How does wrestling affect the production of neurotransmitters and can wrestling be used to cure severe mental conditions such as depression?

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Abstract

Many people are plagued with mental conditions that decrease quality of life. These conditions are often caused by imbalances in the neurotransmitters. A way to treat these imbalances is by encouraging patients to participate in physical activity. One example of a way to pursue this approach is to motivate people to enroll in wrestling practices. This is likely to address the imbalance of neurotransmitters more naturally providing an alternative or parallel treatment to the more traditional route of medications. Considering that a large majority of people with mental conditions are teens and young adults, they will most likely have a higher level of physical health making it a reasonable option for these people. Many scientific studies suggest that wrestling could help increase mental health and prevent mental conditions due to its ability to alter neurotransmitter concentrations.

Introduction

A great way to boost psychological health is physical activity. It leads to many positive outcomes such as boosting self-esteem and reducing feelings of depression and anxiety (Calfas et al., 2020). Exercise is a subset of physical activity with the intention of becoming fit (Dasso, 2019). In addition around 40% of the world suffers from a neurological condition. (Tian et al., 2023). There are multiple factors that influence these neurological conditions such as the concentration of neurochemicals. the amount of physical activity that a person does. (Di Liegro et al., 2019) Neurotransmitters are some of the most vital chemicals the body produces. Neurotransmitters are released from neurons into the synaptic gap to communicate with other neurons. This mechanism is important for facilitating many of the functions our brain carries out, such as thinking, memorizing, and cognitive processing. An imbalance or lack of these chemicals can lead to severe conditions such as anxiety and depression (Naoi et al., 2018). Currently, the most used way to stop these symptoms is medications that may have horrible side effects such as shakiness, feeling agitated, and feeling more suicidal. Another option for mental health treatment that follows a more natural direction is physical activity engagement. In cases of low to medium depression, exercise should be the first step. Some countries such as the United Kingdom have already started prescribing exercise as a form of treatment and have been

seeing wonderous results. (Young et al., 2007). One such physical activity is wrestling. High-intensity physical activities such as wrestling have a higher correlation with higher psychological health in children (Parfitt et al., 2009), meaning that wrestling is a good option for the betterment of mental health. This paper aims to demonstrate that wrestling can be used to treat mental conditions by altering neurotransmitter concentration.

Operational Definitions and Literature Review

Neurotransmitters are endogenous chemicals that allow neurons to communicate with each other throughout the body. They are directly related to mental health. If a person has an imbalance in these transmitters, it can result in a person getting a mental health condition. Some neurotransmitters are testosterone, epinephrine, cortisol, serotonin, dopamine, and beta-endorphins. Testosterone is the male sex hormone and is responsible for many positive effects, such as acting as an antidepressant when it is in the amygdala or prefrontal cortex. (Celek et al, 2015). This means that if testosterone levels are modulated, depressive/other symptoms can be mitigated. Epinephrine, also known as adrenaline, is a chemical that regulates visceral functions, such as the circulatory system, and can help overcome stress by increasing blood flow to skeletal muscles and lowering supply of blood to processes that aren't as necessary at the time. (Mathews et al, 1990). It also helps the brain prevent chronic stress by signaling to the brain about a stressful event and then letting the brain make the decision to delete the stress memory.(Wong et al., 2011) However, if too much of it is in the body, it can have some serious side effects such as headaches, palpitations, tremors, and anxiety. Cortisol, also known as the stress hormone, helps your body respond to stress but in excess, it results in mood swings. Serotonin and dopamine are transmitters that affect a person’s mood. At high levels, these neurotransmitters can induce feelings of happiness. However, if serotonin has too high of a concentration, it can result in negative side effects such as rigidity, tremors, anxiety, and agitation.(Isbister et al., 2007) Beta-endorphins are transmitters that are used to relieve pain, but they can also boost happiness. According to Pilozzi et al. (2021), beta-endorphins increase their concentration when stress is reduced and levels of exercise are increased. Since wrestling is a very rigorous exercise, it could increase the amount of beta-endorphins. In conclusion, to maintain good mental health, you would want a good balance in the concentration of testosterone, epinephrine, dopamine, and beta-endorphins, serotonin, and cortisol. This balance of neurotransmitters will help promote mental health by stabilizing the levels of neurotransmitters. A majority of the neurotransmitters also have negative effects when produced too much or too little meaning that a balance of them is crucial in maintaining good mental health.

In their article on neurotransmitters, Sutoo and Akiyama (2003) suggest that brain functionality more specifically enhanced dopamine synthesis and serum calcium production can be increased by exercise, more specifically, cardio. They came to this result by Another article by

Wipfli (2008) states that out of a group of people who exercised and a group of people who didn't, the exercise group had lower levels of depression. In addition to this, they had a more balanced level of serotonin. The serotonin was measured by taking a little blood before and after the exercise intervention in order to measure serotonin. This would be healthier for them since having an extreme amount of serotonin isn't good for the body. Another study that supports the benefits of exercise is Dey et al. (1992) which states that serotonin levels dropped after training but had a rebound in levels after one week. Another chemical that gets boosted from exercise is beta-endorphins.(Enayatjazi, et al., 2015). Since mental health is heavily reliant on this balance of neurotransmitters, it's safe to say that exercise is essential to maintaining good mental health due to it balancing many neurotransmitters.

Considering that wrestling is a sport that consists of vigorous exercises such as intensive cardio and calisthenics, in addition to high intensity drills, it would increase the concentration of neurotransmitters. Wrestling has also been shown to increase the production of beta-endorphins. This example comes from Dey et al. (1992) article in which he states that beta-endorphins sharply increase after a wrestling practice and that these neurotransmitters make people feel less depressed. If wrestling gives all these benefits to mental health, it could be extremely useful in fighting some of the more severe conditions.

Wrestling and Psychological Health

Many studies suggest that wrestling affects the production of neurotransmitters. For example, Fry et al. (2011) evaluated the neuroendocrine responses of wrestlers across a two-day period in which the wrestlers played in 5 matches. Using serum samples, the researchers were able to conclude that a high-stress competitive environment led to increased testosterone, cortisol, and epinephrine. Considering cortisol increases metabolism, weakens the immune system, and alters mood, this might be a negative outcome. However, another study by Passelergue (1999) suggests that cortisol levels decrease after a competition. This means that the effects previously discussed will not be seen. When taking into account wrestling's impact on epinephrine and testosterone levels in Fry et al. (2011) it's safe to say that wrestling could be beneficial for an athlete's neurobiological health. According to a study by Wong et al. (2011), epinephrine can help deal with stress, and low levels of epinephrine can result in conditions such as depression and anxiety. This means that epinephrine is a key player in the stability of someone's mental health.

Wrestling can also boost beta-endorphins in people (Enayatjazi et al., 2015). According to Enayatjazi's study, beta-endorphins can boost people's happiness. In summary, wrestling can improve a person's metabolic rate, make a person happier, cause an antidepressant-like effect, improve learning/memory, improve the immune system, and stop the altering of mood. This means that participating in wrestling could combat serious conditions such as depression, anxiety, obesity, and many others.

Exercise and Psychological Health

According to a study published by Young et al. (2007), the NIHC recommends treating mild to medium levels of depression with exercise. Exercise causes a release in dopamine and doesn't cause the negative side effects that antidepressants cause. According to another study by D'souza et al. (2005), dopamine brings happiness and can help fight terrible conditions like depression. High levels of dopamine are crucial to the maintenance of good mental health. Some experiments have been conducted on rats to test the effects of exercise on dopamine and serotonin production. Research by Foley et al. (2008) found that habitually physically active animals may have an enhanced ability to increase dopamine receptors. This suggests that if humans are more active, then their dopamine receptors should process more dopamine. In addition to this, a study by Faizan (2023) states that anaerobic exercise, specifically Olympic weight lifting, tends to reduce anxiety and cortisol levels. This would help maintain the neurotransmitter balance and help modulate stress. Another study by Augustin, et al. (2023), states that exercise increases self-esteem in addition to boosting overall mental health. Wrestling is another anaerobic exercise that requires lots of conditioning and training. This intensive training is likely to lead to the wide array of benefits that were listed above meaning that wrestling could be a great tool to combat neurological conditions.

Limitations:

While the psychological benefits of wrestling appear to be easily accessible, there are some challenges that individuals may face when trying to reap the therapeutic benefits of this form of physical activity. One of these challenges that could prevent people from participating in a sport like wrestling is time. Considering that a wrestling practice regularly takes 2 hours to complete, a person without much free time wouldn't be able to partake in the practices due to their lack of time. Not everyone is interested in participating in wrestling. Other sports might be more appealing. However, sports with similar characteristics to wrestling (such as goal setting, competitions, tactical or strategic moves, etc.) may provide similar benefits. Another problem would be physical disabilities. 16% of the world has physical disabilities. Considering that wrestling is a sport that requires your full body, it would be hard for some people with severe disabilities such as missing limbs to compete. Some issues they might run into are struggling to do conditioning or not being able to complete practices; however, it's not impossible to do the practices/conditioning since previous wrestlers have been disabled. Even with the disability, a person would still reap all the benefits of wrestling. This would make competing in the sport challenging.

Another limitation is the mental effect that wrestling may have on a person. It's important to note that there may be negative externalizing psychological effects associated with wrestling participation. A review on martial arts, combat sports, and mental health in adults by Ciaccioni et al. (2024), points out that engaging in these sports would increase feelings of anger, aggression, and hostility. However, they report no negative association between internalizing psychological factors, such as depression and anxiety. Therefore, even if wrestling may increase externalizing

factors, we believe that its potential to benefit internalizing psychological symptoms outweighs potential negative results.

Conclusion

In conclusion, wrestling should be a good way to improve mental health due to its ability to increase certain neurotransmitter concentrations naturally. This helps maintain a balance between the transmitters which results in improved mental health. The articles about physical activity discussed above reveal that physical activity and therefore wrestling, can improve mental health by altering chemical concentrations within the brain and supporting psychological health. While there are a few drawbacks such as limited accessibility and increased hostility in wrestling athletes, the pros far outweigh the cons. Future studies should be conducted on how wrestling can combat specific mental conditions and how its side effects can be mitigated. If the side effects are reduced and the accessibility to the sport increases, wrestling could become a therapeutic technique for psychologists to use.

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