for the first time, please set up your profile so you can be notified of new content in your areas of interest.

If you have questions or problems entering the site email education@neuropt.org.

[ANPT Education Center](#)

Nominate Someone for an Academy of Neurologic PT Award!



[Nomination Link](#)

The Academy of Neurologic Physical Therapy Awards Committee is seeking individuals to be nominated for the 2023 ANPT Awards. This year there are ten individual awards all with nomination deadlines of [August 1, 2022](#).

AWARD DESCRIPTIONS

SIG Awards

SIG Service Award

Purpose: To acknowledge a member of a particular SIG who goes above and beyond through volunteer contributions to the SIG and its efforts.

SIG Research Award

Purpose: To recognize a member of a particular SIG who has demonstrate exemplary contributions to the body of research representative of the population the SIG serves.

Academy Awards

Service to the Academy Award

Purpose: To acknowledge and honor a member of the Academy of Neurologic Physical Therapy whose contributions to the Academy have been of exceptional value.

Excellence in Neurologic Research Award

Purpose: To acknowledge and honor a member of the Academy of Neurologic Physical Therapy who has demonstrated continuing excellence in research related to neurologic physical therapy science, theory, practice, or education.

Excellence in Neurologic Education Award

Purpose: To acknowledge and honor a member of the Academy of Neurologic Physical Therapy who is a gifted and creative educator. The awardee spends a majority of their time in an academic setting but continues to treat patients and develop strategies for intervention that directly affect patient care.

PT Clinical Excellence in Neurologic Physical Therapy Award

Purpose: To acknowledge and honor a physical therapist member of the Academy of Neurologic Physical Therapy whose major professional involvement and contributions are currently with the practice of neurologic physical therapy.

PTA Clinical Excellence in Neurologic Physical Therapy Award

Purpose: To acknowledge and honor a physical therapist assistant who is a member of the Academy of Neurologic Physical Therapy whose major professional involvement and contributions are currently with the practice of neurologic physical therapy.

Outstanding Clinical Innovator in Neurologic Physical Therapy Award

Purpose: To acknowledge and honor a member of the Academy of Neurologic Physical Therapy who translated recent evidence or emerging practice/business strategies into a program, initiative, or service to benefit patients/clients with neurologic impairment. The awardee should be individuals who led or co-led the implementation of this innovation and participated in monitoring its outcomes to measure its impact as well as success on the greater physical therapy community.

Outstanding Advocacy in Neurologic Physical Therapy Award

Purpose: To acknowledge and honor a member of the Academy of Neurologic Physical Therapy who is an advocate for the neurologic physical therapy profession and/or neurologic populations.

Early Career Professional Award

Purpose: To support new professionals who are members of the APTA Academy of Neurologic Physical Therapy and show potential to make lasting contributions to the Academy of Neurologic Physical Therapy, by providing them financial assistance to attend CSM.

CSM Abstract: Early Career Scientist Award – After submitting your abstract through the CSM portal complete the form on the application page to be considered for this award.

Please take the time to nominate a deserving colleague! For more information and nomination forms [click here](#).

Prepping for the NPTE or NCS? Check out our Stroke Test Prep Questions - Answer #1 Video Now Posted!



STROKE SIG
STUDENT INFO

Academy of Neurologic Physical Therapy

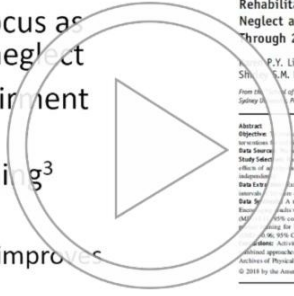
The [Stroke SIG Student Corner](#) team is putting together a series of test questions to help future takers of the National Physical Therapy Examination (NPTE) and Neurologic Clinical Specialist exam.

Test your stroke knowledge by visiting the [Stroke Corner website](#) (questions are at the bottom). New questions are posted around the first of the month.

This month's answer review video is now posted! Dr. Michelle Sawtelle reviews the evidence-based rationale behind the correct answer for the homonymous hemianopsia question.

Article 1²

- Visual pathway damage²
- Similar rehabilitation focus as with unilateral spatial neglect
- Activity-based vs. Impairment reduction
- Benefits of visual scanning³
- Outcomes:
 - Activity-based training improves visual outcomes & ADL performance
 - Non-activity-based training improves ADL performance



Archives of Physical Medicine and Rehabilitation
period. homepage: www.aphm.org
Archives of Physical Medicine and Rehabilitation 2019;100(9):79

REVIEW ARTICLE (META-ANALYSIS)

A Systematic Review and Meta-Analysis of Rehabilitative Interventions for Unilateral Spatial Neglect and Hemianopia Poststroke From 2006 Through 2016

Shih-Ping Y. Liu, Ph.D.,^{a,b} Jessica Hanly, MOT,^a Paul Fahey, MMedStat,^{a,b} M. M. Fong, Ph.D.,^a Rosalind Bye, Ph.D.^a

From the ^aDepartment of Science and Health, Western Sydney University, Parrish, Australia; ^bNeurological Health Research Institute, Western Sydney University, Parrish, Australia; and ^cSchool of Public Health, The University of Hong Kong, Hong Kong.

Objective: To determine the effectiveness of activity-based, nonactivity-based, and combined activity- and nonactivity-based rehabilitative interventions for unilateral spatial neglect (USN) and hemianopia.

Design: Systematic review and meta-analysis.

Setting: CINAHL, Cochrane Library, EMBASE, MEDLINE, and PubMed from 2006 to 2016.

Study Design: Systematic review and meta-analysis.

Study Population: Randomized controlled trials (RCTs) with a mean of or more on the Neurobehavioral Evaluation System Scale that examined the effects of activity-based and nonactivity-based rehabilitative interventions for people with USN or hemianopia. Two reviewers selected studies for inclusion.

Study Size: 10 studies from the published RCTs. Mean difference (MD) or standardized mean difference (SMD), and 95% confidence intervals (CI) were calculated. Heterogeneity was assessed using the I^2 statistic.

Results: A total of 20 RCTs for USN and 5 for hemianopia, involving 204 and 206 stroke participants respectively, were identified. Evidence was based on random-effects meta-analysis for visual scanning training and compensatory training for hemianopia and on fixed-effects meta-analysis for USN. Activity-based interventions were more effective than nonactivity-based interventions for USN (SMD=-0.40, 95% CI, -0.58 to -0.22; $P<.001$) on visual outcomes, and significant outcomes were observed for USN (SMD=-0.40, 95% CI, -0.58 to -0.22; $P<.001$) on functional performance in activities of daily living, and for hemianopia (SMD=-0.40, 95% CI, -0.58 to -0.22; $P<.001$) on functional performance in activities of daily living.

Conclusion: Activity-based interventions are effective and commonly used in the treatment of USN and hemianopia. Nonactivity-based and combined approaches for both impairments have not been defined, because more studies are required for substantial conclusions to be drawn.

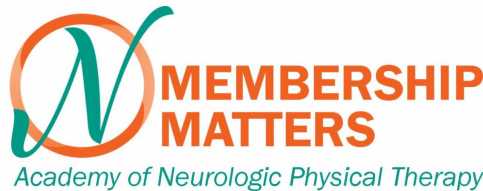
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Unilateral spatial neglect (USN) and hemianopia are debilitating impairments for people poststroke or brain injury, occurring in up to 52% and between 25% and 70% of cases respectively.¹ USN is a deficit of attention and is described as the inability to report, respond, or attend to sensory or visual stimuli when it appears on the side opposite to the lesion.² Hemianopia is described as the partial loss of the visual field in both eyes, arising when there is damage to the visual pathway.³ Partial limb losses are the most common cause where USN and hemianopia coexist.⁴ Both impairments are strong indicators of poor outcomes in relation to functional performance or independence in daily living, social, and emotional implications of functioning. In addition, both conditions affect body part representation in activity and mobility, identification for a specific, and it necessitates a specific approach to intervention programs. But, not to date.

Keywords: stroke, unilateral spatial neglect, hemianopia, visual scanning, functional performance, independence, daily living, social, emotional, implications of functioning, body part representation, activity and mobility, identification for a specific, intervention programs.

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