Short, intense bursts of exercise more effective after stroke than steady, moderate exercise

August 8 2024

One-minute, short bursts of high-intensity interval training for 19 minutes may be more effective for improving fitness among people six
months or more after a stroke than traditional, 20–30 minutes of moderate-intensity exercise sessions, according to research published today in the journal *Stroke*.

"This study shows that people with stroke can also benefit from high-intensity interval training," said Kevin Moncion, Ph.D., a physiotherapist who led this study as part of his doctoral studies at McMaster University in Hamilton, Ontario, Canada. "With the right support and guidance, stroke survivors can safely and effectively engage in high-intensity interval training, significantly improving their overall health and recovery."

The multi-site trial took place between September 2018 and March 2024 and included stroke survivors between six months to 5 years after a stroke. Researchers randomly grouped participants to receive either three days per week of 12 weeks of high-intensity interval training or three days per week of 12 weeks of traditional moderate exercise sessions. The high-intensity interval training protocol involved ten 1-minute intervals of high-intensity exercise, interspersed with nine 1-minute low-intensity intervals, for 19 minutes total. The moderate intensity continuous training involved 20 to 30 minutes of steady exercise at moderate intensity.

Researchers then compared fitness levels, cardiovascular risk factors such as blood pressure and stiffness of blood vessels, walking speeds and distances between the two groups. All assessments were repeated one final time 8 weeks after the exercise interventions to evaluate whether the changes were sustained over time.

Researchers found:

- The high-intensity interval training group's cardiorespiratory fitness levels (rate of oxygen consumed at peak exercise)
improved twice as much as the moderate intensity continuous training group: 3.5 milliliters of oxygen consumed in one minute, per kilogram of body weight (mL/kg/min) compared to 1.7 mL/kg/min.

- The improvement in the high intensity interval training group stayed above clinically important thresholds even at the 8-week follow-up (1.71 mL/kg/min), whereas the moderate intensity continuous training group did not (0.67 mL/kg/min).
- Both the high intensity interval training and moderate intensity continuous training groups gained improvement in walking endurance, as measured by distance walked over 6 minutes. At baseline, both groups could walk about 355 meters (the approximate distance of three American football fields) over 6 minutes. After 12 weeks of exercise, both groups increased their walking distance by 8 meters, and after the 8-week follow-up, they increased their walking distance by 18 meters.

"This is the first randomized trial to examine a time-efficient, high intensity interval training program to incorporate a phased and progressive approach," said senior author Ada Tang, Ph.D., a physiotherapist, professor and assistant dean of Rehabilitation Science at McMaster University. "We also used an adaptive recumbent stepper, which we believe allowed more people to participate in high-intensity interval training, even those who cannot walk fast enough or long enough on a treadmill."

The limitations of the study include that study participants were higher functioning stroke survivors from a physical standpoint who were at lower risk for heart disease. Study minimum criteria included the ability to walk 10 meters without the physical assistance of another person, although the use of a cane or walker was permitted. Outcome assessments were unblinded at follow-up, which may have influenced results. Lastly, enrollment and exercise for the trial was halted two years
for COVID-19 lockdowns, thus inflating the rate of participants who left the study and potentially limiting the statistical power of the analysis.

In 2021, there were 7.44 million deaths attributable to stroke worldwide, according to the American Heart Association's Heart Disease and Stroke Statistics 2024 Update.

Future research should examine stroke survivors with more severe impairment in physical function or heart disease risk, according to the study authors.

"Stroke rehabilitation professionals now have evidence to support implementing short, high-intensity interval training protocols in clinical practice. We showed our program is safe and effective at improving fitness and walking distance in people after stroke, which are important outcomes for stroke survivors," Tang said.

Study details and background:

- The study conducted at McGill University in Montreal and McMaster University in Hamilton, Canada included 82 predominantly white adults, (50 men, 32 women), ages 40 to 80. All had mild or minimal disability from a stroke about 1.8 years earlier.
- Participants exercised on adaptive recumbent steppers that allow for stroke survivors with a wide range of abilities to exercise at high intensities.
- Assessments were done 3 times in total: before starting exercise training (baseline, 0 weeks), immediately after exercise (post, 12 weeks), follow up 8 weeks after the intervention ended (i.e. 20 weeks from baseline).
- At each assessment, researchers measured cardiovascular health fitness levels, including resting blood pressure, stiffness of
arteries, waist-hip ratio (calculated by waist circumference at the belly button and hip circumference at the hip bone), and mobility (walking speed and distance).

- No participants experienced any adverse effects, including feeling tired, shortness of breath, muscle soreness, cramps or lightheadedness during exercise.

More information: Cardiorespiratory Fitness Benefits of High-Intensity Interval Training After Stroke: A Randomized Controlled Trial, Stroke (2024). DOI: 10.1161/STROKEAHA.124.046564

Provided by American Heart Association

Citation: Short, intense bursts of exercise more effective after stroke than steady, moderate exercise (2024, August 8) retrieved 16 August 2024 from https://medicalxpress.com/news/2024-08-short-intense-effective-steady-moderate.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.