

# Enhancing Post-stroke Gait with Transcranial Direct Current Stimulation: A Systematic Review Overview

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## Introduction

Stroke remains a leading cause of long-term disability worldwide, with a profound impact on motor function, particularly gait. As the quest for innovative rehabilitation strategies intensifies, Transcranial Direct Current Stimulation (tDCS) has emerged as a potential modality to enhance post-stroke gait recovery. This systematic review embarks on a comprehensive exploration of the existing literature, aiming to provide an overview of studies investigating the efficacy of transcranial direct current stimulation in augmenting gait rehabilitation after stroke. By synthesizing evidence from diverse research endeavors, this review seeks to elucidate the current state of knowledge, highlight methodological variations and discern patterns in outcomes, paving the way for a deeper understanding of the potential role of tDCS in post-stroke gait enhancement [1].

## Description

The systematic review encompasses a thorough examination of studies employing transcranial direct current stimulation as an adjunct to gait rehabilitation in post-stroke individuals. By scrutinizing various parameters such as stimulation protocols, patient characteristics and outcome measures, this overview aims to distill key findings and trends in the existing literature. The diversity of experimental designs, including randomized controlled trials, crossover studies and case series, contributes to the richness of the evidence landscape [2]. Moreover, the systematic analysis delves into the targeted brain regions, electrode montages and the temporal aspects of tDCS application to unravel potential factors influencing its effectiveness in enhancing post-stroke gait. Across the spectrum of findings, the review explores the impact of tDCS on gait parameters, functional mobility and neurological recovery. Potential mechanisms underlying the observed effects, such as modulation of cortical excitability and neuroplasticity, are scrutinized to provide a comprehensive perspective on the physiological rationale behind the use of tDCS in gait rehabilitation. Additionally, the review acknowledges the variability in outcomes, recognizing the need for standardized methodologies, larger sample sizes and longer follow-up durations to draw more definitive conclusions [3].

Moreover, the systematic review underscores the potential of transcranial direct current stimulation as a promising avenue in the realm of post-stroke rehabilitation, providing insights into its role as an adjunct to traditional gait therapy. The nuanced exploration of stimulation parameters, participant characteristics and diverse outcome measures reveals the complexity of the interactions between tDCS and post-stroke gait recovery. As researchers grapple with the intricacies of optimizing this intervention, it becomes apparent that a tailored and individualized approach, accounting for the heterogeneity

of stroke survivors, is crucial for maximizing its efficacy. While the reviewed studies collectively suggest positive trends in the use of tDCS for gait enhancement, the necessity for well-designed, robust clinical trials emerges as a critical imperative. Establishing standardized protocols, incorporating larger sample sizes and employing rigorous methodologies will contribute to a more cohesive and reliable evidence base. Additionally, the duration of follow-up assessments in future studies must be extended to delineate the long-term effects of tDCS on post-stroke gait, providing a clearer understanding of its sustained impact beyond immediate intervention periods. The integration of transcranial direct current stimulation into post-stroke gait rehabilitation represents a dynamic intersection of neuroscience and rehabilitation science. This systematic review not only consolidates existing knowledge but also calls attention to the need for further investigation, collaboration and refinement. The potential of tDCS as a neuromodulatory tool in the context of gait recovery post-stroke is an exciting prospect and future endeavors should continue to explore its boundaries, optimize its application and contribute to the growing arsenal of rehabilitation strategies for stroke survivors [4,5].

## Conclusion

In conclusion, the systematic review provides a panoramic overview of the current state of research on transcranial direct current stimulation for enhancing post-stroke gait. While the amalgamation of evidence underscores the potential benefits of tDCS in augmenting gait rehabilitation, the variability in methodologies and outcomes necessitates cautious interpretation. As the field progresses, addressing methodological heterogeneity and expanding the depth of evidence through well-designed, rigorous studies will be pivotal. By elucidating the patterns and nuances in the existing literature, this review not only informs the scientific community but also lays the groundwork for future research endeavors aimed at refining the role of transcranial direct current stimulation in optimizing post-stroke gait recovery. Ultimately, the synthesis of evidence presented here serves as a compass for researchers, clinicians and policymakers navigating the complex landscape of post-stroke rehabilitation interventions.

## Acknowledgement

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## Conflict of Interest

There are no conflicts of interest by author.

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