The Neurological Benefits of Exercise

A round-up by Sophie Addison

1. **Enhanced Cognitive Capabilities**

In examining the theory that regular exercise enhances cognitive capabilities, Colcombe and Kramer (2003) conducted a meta-analytic study of eighteen independent reports published between 1966 and 2001. At the end of their thorough analysis, both experts were convinced by evidence that regular exercise helps to enhance cognitive functions.

Colcombe and Kramer (2003) further elaborated that individuals who actively exercised experienced a 0.5 SD increase in cognitive performance. Furthermore this statistic remained constant across different types of exercise, cognitive tasks, and personal characteristics.

2. **Effective Stress and Anxiety Management**

The demands of modern society mean that majority of the population must cope with excessive stress and anxiety levels. Ineffective stress management techniques can have dire consequences and lead to a myriad of health implications.

Streeter et al. (2010) addressed this issue by conducting a 12-week intervention to measure the effects on stress of yoga exercises versus walking. The study concluded with convincing results showing increased GABA levels in each participant, which led to decreased stress and anxiety levels. The benefits of yoga are not restricted to stress and anxiety management only, majority of the study participants were using it as an alternative back pain treatment.

3. **Promotes Brain Longevity**

Other than promoting better health, Wright et al. (2016) put forward the theory that regular physical exercise can help to promote brain longevity.

The longitudinal study involved 876 participants who were tested with a brain MRI and several thinking tests at baseline, 7 years and 5 years later. When these results were compared, it was discovered that participants with low levels of physical activity also recorded a significant cognitive decline.

The results were controlled for the variables of smoking, high blood pressure, and body mass index which also impact cognitive functioning, and even with these factors controlled the decrease in cognitive function equated to ten years of aging!

4. **Improved Brain Health**

In Cotman and Berchtold (2002), both authors acknowledge that exercise benefits the brain in various ways such as increasing the levels of brain-derived neurotrophic factor (BDNF), which stimulates neurogenesis and promotes resistance to brain insult.

In a general sense, the authors believed regular physical activity as a global behavioural practice activates cellular and molecular cascades that maintain brain health.

Through each activity, the brain receives important information from the environment and activates mechanisms to protect itself from damage. Each exercise session strengthens this process and ultimately promotes brain health even as the human body enters its older years.

5. **Facilitate Learning and Memory Performance**

Multiple scientific studies have established that exercise improves learning and memory performance. However, Berchtold, Castello and Cotman (2010) took it a step further by examining whether these neurological factors are time-dependent. The test subjects participated in a 3-week running program and were analysed at three stages: immediately after the exercise period, after one week and again after two weeks.

Interestingly, each test period showed drastic improvements in learning and memory capabilities. The results after one week recorded the shortest latency and least number of errors, whilst memory functions were most affected immediately after the exercise activity.

The enhanced cognitive capabilities returned to baseline after 3-4 weeks, thus validating the need to exercise regularly to maintain increased performance.

6. **Better Mood Regulation**

Frequent physical exercise sessions increase neurotransmitters, neuropeptides, and neuromodulators in the brain. Some of the well-known ones include phenethylamine, endorphin, and anandamide- each of which play a vital role in mood regulation, letting go of gloomy moods and elevating positive feelings.

7. **Short-Term Euphoria**

An immediate neurological benefit that most fitness enthusiasts experience after exercise is the temporary state of euphoria. Also known as “runner’s high”, this affective state is characterized by feelings of profound elation, contentment, and well-being.

Raichlen et al. (2012) explain that this unique experience is the result of activated cannabinoid receptors in the brain which reward regions throughout the brain

immediately after each exercise period. These receptors are only activated during high-intensity exercises, which may explain why endurance exercises are highly popular even though they are associated with higher energy depletion and risk of injury.

8. **Prevention and Treatment of Depression**

Last but not least, as Cooney et al. (2013) famously theorized, the neurological benefits of exercise are moderately more effective at managing depression as compared to other forms of treatment methods. Although the study was limited to a few relatively small trials, the results were all in favour of utilizing exercise as a form of treatment for depression. Moreover, physical exercises do not possess the potential side effects that are associated with depression medications, further substantiating its case as a viable treatment for depression.

In addition to depression, other medical studies have also shown that regular exercise can be beneficial in preventing neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, and Huntington's disease.

Conclusion

We all know that exercise can improve our physical fitness however based on the evidence stated above there seems a strong argument for its benefits to emotions and cognitive functioning. These benefits progress are both an immediate reward and will serve the brain in its twilight years. Last but not least, physical activities have also been proven to be beneficial in preventing mental disorders such as depression and other neurodegenerative diseases whilst helping to regulate mood and emotions. All of these convincing factors encourage the world to incorporate regular exercises actively into their lifestyle not only for the muscles but for the future of their mental and cognitive health.