J Neurol Neurosci ©
14 (2) 2023 : 001-02 • OPINION

Neuroplasticity and stroke recovery: Current understanding and future directions

Vivian Isaac*
Department of Neurology, Sydney Adventist Hospital, Wahroonga, Australia

INTRODUCTION

Neuroplasticity refers to the brain's ability to change and adapt in response to new experiences, learning, or injury. It is a fundamental process that underlies learning and memory, as well as the brain's ability to recover from damage. One area where neuroplasticity has been studied extensively is stroke recovery, as researchers seek to understand how the brain can adapt and reorganize after a stroke. Stroke is a leading cause of long-term disability worldwide, and the potential for neuroplasticity to improve stroke recovery has led to new and exciting avenues for treatment. In this context, this note aims to discuss the current understanding and future directions of neuroplasticity and stroke recovery research [1].

DESCRIPTION

Neuroplasticity is a complex and dynamic process that involves changes in the structure and function of neurons and their connections in response to experiences and stimuli. After a stroke, the brain undergoes a process of rewiring and reorganization as it tries to compensate for the damaged areas. This process can involve the growth of new connections between neurons, changes in the strength of existing connections, and even the creation of new neurons in certain parts of the brain [2].

Research on neuroplasticity and stroke recovery has yielded several key findings. First, the brain's capacity for plasticity is not fixed or limited to a certain time window. While it was once believed that the brain's ability to reorganize was limited to a few months after a stroke, recent studies have shown that neuroplasticity can continue to occur even years after the initial injury. This has led to the development of new rehabilitation approaches that emphasize the importance of ongoing therapy and practice [3].

Another important finding is that the process of neuroplasticity is influenced by a variety of factors, including age, severity of stroke, and the type and intensity of rehabilitation. For example, younger patients may have a greater capacity for plasticity and may benefit from more intensive rehabilitation programs. Similarly, patients who receive therapy that is tailored to their individual needs and abilities may see better outcomes [4].

There are also several approaches to harnessing the power of neuroplasticity for stroke recovery. Intensive rehabilitation programs that target specific motor or

Address for correspondence:

Vivian Isaac
Department of Neurology, Sydney Adventist Hospital, Wahroonga, Australia
E-mail: Isaac35@gmail.com

Word count: 703 **Tables:** 00 **Figures:** 00 **References:** 05

Received: 15.03.2023, Manuscript No. ipjnn-23-13657; **Editor assigned:** 17.03.2023, PreQC No. P-13657; **Reviewed:** 31.03.2023, QC No. Q-13657; **Revised:** 06.04.2023, Manuscript No. R-13657; **Published:** 14.04.2023

cognitive functions have been shown to be effective, as have non-invasive brain stimulation techniques such as transcranial magnetic stimulation (TMS) or transcranial direct current stimulation (tDCS). These techniques use magnetic or electrical fields to stimulate the brain, which can enhance the process of neuroplasticity and improve stroke recovery.

Despite the promising findings in neuroplasticity and stroke recovery research, there is still much to be learned about the underlying mechanisms and how to optimize treatment approaches. Future directions for research in this area include the development of new technologies for measuring and tracking changes in the brain, as well as a greater understanding of how different types of therapy can be tailored to individual patients based on their unique needs and abilities [5].

CONCLUSION

In conclusion, the study of neuroplasticity and stroke recovery has yielded important insights into the brain's capacity for adaptation and reorganization. This understanding has led to the development of new and promising approaches to stroke rehabilitation, including intensive therapy programs and non-invasive brain stimulation techniques. However, there is still much to be learned about how to optimize these approaches and how to tailor treatment to individual patients based on their unique needs and abilities. Further research in this area is necessary to fully realize the potential of neuroplasticity for stroke recovery and improve outcomes for stroke survivors.

REFERENCES

1. **Li S.** Ankle and foot spasticity patterns in chronic stroke survivors with abnormal gait. *Toxins*. 2020; 12(10):646.
2. **Pazzaglia C, Imbimbo I, Tranchita E, et al.** Comparison of virtual reality rehabilitation and conventional rehabilitation in Parkinson's disease: A randomised controlled trial. *Physiotherapy.* 2020; 106:36-42.
3. **Betti S, Fedele M, Castiello U, et al.** Corticospinal excitability and conductivity are related to the anatomy of the corticospinal tract. *Brain Struct Funct*. 2022; 227(3):1155-1164.
4. **Caparelli EC, Backus W, Telang F, et al.** Is 1 Hz rTMS always inhibitory in healthy individuals?. *Open Neuroimaging J.* 2012; 6(1).
5. **Mansur CG, Fregni F, Boggio PS, et al.** A sham stimulation-controlled trial of rTMS of the unaffected hemisphere in stroke patients. *Neurol.* 2005; 64(10):1802-1804.