

Motorized cycling may prime brain for relearning after stroke

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Micrograph showing cortical pseudolaminar necrosis, a finding seen in strokes on medical imaging and at autopsy. H&E-LFB stain. Credit: Nephron/Wikipedia

Exercise on a motorized stationary bike appeared to give stroke patients an advantage in relearning everyday tasks and improved motor function of their arms, according to research presented at the American Stroke Association's International Stroke Conference 2015.

Aerobic exercise has been shown to help the brain learn information. The role of [aerobic exercise](#) in enhancing neuroplasticity - the brain's ability to reorganize itself and form new connections - has not been well studied.

Researchers theorized that intense aerobic exercise would "prime" the central nervous system, to exploit the motor learning effects of task practice, said Susan Linder, P.T., D.P.T., N.C.S., a physical therapist at the Cleveland Clinic in Cleveland, Ohio.

In a small study of 17 [stroke](#) survivors (ages 23 to 84), researchers investigated what type of exercise might help stroke patients relearn [everyday tasks](#) and regain upper arm strength.

Stroke had occurred six to 12 months prior to study enrollment. All patients participated in upper extremity repetitive task practice to help regain arm use such as relearning how to hold a cup or fork or relearning how to dress themselves as well as improve their quality of life.

In addition to repetitive task practice, patients were assigned to one of three groups: forced exercise using a motorized stationary bike, voluntary cycling on a stationary bike without a motor, or no aerobic exercise training at all but twice as much repetitive task practice time. All cycling sessions were 45 minutes long, and were followed immediately by the upper extremity repetitive task practice intervention. Participants completed a total of 24 exercise sessions over an eight-week period.

Patients who exercised on the motorized [stationary bike](#) before their repetitive task practice session experienced a 34 percent improvement in their motor skills compared with 16 percent improvement among those who cycled on their own and 17 percent for those who doubled up on repetitive task practices but did not receive aerobic exercise training on

the bicycle. In addition, improvements in self-reported quality of life and depressive symptoms improved across all three groups, with trends favoring the motorized cycling group.

"Forced exercise administered via a motor-assisted stationary bicycle has shown to help patients with Parkinson's disease, another neurological disorder, and may improve neuroplasticity," Linder said. The advantage to the motorized bike is that it helps patients with limited mobility to pedal and achieve and maintain the intensity of training thought to be necessary to have an impact on brain function. It is important to note that the cycling is not passive; participants must contribute to the activity in order to exercise within their target heart rate range, he said.

According to the American Stroke Association, every 40 seconds in the United States, a person suffers a stroke, and nearly a quarter of these strokes are recurrent. Stroke is the fifth leading cause of death in the United States and a leading cause of long-term disability.

Reducing disability as well as the risk factors of a recurrent stroke could yield significant public health benefits, she said. Other studies have shown aerobic exercise conditions the brain for learning, so Linder says it's not a surprise that their results, although preliminary, suggest the same.

Although the study wasn't designed to measure patients' cardiovascular outcomes, it is well known that aerobic exercise improves blood pressure, cholesterol levels and blood flow.

"Not only are we improving motor recovery with half the amount of task practice but we're also improving cardiovascular health, and [stroke patients](#) often have cardiovascular co-morbidities," said Linder. "If we can improve motor recovery and cardiovascular health simultaneously, [patients](#) can regain lost motor function and improve their quality of life."

Provided by American Heart Association

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