



## The use of Transcranial Direct-Current Stimulation in the Prevention of Chronic Migraine: an Integrative Review

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### Introduction

Migraine is one of the most prevalent neurological disorders in the world. It becomes chronic when there are 15 or more headache days per month for over three months, with at least 8 of those days meeting the criteria for migraine. The cerebral cortex of individuals with chronic migraine (CM) is hyper-responsive to external stimuli, possibly due to altered functional connectivity with subcortical structures. There are non-invasive neuromodulation techniques, such as transcranial direct current stimulation (tDCS), which involves delivering a low-intensity current through the scalp via electrodes, potentially neutralizing the pathophysiological triggers of migraine. Preventive treatments for migraine are recommended in cases of high-frequency, disabling attacks, or poor response to acute treatments. The investigation of tDCS as an alternative treatment for CM is relevant because current medications may not yield a satisfactory response or may have undesirable adverse effects. This study is justified by the scarcity of publications on the topic. Only four relevant articles were found in the databases searched between 2019 and 2023. Therefore, it is essential to conduct an integrative review of these articles to better understand the use of tDCS in the prevention of CM.

### Objectives

The objective of this study is to conduct a literature review on transcranial direct current stimulation (tDCS) therapy in the prevention of chronic migraine.

### Methods

The present study is a bibliographic research in the format of an integrative review aimed at understanding the efficacy of tDCS in preventing chronic migraine. This research consists of a review conducted in the databases: PUBMED/MedLine, Embase, and Scielo in September 2023. The descriptors "Migraine," "Prevention," and "Transcranial direct current stimulation" were used, linked by the Boolean operator "AND." Inclusion criteria included full-text original writings with research objectives and a time frame from 2019 to 2023, as well as the ability to answer the following guiding question: Is transcranial direct current stimulation effective in preventing chronic migraine? Theses, dissertations, abstracts, reviews, articles that did not meet the research objective, and duplicate articles were excluded. After the search, 16 articles were found, all in the English language. The sample composition was based on 4 articles, considering the criteria presented.

### Results

Among the total selected articles, one is from 2021, one from 2022, and two from 2023. Among these, two articles assessed CM with allodynia, while the other two did not take it into consideration. Those that addressed allodynia showed promising results for tDCS, with improvements in the levels of this symptom. However, for patients without allodynia, the response to treatment was more significant. Following tDCS, the frequency, duration, and use of symptomatic analgesics for migraine attacks decreased. It proved to be safe, effective, and plausible for prophylactic treatment in these individuals. Nevertheless, further studies evaluating this therapeutic approach are necessary.

Regarding the studies that assessed only CM, the efficacy of tDCS in the active groups was substantial. All active groups demonstrated significant reductions in the frequency, duration, and intensity of migraine attacks.

### Conclusions

The use of tDCS is of potential interest for the prevention of CM, but the quality of the evidence is very low. Nevertheless, the results presented are quite promising. Therefore, tDCS could be an intriguing therapeutic strategy to prevent the progression of CM into a refractory form.

Larger controlled trials are needed to confirm the efficacy demonstrated in the present study, assess the long-term effects of tDCS, and identify predictive factors that may influence the clinical response to treatment.

**Keywords:** Migraine; Prevention of Migraine; Transcranial stimulation; Chronic Migraine.