



Physical Exercise Can Fight Alzheimer's Disease

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Abstract

Alzheimer's disease (AD) is a very common and prevalent type of dementia, affecting millions of people in the world, and there is no current cure. However, current research and several studies have shown that healthy lifestyle habits, especially physical exercise, can help with the prevention of AD. The purpose of this literature review is to analyze existing research on how physical exercise affects the risk of AD and its progression. This review will discuss how brain blood flow, healthy lifestyle changes, and exercise hormones affect AD. The studies discussed in this review have found that physical exercise consistently improves general brain health and reduces the progression of AD, which can be a temporary solution to helping AD patients until a real treatment is found. While there are some limitations of the studies, such as few of them involving lab animals rather than actual human subjects, the results are promising and suggest that physical exercise can reduce the risks of AD and related issues overall.

Introduction

Alzheimer's disease (AD) is a specific type of dementia that affects millions of people worldwide, and no cure currently exists. It is very common among elderly patients, and in fact, approximately 60-80% of dementia cases are classified as AD. It is caused by the accumulation of beta-amyloid plaques and tangles of tau in the brain, which eventually destroy nerve cells and lead to memory loss. An AD patient's condition does not deteriorate immediately. Rather, it is a slow progression from asymptomatic to mild cognitive impairment to dementia. Unfortunately, no perfect cure for AD currently exists, but there are some treatments (e.g., donanemab and lecanemab) that can lessen cognitive decline by getting rid of beta-amyloid plaques (1). AD is very prevalent in certain countries, including the United States. Approximately 6.9 million elderly Americans (aged 65 years and older) suffer from AD. Many factors that lead to AD are uncontrollable, such as age, genetics, high blood pressure, cholesterol, and hearing loss. However, many factors that cause AD can be controlled and/or eliminated, such as smoking, lack of exercise, poor sleeping habits, and limited social and mental engagement. In fact, current research suggests that the risk of an individual getting AD lowers when they eat healthy and exercise regularly (2). This research literature review will try to summarize all the findings of how physical exercise improves and fights AD. Specifically, the review will discuss how exercise affects brain blood flow, healthy lifestyle changes, and brain hormones that each affect cognitive function.

Research Findings

The first study that will be discussed was conducted by Dr. Jonathan S. Stamler and his research team at the Harrington Discovery Institute, and the results are summarized in the article "Can Individualized Exercise Slow Alzheimer's Disease?" (3). Dr. Stamler and his team discovered that red blood cells release nitric oxide during exercise, which expands blood vessels and increases blood flow in the brain. They also conducted a lab animal study on mice and found that mice without nitric oxide were not able to increase blood flow to their brains and had severe memory loss. Based on their findings, they encourage AD patients to exercise and improve the blood flow in their brains, thus improving memory/cognition and reducing the effects of AD. The next study to be discussed is the U.S. POINTER study from the article titled "Get



Moving” on the Alzheimer’s Association website (4). The study conducted a healthy lifestyle program involving nutrition, exercise, and cognitive engagement. The researchers found that the program greatly improved the well-being of the brain. Also, they found that exercise had a significant effect on reducing AD in patients, and even just 20-30 minutes of walking per week was beneficial. This is because physical exercise increases heart rate and improves oxygen flow to the brain and neurons. They also noted that physical exercise not only helps with conditions like AD, but also other conditions like managing diabetes, blood pressure, and weight. The next study that will be discussed is “Exercise Hormone Irisin Is a Critical Regulator of Cognitive Function,” which is published on the Nature website (5). This study talked about how exercise makes the body release irisin, a kind of hormone. The researchers used mice to test whether irisin could help reduce cognitive decline and improve brain health. They changed the genetic makeup of the mice so that they did not have irisin. They found that this caused memory issues in the mice and cognitive decline. Many conditions similar to AD formed within the mice. They also tried a reverse experiment where they improved the irisin levels in the mice’s bloodstream, which improved both memory and prevention of AD-related conditions in the mice. This suggests that physical exercise (which corresponds with irisin) can help reduce and prevent AD and dementia, in general.

Conclusion

Across all three studies discussed in this literature review, physical exercise was shown to have a positive effect on brain health and AD, even though each study was quite different while having the same goal. The first study aimed to improve blood flow through nitric oxide (3), the second study tried to improve overall lifestyle and oxygen flow through the U.S. POINTER Program (4), and the last study tried to improve irisin hormone release (5). All of these studies resulted in the same conclusion: physical exercise helps manage AD. However, there are some limitations that need to be discussed. Two of the studies were conducted on mice. Although mice are approximately 85% genetically similar to humans, we cannot assume that the results will apply perfectly to humans. Nevertheless, the results discussed are promising, regardless. Physical exercise could greatly help with fighting AD, but it would be ideal if more human-based research were done on this to confirm that results are accurate. Regardless, it is recommended that AD patients exercise in general based on the positive outcomes described in the research.



References

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