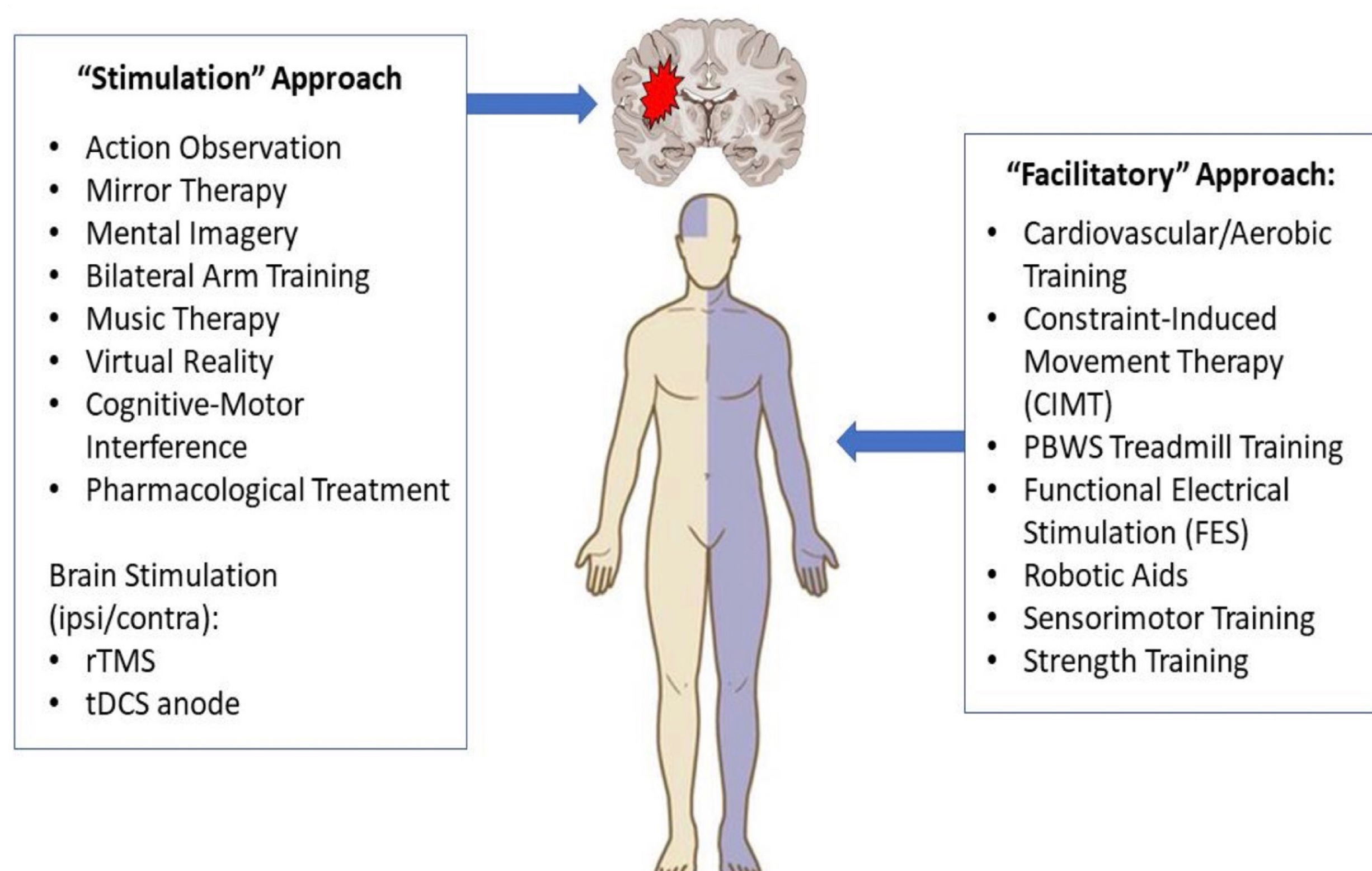


What is a Stroke?

795,000 Americans experience a stroke each year and roughly 80% of them will acquire hemiparesis (CDC, 2022): weakness/paralysis on one side of the body. There are two types of stroke, ischemic and hemorrhagic. An ischemic stroke is where an artery becomes blocked and blood cannot flow through the brain and its surrounding tissues. An hemorrhagic stroke occurs when a blood vessel or aneurysm bursts and blood leaks throughout the brain. Common side effects of stroke include, but are not limited to, muscular weakness/paralysis, problems with vision, difficulty with speech and swallowing, "pins and needles" sensation or reduced sensation of touch, and difficulty with balance.

Traditional Stroke Therapy

Traditional stroke therapy takes a multidisciplinary approach including physical therapy, speech therapy and occupational therapy. Together, the therapists will work together to help the patient to regain muscle control and provide the patient with the ability to return to activities of daily living and be as independent as possible (CDC, 2022).



What is Mental Imagery?

Mental imagery is the use of cognitive processes that allows a participant to visualize themselves performing a task without the requirement of physical movement.

Thesis Argument

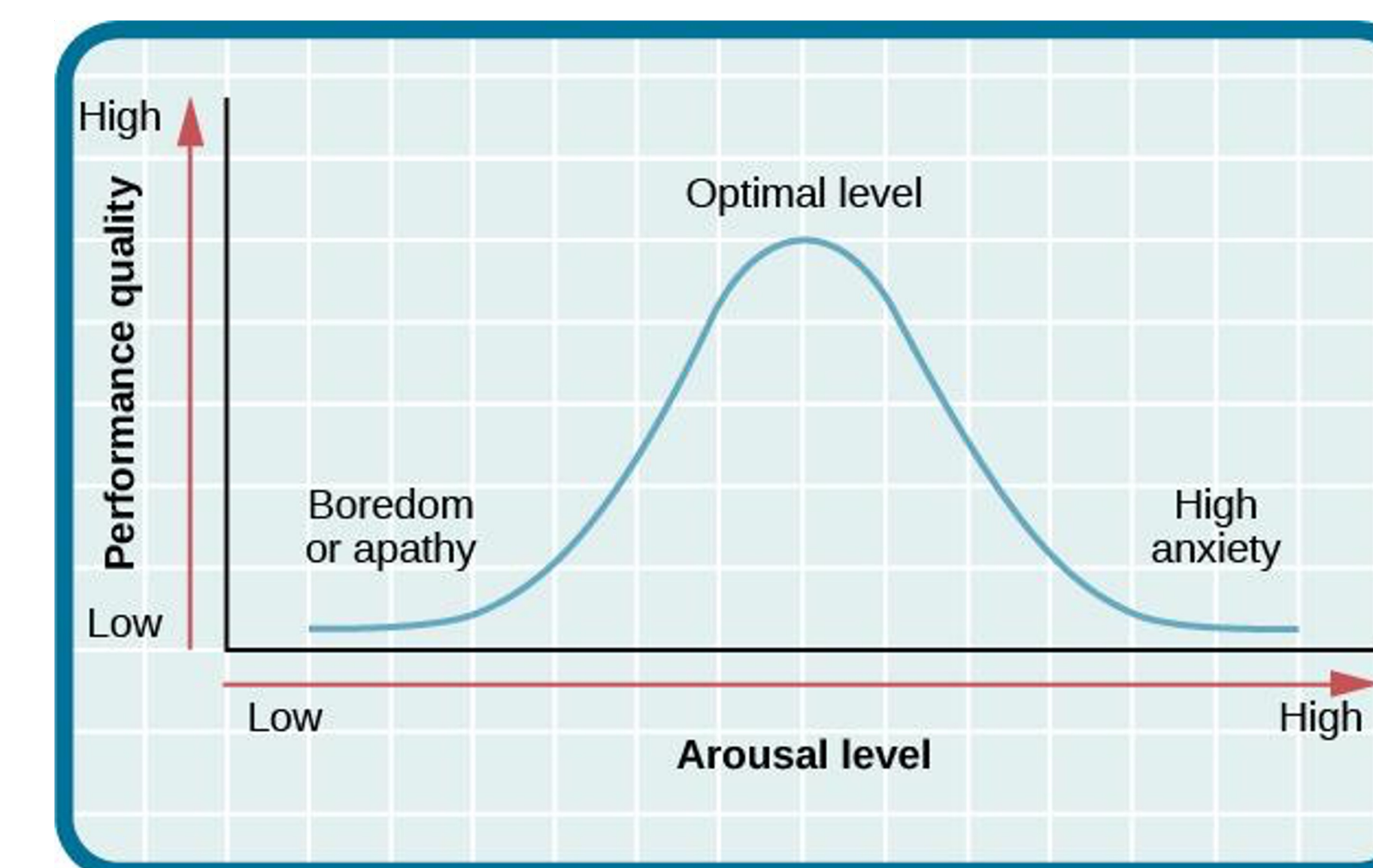
The provision of mental imagery exercises during stroke rehabilitation could improve the rehabilitation both cognitively and emotionally, as well as physically for patients with hemiparesis

Theoretical Mechanisms

Psychoneuromuscular theory: Originally proposed by William Carpenter in the 1930s, psychoneuromuscular theory explains how mental imagery of a specified activity can improve the physical performance of that activity because when mental practice occurs, neurons are firing at a low intensity: too low to stimulate muscle movement, but high enough to stimulate and regenerate the pathway used (Carpenter, 1939).

Symbolic Learning Theory: First proposed by Jerome Bruner in 1957 where he explained how mental imagery can enhance motor performance by creating a "mental blueprint" the first time a task is completed (Bruner, 1957). Our brain creates a mental map of what our body needs to do to complete a task, and stores that information, until the next time we need to use it. There are three stages to symbolic learning theory: the first is the enactive stage which involves learning through physically performing a skill and experiencing the word around you. The iconic stage is where the brain develops the mental blueprint that represents a specific motor function, object, or event. Finally, in the symbolic stage, we are able to use symbols to represent ideas, movements, objects, actions, etc. (Bruner, 1957).

Arousal-Activation Theory: proposed by Yerkes and Dodson in 1908 where they studied the relation of strength of a stimulus to rapidity of habit formation. They proposed that there were differing levels of arousal, ranging from apathy to high anxiety on an inverted bell-curve (top right image, Nickerson, 2023).



Conclusion

The purpose of this review was to evaluate the efficacy of mental practice in adjunct with traditional therapies for stroke rehabilitation in patients with hemiparesis.

Previous studies involving the three theoretical mechanisms support mental practice and the positive effects they may have on stroke recovery. This theoretical trifecta: Psychoneuromuscular, Symbolic Learning, and Arousal Activation Theory may further benefit the multidisciplinary approach to stroke rehabilitation currently in place.

Select References

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