

Exercise and Brain Health

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I'm sure many of you have come across this situation: Your father or mother retires at age 65 or so and spends the rest of his or her days "relaxing." After several years of puttering around the yard, visiting the grandchildren, and watching "Wheel of Fortune," you notice that their mental abilities aren't quite as "sharp" as they were in the years before retirement. After a few more years, they are on the road toward needing assisted living. Sound familiar? It is to me. It's pretty much exactly what happened to my own father.

It is a fact of our biology that the brain begins to lose neurons (nerve cells) pretty steadily after we reach early adulthood. That means that over time, one's memory and reasoning power gradually decline. This process accelerates after the age of around 60; by that time, the brain is losing approximately 0.5-1% of its volume each year. As time goes on, many people develop so-called mild cognitive impairment, which is often the first step along the way to a full-blown dementia. In decades past, it was believed that there was little to be done about this.

However, we now know that this is no longer the case. Beginning in the 1970's, scientists discovered that the brain has the ability to form new neurons and make new connections with existing neurons. This was the first hint that the brain is really a "plastic" organ; that is, it is capable of dynamic change. Instead of being cast in "stone," the brain actually has the capacity to reshape itself in a very real sense. The whole idea of a dynamic and changing brain was revolutionary.

Over the last ten years or so, the concept that the brain is capable of such change has become well-accepted. From a practical standpoint, this means that the steady and inevitable decline of brain function in old age may not be so inevitable after all. In addition, there are some things that can be done to stave off this gradual decline in our intellectual capacity.

As we get older, the areas of the brain that seem to suffer the most are the prefrontal cortex, which is involved in judgment, reasoning, and planning as well as our working memory (which is what we use when we need to keep some piece of information readily retrievable while we're doing something else). Another part of the brain that suffers is the hippocampus, which is important in long-term memory. After age 50, for instance, recall becomes slower (it may take a few minutes to recall something) and it may be harder to solve a complex problem. By the age of 70 or 80, a significant proportion of the population is cognitively impaired (up to 25% of people in their 80's are demented).

It turns out that aerobic exercise (running or walking are examples of aerobic exercises, as opposed to lifting weights, which is a form of anaerobic exercise) is one of the most effective ways to ward off this age-related decline in brain function. Regular exercise not only increases blood flow to the brain, but also stimulates the production of so-called "brain-derived neurotrophic factor," which promotes the growth of new brain cells.

What seems to be happening is that the increase in blood flow to the brain has long-lasting benefits; brain cells get stimulated and over time, blood flow to the brain is increased even in the absence of physical activity. In a sense, aerobic exercise appears to serve an important "maintenance" function for both the blood vessels that supply the brain and the brain itself. This enables existing neurons to maintain their connections with each other (and form new connections) more effectively; over time, their numbers may increase as well. As a result, the brain is "protected" to some degree against the aging process.

The take-home message here is simple; if you are medically able to engage in regular aerobic exercise (and always check with your health-care provider before beginning any exercise regimen) the time to start is now. As someone once said: "no pain, no (mental) gain."