Does a Regular Program of Physical Activity Delay the Progression of Cognitive Decline in Elderly Patients?

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Abstract

The relationship between physical activity and cognitive impairment in aging adults is researched and discussed. Using professional journal articles and studies, it has been found that this relationship does exist. In the nursing field this is important information because it can change the way that we look at the physical activity of our patients. This information has implications not only for slowing down the advancement of cognitive impairment in patients but also may have a part in preventing cognitive impairment from starting.
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The average life expectancy for men and women, according to the United States Census Bureau, has been increasing approximately one and a half years over each ten year span since 1980 (2006). Americans are living longer and the incidence of dementia is increasing. In 2008 it was estimated that 6-10% of people age 65 and older have been diagnosed with a form of dementia (Senior Home Care Information, n.d.). The importance of a healthy lifestyle is being promoted as a way to decrease the risk for chronic illness such as heart disease and stroke. Would this lifestyle also be beneficial to prevent or delay the onset of cognitive decline? Using professional articles and studies the relationship between a healthy active lifestyle and the onset of cognitive impairment is explored. We have found that there is a direct link; that staying active offers some protection to cognitive functioning. As healthcare providers, we believe that these findings will be beneficial to the health promotion of our patients.

Question at Issue?

Aging is inevitable. As we age, there is a question of whether or not we will remain cognitively intact. The presence of patients with cognitive disabilities is increasing, yet there are many who maintain a high level of cognitive functioning throughout this process. Is there a way to prevent or delay a cognitive decline as we age? Studies have been conducted in the pursuit of the answer to the question; does a regular routine of physical activity prevent or delay cognitive decline with aging?

What is Dementia?

According to the Medical-Surgical Nursing textbook, dementia, or cognitive decline, is defined as “a syndrome caused by brain disease, evidenced by chronic personality disintegration,
confusion, memory impairment, deterioration of intellectual capacity and function” (Lewis, Heitkemper, & Dirksen, 2007, p. G-3) The article “Physical Activity, APOE Genotype, and Dementia Risk: Findings from the Cardiovascular Health Cognition Study”, states that dementia is, “A condition characterized by a global decline in cognitive functioning” (Podewils et al., 2005, p. 639). There is a variety of dementia types however they all share common traits or brain abnormalities such as “accumulation of amyloid proteins, neurofibrillary plaques and tangles, neurodegradation, decline in endogenous neurotransmitters and synaptic density, increase in cellular oxidative damage, and increase in central inflammatory processes” (Packer, p139). Cognitive and behavioral symptoms are also used to characterize types of dementia. These symptoms include the ability to perform activities of daily living, communication abilities, orientation, decision making abilities, and memory loss (Packer, p139). Dementia ultimately affects the mental and physical ability of patients as well as their families and is irreversible. For this reason, prevention as well as delaying disease progression is of interest.

Assumption and Facts

The common assumption about aging is that inevitably our bodies begin to slow and lose strength and agility. No one expects to be able to run as fast or work as long as they did when they were younger. The same belief is true of our minds. One’s mental faculties are expected to show signs of decline as one gets older. There is deterioration in structure, metabolism, and function of the brain.

The normal process of aging is associated with many cellular changes. There is a decrease in cerebral white matter as well as shrinking in various areas of the brain. There is a dwindling in the weight and size of the brain. After the age of twenty, the brain can shrink between five and ten percent.
In addition to the physical changes that occur to our brains as we age, research has shown that the cognitive losses that also happen are due not to the effect of the loss of neurons but are due to the chemical changes that take place over time. (Guttmann, n.d., para. 10)

The overall health benefits of regular physical activity have been well researched and publicized. Most of our patients are aware of the cardiovascular and musculoskeletal benefits of exercise. As van Ufflen, et al (vanUffelen, Hopman-Rock, Chin A Paw, & vanMechelen, 2005) demonstrate, physical activity improves cerebral blood flow and the effectiveness of cellular function. Physical activity also supports good sleep which aids neurological health.

In addition to the physical benefits to our brain, regular physical activity also provides psychosocial benefits. Research indicates that a feeling or sense of being in control over one's own life plays a role in maintaining cognitive function. The perception of loss of control leads to stress. This stress in turn causes physiological changes brought on by the endocrine system. (Wight, Aneshensel, Seeman, & Seeman, 2003). Stress causes the release of the hormone cortisol. Increased cortisol levels over an extended period of time have been shown to break down the connections between neurons in the brain. Cortisol also interferes with the operation of neurotransmitters - the chemicals that transfer messages from one brain cell to another. Stress has also been noted to speed up cellular aging. The effects of stress initiate "a cascade of events that eventually may lead to widespread cell death and dementia."("This is your brain getting older", 2006, p. 1). Physical exercise has been known to lower stress levels thereby preventing this cascade from taking place. The cognitive decline seen from increased cortisol and the cellular aging that results could be avoided.

There is increasing evidence that indicates continuing a healthy lifestyle that includes regular physical activity helps protect and preserve cognitive functioning as we age. Since no
one can avoid aging, the long term benefits of participating in regular physical activity far outweigh any possible negatives. The phrase “use it, or lose it” takes on an entirely different connotation when we realize that any exercise we get today will help us reap incredible benefits for many years to come. The challenge to healthcare providers is to encourage and challenge our patients, regardless of their present level of physical activity, to incorporate a regular program of physical activity into their daily routines.

Conclusion

Average life expectancy is increasing along with a rise in rates of dementia- this creates curiosity in how one can prevent or delay the progression of such a cognitive decline. There are many different types of dementia and factors such as physical and behavioral symptoms and abilities are taken into account when a diagnosis is being considered. Many assume that as one ages, the body will lose speed and agility, but do not take into account the effect of aging on cognition. Regular physical activity does have the ability to slow the progression of cognitive decline both physically and psychosocially. Physically, regular activity improves cerebral blood flow and the effectiveness of cellular function. Psychosocially, physical activity decreases stress which in turn decreases cortisol which prevents breakdown of connections between neurons, prevents interference of neurotransmitters, and prevents the speeding up of cellular aging. As healthcare providers we must encourage our patients to incorporate a routine of physical activity into their daily lives.
References


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This is your brain getting older: some brain changes are inevitable with aging, others may be avoidable. Here’s what you need to know to stay sharp longer... (2006). *Mind, Mood, and Memory, 2*(8), 1-2.