Commentary

Social Functioning can Improve Motor Recovery after Stroke

Simona Lattanzi1,*, Afshin A. Divani2, Michela Coccia3

1Neurological Clinic, Department of Experimental and Clinical Medicine, Marche Polytechnic University, 60121 Ancona, Italy
2Department of Neurology, University of New Mexico, Albuquerque, NM 87131, USA
3Department of Experimental and Clinical Medicine, Marche Polytechnic University, 60121 Ancona, Italy
*Correspondence: alfierelattanzi@simona@gmail.com (Simona Lattanzi)

Academic Editor: Gernot Riedel
Submitted: 29 October 2022 Accepted: 8 November 2022 Published: 14 February 2023

Keywords: cerebrovascular disease; cerebral infarct; stroke; rehabilitation

Globally, stroke remains a leading cause of mortality and morbidity, with ischaemic stroke representing around two-thirds of all incident cases. Although reperfusion therapies represent a key step for minimizing brain damage, the impact of cerebral infarct in terms of residual impairment in physical, psychological, and social functioning remains high [1–5].

In an issue of the Journal of Integrative Neuroscience, the study by Dr. Chang and colleagues [6] aimed to evaluate the relationship between neuropsychological domains and motor recovery in patients with cerebral infarction. Among 37 patients with ischemic stroke, the Social Maturity Scale Social Quotient (SMSSQ) score in the Vineland Social Maturity Scale at one month and the change in the SMSSQ score at three months from stroke onset showed a statistically significant correlation with the change in motor function over the same period as assessed by the Modified Barthel Index [6]. Of note, a higher initial SMSSQ score and an improvement in SMSSQ score at follow-up correlated with a greater improvement in motor recovery. The Vineland Social Maturity Scale is a psychometric assessment tool designed to evaluate social and adaptive functions; a high SMSSQ score indicates good social capabilities, whereas a low score implies that social interaction with other people is difficult or minimal [6]. These findings emphasize and extend currently available experimental and clinical evidence about the benefits that social interaction may have for recovery after stroke.

In animal models, post-stroke isolation has been associated with a significant increase in infarct size and mortality [7]. Interestingly, mice paired with a healthy partner showed significantly lower mortality than mice paired with a stroke partner and enhanced behavioural recovery than either isolated mice or mice paired with a stroke partner [7]. Karelina et al. [8] explored the role of physical contact as a mediator of the beneficial effects of social interaction after stroke. In a rodent model with focal cerebral ischemia, pair housing reduced infarct volume and led to a recovery of locomotor activity when compared to social isolation [8]. However, among a mice pair housed in a cage separated by a grid partition that prevented physical contact, infarct volume was comparable to that of socially isolated mice, and locomotor activity did not fully recover [8]. Similarly, in an animal model of ischemia-reperfusion injury, rats in the enriched environment group exhibited smaller infarction volumes and significantly improved neurological functions as compared to rats in standard housing conditions [9].

The mechanisms underlying the social influences on stroke outcome are likely multifactorial and involve alterations in neuroendocrine and inflammatory responses [8,10,11], enhanced synaptic plasticity and neurogenesis [12], attenuation of astrogliosis [13], increased angiogenesis with the formation of new capillaries, and proliferation of endothelial cells in the ischemic penumbra [9].

In a clinical context, social support has been shown to influence both the extent and speed of recovery. Looking at performance in both mobility and activities of daily living, Glass et al. [14] found that patients with more social support improved far better than those with less support, and higher levels of support were predictive of a more rapid rate of recovery of functional status, even among patients with severe strokes. Patients with the least amount of social support normally recovered in the first month, but failed to maintain the improvement with a decline in functional status over time [14]. Conversely, continued improvement was observed after the first 6 weeks of recovery among patients receiving more support [14].

While there are some excellent studies investigating the impact of social support on functional outcomes, further research is warranted. The bidirectional relationship between cognitive abilities, personality, emotion, behaviour, social participation, and functional recovery after a stroke needs to be further explored. Development of dedicated tests, scales, tools, and protocols may more easily allow for performing a standardized, comprehensive assessment of multiple clinical domains.

In summary, environmental influences are being recognized for their potential to affect stroke outcomes, and social interaction can improve the recovery of stroke patients. This body of evidence may have huge implications for clinical practice: stroke patients will benefit from strategies aimed at enhancing social capabilities and skills to inter-
act with others, and areas of rehabilitation such as occupational therapy and social rehabilitation should be strengthened. Ballester et al. [15] investigated the effects of including social interaction in a virtual reality-based system for stroke rehabilitation. The multi-player virtual reality environment favoured social engagement and interaction among the players and added enjoyment during the task. After applying rehabilitation in the multiplayer environment, the motor improvement of the affected upper limb was greater compared to the recovery observed in the single-player environment [15].

**Author Contributions**

Conceptualization—SL; writing-original draft preparation—SL; writing-review and editing—SL, AAD, MC. All authors have read and agreed to the published version of the manuscript.

**Ethics Approval and Consent to Participate**

Not applicable.

**Acknowledgment**

Not applicable.

**Funding**

This research received no external funding.

**Conflict of Interest**

The authors declared no conflict of interest. SL is serving as one of the Editorial Board members of this journal. We declare that SL had no involvement in the peer review of this article and has no access to information regarding its peer review. Full responsibility for the editorial process for this article was delegated to GR.

**References**


