



Alzheimer's Disease: So Many Questions

Leading Research Supports That Exercise Boosts Brain Power

BY ANGIE MILLER, MS

Alzheimer's disease, the most common form of dementia, is the seventh leading cause of death in the United States, with an estimated five million men and women affected. Analysts project that by the year 2030, the number will reach 7.7 million, and by the year 2050 more than 11 million people may be affected.

According to Lorne Label, MD, MBA, Director of Center for Longevity of the Brain in Thousand Oaks, Calif., and Associate Clinical Professor of Neurology at UCLA, "If you do not currently know someone with memory loss—a family member, friend, neighbor or co-worker—then you most certainly will know someone in the near future." Label states, "Dementia is a subject that most people try to avoid. Just the thought of memory loss—in a loved one, friend, co-worker or, worse yet, ourselves—makes us terribly uncomfortable. Unless we are confronted directly with dementia, we prefer to think of it as 'someone else's problem.'" But as Label points out, dementia is one of the world's fastest growing diseases and soon it will become "everyone's problem."

These statistics, due in large part to a population that is expected to live longer, has leading researchers, scientists and experts in the field of neurology searching for answers. The question on everyone's mind is, "What can we do to prevent this disease?"

Richard J. Hodes, MD, Director, National Institute on Aging, NIH, comments, "If we fail to prevent Alzheimer's disease in the years and decades to come, we'll face an enormous increase in human suffering as well as the financial and societal impact that will occur."

What Is Alzheimer's Disease?

Alzheimer's disease is a progressive and fatal brain disease that attacks and destroys brain cells. It's irreversible and leads to memory loss, impaired cognitive abilities, and eventually the inability to carry out even the simplest tasks of daily living.

Alzheimer's Facts

1. During the period from 2010 to 2050, the costs of care for Americans age 65 and older with Alzheimer's disease will increase five-fold, from \$172 billion to \$1.08 trillion per year.
2. This does not include the value of unpaid care provided by families and others, estimated to have been \$144 billion in 2009.
3. Currently, there are no treatments to prevent or cure the progression of Alzheimer's and other dementias. The five medications that are approved by the U.S. Food and Drug Administration (FDA) temporarily reduce symptoms for some, but they cannot change the underlying course of the disease.

Lifestyle Changes...Currently Our Best Strategy

Lifestyle changes may be our best strategy toward lowering the risk factors that potentially lead to Alzheimer's and dementia.

According to Label, "There are modifiable lifestyle factors that can improve brain health and potentially decrease our risk of dementia." These factors include but are not limited to the following:

1. **Socialization.** Research verifies that the larger a person's social network the more support they receive and the more they engage in activity. Remaining socially active is especially important as a person ages.
2. **Brain exercising activities.** The brain is like a muscle and it's important to continually challenge it with cognitively stimulating activities.
3. **Diet.** Eating a healthy diet helps lower the risk factors for many diseases, and a disease of the mind is just one of them.
4. **Decreasing Depression.** Participating in activities, having an active social life and eating a healthy diet all contribute toward keeping depression at bay, which is especially significant in the elderly population.

5. Engaging in physical exercise. Exercise gets blood flowing to the brain.

How Important Is Exercise?

According to Label, "There is a fair amount of literature that supports that exercise will improve our cognitive status." In one of his articles, "*Keep body, brain working*," Label states that exercise stimulates brain cell growth, enhances blood flow to the brain, and increases the density and size of the brain capillaries, thus increasing oxygen to the brain.

He believes that exercise may potentially decrease our risk of dementia because:

1. "Exercise raises the level of BDNF (brain-derived neurotrophic factor) in the brain. BDNF strengthens neurons and protects them from the natural process of cell death."
2. "Exercise improves blood flow...to the brain."
3. "Exercise promotes neuroplasticity." Sleep deprivation, stress, depression, diabetes and smoking, among other factors, decrease neuroplasticity.

According to Reisa Sperling, MD, MMSc, Associate Professor of Neurology, Harvard Medical School, and the Director of the Center for Alzheimer's Research and Treatment at Brigham and Women's Hospital and Massachusetts General Hospital, "There is evidence that aerobic exercise has beneficial effects on the brain, but we still need well-controlled trials that prove that exercise *changes the course of dementia or Alzheimer's disease*."

Sperling states that exercise has "Multi-factorial benefits. It is thought to increase brain growth factors, and may have positive effects on Alzheimer's pathology, which are the underlying brain changes that are believed to cause dementia."

Dr. Laura Baker, PhD, Assistant Professor at the University of Washington, School of Medicine and the VA Medical Center in Seattle, believes that "Exercise may postpone cognitive impairment or even improve cognition with or without memory impairment." She states, "Exercise will not totally negate the risk factors... but the question is: If exercise were to buy you an extra six months, or another year of cognitive health, would you be interested?"

Her belief is that the American culture, one prone toward sedentary lifestyles, high levels of stress, processed foods and poor

diet, puts a large percentage of the population at risk for diseases such as type 2 diabetes, heart disease and stroke. These diseases affect the vascular system and are tied to declines in cognitive health and increased risk for Alzheimer's and dementia. Baker believes that exercise can help modify and control the risk factors for these diseases and is therefore "one of the most potent interventions."

Label agrees that there is no definitive evidence that exercise can help ward off Alzheimer's and dementia, but his philosophy is this: "Why not? If we find out someday that exercise didn't help the brain, but it improved our quality of life, ultimately how can it hurt?"

What Do the Studies Show?

In an observational study published in the *Annals of Internal Medicine*, January 2006, involving 1,740 participants older than 65 years of age, findings suggested that the risk of Alzheimer's was 35 to 40% lower in those who exercised for at least 15 minutes three or more times a week than in those who exercised fewer than three times a week. Although it did not directly demonstrate that exercise reduces the risk of dementia, findings implied that regular exercise may be associated with a *delay in onset* of dementia and Alzheimer's disease.

In another study, led by neurologist Dr. Scott Small at Columbia University, magnetic resonance imaging (MRI) scans looked at the brains of people before and after exercise, measuring and tracking cerebral blood volume. Results showed an increase in brain activity and growth of new brain cells as participants' cardiovascular fitness increased.

In a study published in *Archives of Neurology* in January 2010, the objective was to examine whether 6 months of aerobic exercise could benefit memory and thinking abilities in people with mild cognitive impairment, known as pre-Alzheimer's disease. Thirty-three people were involved in the controlled trial: two-thirds in an aerobic group, one-third in a control/stretching group. All participants were sedentary to begin with. During the study, participants exercised four times per week for 45 minutes, and performed memory and thinking tests before and after the study was conducted.

The aerobic group improved their executive function abilities on average 25%. Executive function abilities are essentially the cognitive abilities we use to select information, immediately process it and then respond. They are similar to critical thinking skills. The stretching group showed no improvement in executive function abilities.

According to Dr. Baker, "No other intervention trials have demonstrated an improvement in cognition in people who already have mild cognitive impairment (MCI)/ pre-Alzheimer's disease."

One Final Word

With current research demonstrating a strong correlation between exercise and improved cognitive functioning, we know that exercise can do more than burn calories and trim our waistlines. While *exercise is not a proven method of prevention against Alzheimer's and dementia* (a critical distinction that should be noted), research does support that exercise can help *modify and control* risk factors that potentially *lead to* Alzheimer's and dementia. The next time you're training a client or teaching your favorite step class, remember that you are not just boosting their metabolism, you're boosting their brain power as well. **AF**

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