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Applying neurophysiological evidence to guide public health approaches in stroke rehabilitation.

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Introduction

Stroke remains one of the leading causes of long-term disability worldwide, imposing a significant burden on individuals, families, and health systems. Advances in neurophysiology have shed light on the mechanisms of neural repair and functional recovery after stroke, particularly through cortical reorganization and synaptic plasticity. These findings open new opportunities for public health policymakers to develop comprehensive rehabilitation programs that integrate evidence-based neurophysiological interventions to improve patient outcomes [1].

Techniques such as transcranial magnetic stimulation (TMS) and electroencephalographic (EEG) monitoring have revealed patterns of cortical excitability that are predictive of recovery potential. Public health strategies could incorporate these assessments into standard post-stroke care pathways, enabling individualized rehabilitation plans that optimize therapy intensity and modality. Early neurophysiological screening could also inform decisions about resource allocation, ensuring that rehabilitation efforts are prioritized for patients with the highest potential for recovery [2].

Neurophysiology further supports the use of repetitive, task-specific training to promote motor cortex reactivation and neuroplasticity. Public health agencies could partner with rehabilitation centers to develop standardized therapy protocols that are accessible even in resource-limited settings. Community-based rehabilitation models, guided by neurophysiological principles, could deliver cost-effective interventions that maintain continuity of care and reduce disparities in post-stroke recovery outcomes [3].

In addition, research highlights the importance of addressing secondary factors such as depression, fatigue, and sleep disturbances, which can significantly impede neural recovery. Integrating mental health services, social support systems, and caregiver training into stroke rehabilitation programs can address these factors holistically. Neurophysiological monitoring can serve as an objective measure to track the effectiveness of such integrated approaches at the population level [4].

Finally, scaling neurophysiology-informed rehabilitation programs requires investments in workforce training, infrastructure, and public awareness. Governments and public health institutions must collaborate with academic and clinical partners to ensure that evidence-based

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neurorehabilitation practices are disseminated widely. Such coordination can help close the gap between research discoveries and real-world implementation, maximizing the societal benefits of stroke recovery programs [5].

Conclusion

Incorporating neurophysiological evidence into public health planning for stroke rehabilitation offers a powerful approach to improving recovery outcomes. By aligning rehabilitation strategies with the biological mechanisms of brain repair, health systems can deliver more targeted, effective, and equitable care, ultimately reducing the long-term burden of stroke on society.

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