

Walking Maintains Brain Volume, Prevents Cognitive Impairment

Emma Hitt, PhD, Medscape Medical News, Oct 13, 2010

October 13, 2010 — Walking at least 6 miles per week appears to maintain brain volume and preserve memory in old age, according to new research.

Kirk I. Erickson, PhD, with the University of Pittsburgh, Pennsylvania, and colleagues reported the findings in the October 13 online issue of *Neurology*.

"These findings are really quite astonishing," Dr. Erickson told *Medscape Medical News*. "Other studies have previously shown that exercise is related to brain function," he said, "but the fact that we found that walking as little as 1 mile a day is related to brain volume 9 years later, and dementia 13 years later, is truly novel and really quite impressive," he said.

Age-Related Loss of Brain Volume

According to the researchers, the volume of gray matter shrinks in late adulthood and often precedes cognitive impairment. Participation in physical activity and exercise has been "hypothesized to protect against the deterioration of brain tissue, but this hypothesis has not been tested in longitudinal studies," Dr. Erickson and colleagues write.

In the current study, 299 dementia-free people (mean age, 78 years) from the Cardiovascular Health Cognition Study were assessed for physical activity, as measured by the number of blocks they walked in 1 week. Nine years after the physical activity assessment, magnetic resonance imaging (MRI) scans were used to measure brain size. Four years later, the participants were tested for cognitive impairment and dementia.

Participants were classified into 4 quartiles based on the number of blocks walked, and MRI measurement 9 years later ascertained that gray matter volume in the highest quartile differed from the other 3 quartiles (all $P < .05$).

Participants who walked at least 72 blocks — approximately 6 to 9 miles — per week had more gray matter than people who walked less; however, walking more than 72 blocks did not appear to increase gray matter volume any further.

Areas of the brain with an increase in volume associated with a reduced risk of developing cognitive impairment were the inferior frontal gyrus (odds ratio [OR], 1.99; $P < .01$), hippocampal formation (OR, 2.01; $P < .009$), and supplementary motor area (OR,

2.24; $P < .01$).

In the 4-year follow-up, 116 of the participants, or 40%, had developed cognitive impairment or dementia. Greater gray matter volume with physical activity was associated with a 2-fold reduced risk for cognitive impairment.

"Based on our results, we can conclude that there is a relation between the amount of walking earlier in life and brain volume in later adulthood and that greater volume of tissue related to walking is associated with a reduced risk of cognitive impairment," the study authors suggest.

Dr. Erickson added that much more work is needed from randomized trials that assign people to an exercise treatment for long periods. "Only under these conditions will we be able to determine the extent to which exercise augments brain function in late life," he said.

Another Reason to Exercise

"The results of this study are exciting in that they suggest an association between physical activity, in the form of walking, brain structure, and dementia across the period of a decade," independent commentator Art Kramer, PhD, with the University of Illinois in Chicago, told *Medscape Medical News*.

"Such results provide yet another reason for the medical community to prescribe physical activity as means to reduce the probability of age-associated neurodegenerative disease," he said.

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