

## Reversal of Cognitive Aging with Second Heart Training

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Age related cognitive decline is a growing concern. In the United States alone over five million older adults currently suffer from dementia or cognitive impairment. Prevalence is strongly age dependent, with 14% of individuals over age 70 having some form of dementia, and by age 80, one in three will develop Alzheimer's disease. Because pharmaceutical approaches to treating dementia are not currently available, prevention must play a primary role in protecting older individuals from developing dementia.

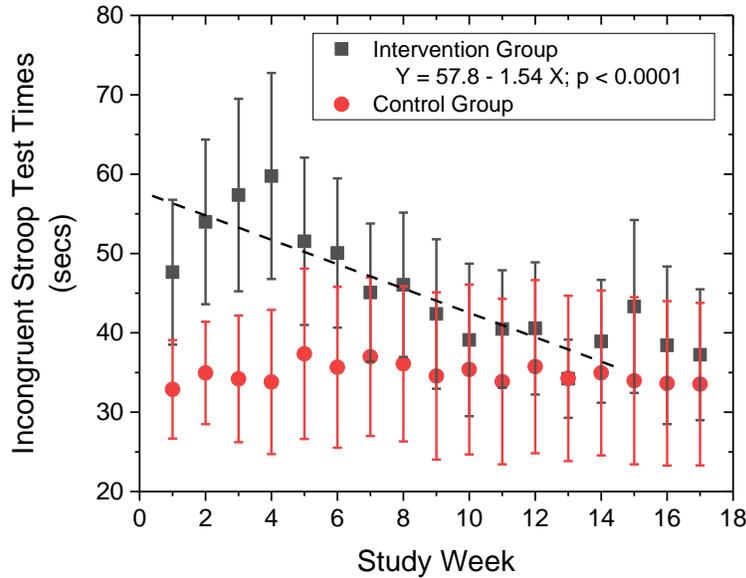
On the positive side, almost every type of exercise tested has been shown to be effective in slowing the progression of age-related cognitive decline. This is thought to be due to the fact that exercise improves blood pressure, and therefore blood flow, to the brain. On the negative side, exercise programs can be very difficult for many older people to maintain. Two-thirds of adults over 75 do not engage in any physical exercise other than their normal activities of daily living. Among those who are physically active, only 30% of men and 15% of women participate in exercise regularly. Moreover, among those who are motivated to initiate a new exercise program, over 50% drop out of the program before realizing any health benefits, with the majority dropping out in the first six months. The usual explanations for low rates of exercise participation include: that physical activity takes too much time and effort; that learning proper technique is too involved; that physical activity is accompanied by discomfort (sweating, muscle soreness); and, that the living arrangements do not support the required exercise schedule.

A recently published study has now demonstrated that a simple and convenient exercise program is sufficient to reverse age-related cognitive decline.<sup>1</sup> This exercise program utilizes a small floor-based appliance on which the individual can place their feet. The device provides micro-mechanical stimulation of the bottom surfaces of the feet, which is sufficient to activate the calf muscles in the lower legs. The calf muscles, specifically the soleus muscles, are responsible for maintaining venous blood return to the heart. Increased blood return to the heart results in improved cardiac output, which leads to a normalizing of blood pressure. A normal blood pressure – that is, a resting diastolic pressure (the lower number in a blood pressure recording) above 70 is necessary to ensure adequate blood flow in the brain. The soleus muscles are so important to ensuring normal heart function that they are referred to as our “second hearts.”

In the study, men and women living in a senior living center were separated into a normal blood pressure (control) group and a low blood pressure (intervention) group. The intervention group used a passive exercise device for one hour per day. Each week, all the participants in the study completed a cognitive function examination (21 item Stroop test) and had their resting blood pressure recorded. The study took place over a four month time period.

At the start of the study, average resting diastolic pressure in the intervention group was less than 60, compared to the control group with had a resting diastolic pressure above 75. With use of the passive exercise device, blood pressure in the intervention group rapidly normalized, so that by 14 weeks, blood pressure in the two groups was essentially the same.

Similarly, cognitive performance in the intervention group was far worse than in the control group, with the intervention group taking almost twice as long to complete a cognitive test than the control group. However, by the fourteenth week of the study, cognitive performance in the intervention group had improved to the point where their test times matched that of the control group.



After fourteen weeks, the participants ended their exercise programs, and correspondingly, their test times started to increase.

Adults in the U.S. sit for an average of over 12 hours per day. As a result, the soleus muscles in most adults is not sufficient to maintain adequate blood flow to the brain. As we age, this situation only gets worse, resulting in chronically low blood flow to the brain and the onset of dementia. Fortunately, passive exercise of the soleus muscles, which can reverse this process, can be undertaken anytime and anywhere an individual is sitting.

Sonostics, Inc. has developed a commercial version of the soleus muscle stimulation device utilized in this study. Sonostics refers to their passive exercise device as the HeartPartner. The HeartPartner is available to anyone as it does not require a physician’s prescription. Using the device to exercise your calf muscles is very convenient, as it does not require removal of socks or shoes, it simply needs to be placed in a location where the feet can be placed on the device whenever the individual is sitting. A quick evaluation of resting diastolic pressure is all that is required to determine if an individual is at risk of reduced blood flow to the brain, and just an hour or more a day of “exercising” with the HeartPartner will help to normalize blood flow to the brain, slowing, and even reversing, age-related cognitive decline.

*McLeod KJ & Stromhaug A (2017) Reversal of cognitive impairment in a hypotensive elderly population using a passive exercise intervention. Clinical Interventions in Aging, 12:1-8.*