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Aerobic Exercise, Cognition, and Cerebrovascular Regulation

Aerobic exercise improves cognitive, cardiovascular, and cerebrovascular outcomes in healthy older adults.

In this single-group intervention study, researchers examined the effects of aerobic exercise on cognition, cardiovascular fitness, and cerebrovascular regulation in 206 healthy adults (mean age, 66 years; 51% female; mean blood pressure, 126/74 mm Hg) with low-active exercise levels. Cognitive outcomes included performance on executive functioning, memory, fluency, processing speed, and attention. Aerobic capacity was measured by participants' maximum oxygen utilization during treadmill exercise. Transcranial Doppler was used to determine cerebral blood flow through the middle cerebral artery (MCA). Cerebrovascular function was assessed at rest, euoxic hypercapnia, and submaximal exercise. All participants enrolled in a 6-month supervised exercise program that progressed from 20 to 40 minutes three times a week with intensities based on aerobic capacity. Participants were also asked to engage in an additional unsupervised session during the week.

Aerobic exercise improved executive function, verbal memory, fluency, and processing speed performance, as well as aerobic capacity. Aerobic exercise was significantly associated with increased mean peak flow velocity through the MCA and cerebrovascular conductance index (CVCi) and decreased cerebrovascular resistance index (CVRi) at rest. CVCi also increased and CVRi decreased during euoxic hypercapnia and submaximal exercise. In exploratory analyses, the pre- and postintervention changes in CVRi were negatively associated with change in executive function during submaximal exercise and positively associated with change in fluency during euoxic hypercapnia.

COMMENT

Aerobic exercise can improve cognition and cerebrovascular regulation and should continue to be recommended to promote brain health. Whether those with hypertension or underlying cerebrovascular disease have similar improvements is an area for further study, and the addition of structural neuroimaging could also inform these effects. ***— Jennifer Rose V. Molano, MD***

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Guadagni V et al. Aerobic exercise improves cognition and cerebrovascular regulation in older adults. **Neurology** *2020 May 26; 94:e2245. (https://doi.org/10.1212/WNL.0000000000009478)*