Effects of Brain Training on Brain Function

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NON-PHARMACOLOGICAL STRATEGIES TO IMPROVE BRAIN FUNCTION

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INTRODUCTION

Brain cognition is a set of mental abilities or processes involved in almost every human action while awake. Every year one million Americans are diagnosed with a chronic brain disease or disorder. Each year over 3 million people suffer from a TBI in the United States (Lawton 2019). Brain cancer is ranked 12th worldwide for mortality (How common are brain tumors?). Therefore, it is necessary that humans take all precautions to prevent brain deterioration and improve brain function. The purpose of the research is to examine the best non-pharmacological strategy to improve brain function and determine which strategy is the most effective for various populations.
Strategies

01 EXERCISE

02 DIET

03 SLEEP
- Physical Exercise
- Brain Training Exercise
- Breathing Exercise
Physical exercise is the most effective strategy to improve brain health and function. Physical exercise has proven to be a protective phenotype against Alzheimer’s Disease (Bernardo 2016). Physical exercise enhances spatial memory, pattern separation, and hippocampal circuitry (Emrah 2016). The greater the intensity of a workout the greater the brain improvement, especially in old age (Emrah 2016). Research has shown that the brain cognition is enhanced by 30% over a six-month period of moderate to high intensity workouts (Bergland 2019).
Brain training exercise is a growing strategy that has proven to enhance brain function. Brain training games have been classified as an active workout for all age groups. Neuroscientists have found that the brain has the capacity to make new neural connections despite age which allows the brain to be more adaptive (Atwood 2016). Nintendo’s, “Brain Age” and Lumosity are two of the most commonly used brain training games that are studied. Research has revealed that brain training games and video games have both increased executive functions, working memory, and processing speed.
A study analyzed the effects of focused breathing exercises on cognitive performance through standardized testing. The results found improvement in mood, attention, and health (Eisenbeck 2018). Focused breathing exercises increased performance for the memory task significantly more than the control exercise (Eisenbeck 2018). The study found that breathing exercises can improve overall health and prevent the onset of several diseases including Alzheimer’s Disease, heart disease, and Type II diabetes.
Cross-Sectional Data From More Than 1.2 Million Individuals in the USA

- Popular sports
- Cycling
- Aerobic or gym
- Running or jogging
- Recreational or other
- Winter or water
- Walking
- Missing
- Household

Source: The Lancet Psychiatry, August 2018

Mean mental health burden in the past month (days):

- No exercise
- Exercise

Reduction in mental health burden compared with no exercise (%):
One’s diet is very important to the way the brain functions. The diet must be healthy in providing valuable vitamins and minerals the brain fuels on in order to work efficiently.
The foods you eat affect your body. These effects can be positive or negative. When it comes to brain boosting foods, they create positive change within the brain because they are compiled with antioxidants, vitamins, and minerals. Research has proven that brain boosting foods enhance memory and concentration. These foods include fatty fish, blueberries, turmeric, avocados, leafy green vegetables, dark chocolate, flax seeds, and nuts. Research has shown that brain boosting foods are high in vitamins B, C, D, E, and K. Vitamin B12 is one of the most important vitamins to brain health because it helps to balance homocysteine levels. Studies have also shown that vitamin D benefits the brain with different diseases as it acts as a neuro-steroid that influences regulatory responses within the brain (Kesby 2011).
Studies have shown that sleep deprivation causes interruptions in serotonin, dopamine, and cortisol levels which affect thought, mood and energy. However, proper sleep is linked to increased immune function, improved concentration, decreased risk of heart disease and stroke, and decreased weight gain and inflammation. During sleep, brain cells repair and recharge and heart rate, blood pressure and body temperature fall.
Effects of Sleep deprivation

- Irritability
- Cognitive impairment
- Memory lapses or loss
- Impaired moral judgement
- Severe yawning
- Hallucinations
- Symptoms similar to ADHD
- Impaired immune system

- Increased heart rate variability
- Risk of heart disease
- Increased reaction time
- Decreased accuracy
- Tremors
- Aches

Other:
- Growth suppression
- Risk of obesity
- Decreased temperature

- Risk of diabetes Type 2
CONCLUSION

- Brain health and cognition are very important areas of research.
- Over one million Americans are diagnosed with a chronic brain disease or disorder each year. Understanding more about the brain and how it functions is necessary to decrease that statistic.
- Brain cognition and function can be improved through non-pharmacological approaches which also includes some of the most effective strategies.
- These non-pharmacological strategies include exercise, diet, and sleep.
- Exercise has been proven to be the most efficient strategy to improve brain function amongst all age groups.


Additional Resources


