

A new US study found that increased cardiorespiratory fitness was linked to reduced brain atrophy in people with early stage Alzheimer's Disease, suggesting that either this directly caused the slow down in brain deterioration or some other unidentified disease related factor impacted both brain atrophy and cardio fitness.

This was the conclusion of Dr Jeffrey M. Burns, of the University of Kansas School of Medicine in Kansas City, and colleagues, who published their work in the July 15th issue of the journal *Neurology*, the medical journal of the American Academy of Neurology, of which Burns is a member.

Burns said in a press statement, "People with early Alzheimer's disease who were less physically fit had four times more brain shrinkage when compared to normal older adults than those who were more physically fit, suggesting less brain shrinkage related to the Alzheimer's disease process in those with higher fitness levels."

Burns and colleagues set out to examine the link between cardiorespiratory fitness and brain atrophy and cognition in people in the early stages of Alzheimer's Disease because earlier studies have suggested that physical fitness appears to slow the aging process, including age-related changes in the brain.

"This is one of the first studies to explore the relationship between cardiorespiratory fitness and Alzheimer's disease," said Burns.

For the study, 64 people without dementia and 57 with early stage Alzheimer's had MRI scans and standard clinical and psychometric tests; all participants were over 60 years of age.

The researchers measured peak oxygen consumption (VO<sub>2</sub> peak), the standard measure of cardiorespiratory fitness, during a graded treadmill test and estimated brain atrophy from the normalized whole brain volume seen on the MRI scan. They also measured white and gray matter.

The results showed that:

- There was a modest reduction in cardio fitness (VO<sub>2</sub> peak) in the Alzheimer's group compared to the non-dementia group.
- After controlling for age, VO<sub>2</sub> peak was related to whole brain volume and white matter volume in the Alzheimer's group.
- Taking out the effects of gender, severity of dementia, physical activity and physical frailty did not change the relationship.
- VO<sub>2</sub> peak was linked to cognitive performance (delayed memory and digit symbol tests) in the Alzheimer's group but this relationship went away after controlling for age.
- In the non-dementia group, cardio fitness was not related to brain atrophy.
- Cardio fitness in the non-dementia group was also linked to better cognitive performance but this went away after controlling for age.

The authors concluded that, "Increased cardiorespiratory fitness is associated with reduced brain atrophy in Alzheimer disease (AD)." As the study was not designed to establish cause, they added that, "Cardiorespiratory fitness may moderate AD-related brain atrophy or a common underlying AD-related process may impact both brain atrophy and cardiorespiratory fitness."

"People with early Alzheimer's disease may be able to preserve their brain function for a longer period of time by exercising regularly and potentially reducing the amount of brain volume lost. Evidence shows decreasing brain volume is tied to poorer cognitive performance, so preserving more brain volume may translate into better cognitive performance," said Burns.

***"Cardiorespiratory fitness and brain atrophy in early Alzheimer disease."***

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