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Neuromodulation for Sleep Disorders: Handling Sleep Paralysis at Its Core

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Description

Sleep paralysis is a phenomenon where an individual experiences a temporary inability to move or speak while waking up or falling asleep, often accompanied by different hallucinations and feelings of pressure on the chest. This experience can be distressing and often leads to anxiety and disrupted sleep. Although sleep paralysis is typically harmless, frequent episodes can have a significant impact on a person's mental and physical well-being. Emerging therapies are being studied to address the underlying mechanisms of sleep paralysis, with neuromodulation showing promise as a groundbreaking approach to treatment. During REM sleep, the brain is highly active and most variety dreams occur, while the body experiences atonia.

Neuromodulation refers to the use of electrical or magnetic stimulation to alter neural activity in the brain, aiming to restore or modify brain function. This approach has been successfully used for various neurological and psychiatric conditions, including chronic pain, depression and epilepsy. In the context of sleep disorders like sleep paralysis, neuromodulation aims to regulate the brain's sleep-wake cycle, particularly by addressing the dysfunction that occurs during the Rapid Eye Movement (REM) stage of sleep, which is the phase most often associated with sleep paralysis. One of the primary reasons sleep paralysis occurs is the interruption of REM sleep.

One of the most promising forms of neuromodulation for sleep paralysis is Transcranial Magnetic Stimulation (TMS). TMS uses magnetic fields to non-invasively stimulate specific regions of the brain. By applying magnetic pulses to targeted areas, TMS can modulate neuronal activity and influence brain functions. A reduction in sleep quality as a consequence of sleep paralysis should also be considered, especially in cases where sleep paralysis leads to significant levels of fear and post episode distress. For sleep paralysis, TMS may be used to normalize REM sleep regulation by stimulating areas of the brain involved in sleep and muscle atonia, helping to reduce the frequency of sleep paralysis episodes.

Studies have shown that TMS can positively impact sleep patterns, particularly in individuals with sleep disorders like insomnia and depression, conditions that often coexist with sleep paralysis. Researchers hypothesize that TMS can improve the balance of brain activity during sleep, thus reduces the triggers for sleep paralysis. While neuromodulation therapies like TMS and tDCS hold great promise for managing sleep paralysis, it is important to note that they are not yet widely available as standard treatments. Clinical trials exploring TMS for sleep paralysis are still in the early stages, but the results thus far suggest that it could be a viable therapeutic option for those suffering from frequent episodes.

Another neuromodulation technique being explored is Transcranial Direct Current Stimulation (tDCS). tDCS involves applying a low electrical current to the scalp through electrodes, which can modulate brain activity by altering the excitability of neurons. This non-invasive technique has been studied for a variety of neurological and psychiatric conditions, including sleep disorders. In sleep paralysis, tDCS may help adjust the brain's electrical activity, particularly in areas that regulate REM sleep and muscle atonia. The goal is to normalize the disrupted brain signals that contribute to the paralysis upon waking.

Conclusion

Neuromodulation therapies, particularly Transcranial Magnetic Stimulation (TMS) and Transcranial Direct Current Stimulation (tDCS), are emerging as exciting potential treatments for sleep paralysis. These non-invasive techniques aim to regulate brain activity during sleep, restoring normal REM sleep function and alleviating the triggers of sleep paralysis. As research continues, neuromodulation could offer a novel and effective solution for individuals seeking relief from the distressing and disruptive effects of sleep paralysis, improving their sleep quality and overall health. Nevertheless, good progress has been made in terms of investigating associations between sleep paralysis and other aspects of sleep.

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