Mirror Therapy for Stroke Patients

Name of the Student

Author Affiliation

Course Number: Course Name

Name of the Instructor

Assignment Due Date

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Stroke is considered as one of the major causes of mortality worldwide. Among the many stroke cases around the globe, nearly 62 million stroke patients have been recorded as survivors. However, about one-third people who survive a stroke develop severe disabilities post-stroke (Gandhi et al., 2020). Mirror therapy serves as a useful tool for treating motor impairment faced after stroke (Rossiter et al., 2014). This paper aims to discuss the importance of mirror therapy in stroke patients, the probable mechanism of the method, and the factors associated with the approach.

Motor Impairment in Stroke Patients

When individuals survive a stroke, most of them suffer from upper or lower limb motor impairments. Full upper limb functioning is observed in few severely paretic survivors (Gandhi et al., 2020). Half of the stroke survivors, who initially show signs of plegic upper and lower limbs, are able to regain partial motor function. Some stroke survivors also experience pain in the upper limb along with a complex regional pain syndrome-type I (CRPS-type I) in the first year post-stroke (Gandhi et al., 2020). In severe cases, patients have a paretic arm along with additional somatosensory deficits (Brunetti et al., 2015). The daily lives of stroke patients are affected, and its quality is reduced. Mirror therapy assists them during the acute, sub-acute, and chronic phases of stroke (Gandhi et al., 2020). Besides motor impairments, mirror therapy also improves the sensations, visuospatial neglect, and pain that patients go through post-stroke. Patients need mirror therapy after stroke to help reduce the pain and improve the motor function of their upper limb.

Improvements due to Mirror Therapy

MT positively affects motor impairments in stroke patients, but this is not restricted to motor functioning. Mirror therapy also improves sensations, visuospatial neglect, and pain that individuals go through after stroke (Gandhi et al., 2020). The activity in primary and

secondary visual and somatosensory areas tend to increase after implementing MT, a process that produces visible results such as enhanced attention and conscious awareness with regards to sensory feedback (Gandhi et al., 2020). An increase in visual or mental imagery feedback is achieved by combining MT with bilateral arm training, which also stimulates upper limb motor function. Certain aspects of the therapy require further research, such as the determination of the appropriate dosage of MT and its effectiveness over time (Gandhi et al., 2020). Thus, mirror therapy enhances upper limb motor function and reduces pain in patients after stroke, thereby improving the quality of their lives.

Mechanism of the Approach

MT is a type of rehabilitation method that produces an illusion among the patients that their limb is showing better movement, by using the reflection of a moving non-affected limb, also known as the visual input (Gandhi et al., 2020). The approach involves strategically keeping a mirror on a table in front of the patient in such a way that the affected limb is positioned behind and the non-affected one appears in front of the mirror. This way, the movement of the non-affected arm hides the affected arm, thus giving the patient a mirror-illusion (Brunetti et al., 2015). Functional magnetic resonance imagining (fMRI) studies in healthy individuals incorporating mirror visual feedback revealed that activation responses are different than those in the absence of mirror conditions. Mirror therapy (MT) utilizes visual stimuli for generating a desired response in the affected limb in stroke patients (Gandhi et al., 2020). The results obtained by using MT may be be estimated by the functional state of the neural mechanisms that mediate the impact of MT (Brunetti et al., 2015). Mirror therapy may introduce changes in cerebral organization, but further research is needed to determine the exact mechanism and the neuronal mechanisms of MT (Gandhi et al., 2020; Brunetti et al., 2015). The mirror therapy creates a mirror illusion that works as a positive reinforcement in terms of impaired motor function in post stroke patients.

Determinants of Mirror Therapy

The mirror neuron system (MNS) could be an important factor in determining the effect of MT. When stroke patients look at the movement of their own or someone else's limb, it stimulates the MNS response (Brunetti et al., 2015). Some fMRI studies demonstrated that the precuneus (PC) may also mediate the effect of MT, thereby increasing the activation of the PC when MT is administered. Another factor that influences the effect of mirror therapy is the base level of finger motor function that aids in the recovery of the upper distal limb motor function (Brunetti et al., 2015). Thus, the effectiveness of MT may depend on various factors, so further evaluation should be conducted to ensure efficacy, despite external influences.

Conclusion

People who survive stroke are often faced with challenges in terms of motor function and pain, hampering their everyday activities. Mirror therapy is an effective method for reducing these concerns and improving the motor movement of the upper arm. It creates a mirror-illusion and research works have established that it significantly improves motor function even in severe cases. The detailed mechanism of how mirror therapy works would need future research.

References

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