

Moderate exercise improves brain blood flow in elderly women

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Research conducted at Texas Health Presbyterian Hospital's Institute for Exercise and Environmental Medicine in Dallas suggests that it's never too late for women to reap the benefits of moderate aerobic exercise. In a 3-month study of 16 women age 60 and older, brisk walking for 30-50 minutes three or four times per week improved blood flow through to the brain as much as 15%.

Rong Zhang, the lead researcher in the study, will discuss the team's findings in a presentation titled, "[Aerobic exercise](#) training increases brain perfusion in elderly women" at the Experimental Biology meeting (EB 2011), being held April 9-13, 2011 at the Walter E. Washington Convention Center, Washington, DC.

The Study

At the beginning of the study, the researchers used Doppler ultrasonography to measure blood flow in the women's internal carotid arteries, which are located in the neck and supply the brain with necessary glucose and oxygen-rich blood. After assessing the women's [physical health](#) and maximal oxygen consumption (VO₂ max), which is the body's maximum capacity to transport and use oxygen during exercise, the team tailored training programs for each woman according to her fitness level.

Training started at a base pace of 50-60% of the participants' VO₂ max

for 30 minutes per session, three times per week. By the third month, the team had increased the sessions to 50 minutes each, four times per week, and added two more sessions at 70-80% of the women's VO2 max for 30 minutes.

At study's end, the team measured blood flow in the women's carotid arteries again and found that [cerebral blood flow](#) increased an average of 15% and 11% in the women's left and right internal carotid arteries, respectively. The women's VO2 max increased roughly 13%, their blood pressure dropped an average of 4%, and their heart rates decreased approximately 5%.

According to Dr. Zhang, the results provide insight into how vascular health affects brain health. "There are many studies that suggest that exercise improves brain function in older adults, but we don't know exactly why the brain improves. Our study indicates it might be tied to an improvement in the supply of blood flow to the brain."

Blood Flow and the Brain

A steady, healthy flow of blood to the brain achieves two things. First, the blood brings oxygen, glucose and other nutrients to the brain, which are vital for the brain's health. Second, the blood washes away brain metabolic wastes such as amyloid-beta protein released into the brain's blood vessels. Amyloid-beta protein has been implicated in the development of Alzheimer's disease.

Whether the increased blood flow to the brain improves learning and reasoning has yet to be determined, says Dr. Zhang. "I don't have the data to suggest a correlation between brain perfusion and cognitive function, but this is something we eventually will see after this study is completed," he says. "We do know there is strong evidence to suggest that cardiovascular risk is tied to the risk for Alzheimer's disease. We

want to see how we can fight that."

Dr. Zhang stresses the importance of the finding that improvement in brain blood flow is possible in one's senior years. "We often start to see a decline in brain perfusion and cognitive function in the 60s and 70s. That's when the downward trajectory starts. We want to see how much we can do to reverse or delay that process."

Provided by Federation of American Societies for Experimental Biology

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