INPLASY PROTOCOL

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Support: **King Khalid University.**

Review Stage at time of this submission: **Preliminary searches.**

Conflicts of interest:
None.

Effect of transcranial direct current stimulation (tDCS) on upper limb motor function in subjects with stroke: An overview review of the systematic reviews

Tedla, JS[1]; Sangadala, DR[2]; Reddy, RS[3]; Samuel, PS[4], Dixit, S[5]; Gautam, AP[6]; Rengaramanujam, K[7]; Gular, K[8]; Kakaraparthi, VN[9]; Asiri, F[10].

Review question / Objective: **The purpose of this overview review is to find the effect of transracial direct current stimulation on upper limb motor function in subjects with stroke.**
Condition being studied: **Noninvasive brain stimulation is an emerging approach for improving functions in stroke subjects in rehabilitation settings. Numerous Non-invasive brain stimulation approaches are available such as repetitive transcranial magnetic stimulation (rTMS), transcranial direct current stimulation(tDCS), transcranial alternating current stimulation(tACS), and transcranial pulsed ultrasound in rehabilitation. Among these rTMS and tDCS have considerable evidence for rehabilitating stroke subjects. When compared with rTMS, tDCS is less expensive, portable, tolerable, and safe which enhances the interhemispheric balance by different types like anodal tDCS, cathodal tDCS, and dual or bihemispheric tDCS. In the current Overview Review we intend to study the effect of tDCS on upperlimb motor function in subjects with stroke.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 January 2021 and was last updated on 16 January 2021 (registration number INPLASY202110061).

INTRODUCTION

Review question / Objective: **The purpose of this overview review is to find the effect of transracial direct current stimulation on upper limb motor function in subjects with stroke.**

Rationale: **There are many randomized controlled trials and systematic reviews available on the effect of tDCS on upper**

limb function in subjects with stroke. As per the chronological order, the evidence was accumulated and led to confusion among the readers related to its effects. We are attempting to analyze the evidence available in the systematic reviews and meta-analysis studies pertaining to this topic and intended to provide valuable and clear information for the readers.

Condition being studied: Noninvasive brain stimulation is an emerging approach for improving functions in stroke subjects in rehabilitation settings. Numerous Non-invasive brain stimulation approaches are available such as repetitive transcranial magnetic stimulation (rTMS), transcranial direct current stimulation(tDCS), transcranial alternating current stimulation(tACS), and transcranial pulsed ultrasound in rehabilitation. Among these rTMS and tDCS have considerable evidence for rehabilitating stroke subjects. When compared with rTMS, tDCS is less expensive, portable, tolerable, and safe which enhances the interhemispheric balance by different types like anodal tDCS, cathodal tDCS, and dual or bihemispheric tDCS. In the current Overview Review we intend to study the effect of tDCS on upperlimb motor function in subjects with stroke.

METHODS

Search strategy: The electronic databases such as Campbell Library, Data Base of Promoting Health Effectiveness (DoPHER), Cochrane Database of Systematic Reviews (CDRS), Database of Abstracts of Reviews of Effects (DARE), EMBASE, NHS EED, PROSPERO, Pub Med, PsycINFO, MEDLINE (Ovid), SCOPUS, Web of Science, Saudi Digital Library, EBSCO, DOAJ, Google Scholar and CINHAHL will be used for conducting the search. And additional systematic review database such as the JBI database of systematic reviews and Implementation Reports will also be used for search will be used for search strategy. The Medical subject headings (MeSH) like\ tDCS, stroke, upper limb motor function, systematic reviews, and meta-analysis will be utilized for search as keywords in these all databases to obtain the relevant articles. Authors will also search in Google scholar for the reviews. Authors will also search grey literature like manual screening of reference lists from the retrieved reviews.

Participant or population: Subjects with Stroke/Hemiplegia/Hemiparesis/ Cerebrovascular Accident.

Intervention: Studies with any type of tDCS interventions like Anodal tDCS, cathodal tDCS and bi hemispheric tDCS will be included for analysis.

Comparator: Studies with the tDCS intervention compared with any of the treatments like Sham tDCS, Physical Therapy, Exercise, Virtual reality and Robotic therapy etc.

Study designs to be included: Systematic Reviews and Meta-analysis.

Eligibility criteria: Systematic reviews, meta analysis, reviews with meta-analysis of randomized controlled trails regardless of blinding, reviews with quasi experimental trails from the year 2000 to 2020 published in English language. The reviews/ and (or) meta-analysis which are available in full text will be included.

Information sources: Information resources like Campbell Library, Data Base of Promoting Health Effectiveness (DoPHER), Cochrane Database of Systematic Reviews (CDRS), Database of Abstracts of Reviews of Effects (DARE), EMBASE, NHS EED, PROSPERO, Pub Med, PsycINFO, MEDLINE (Ovid), SCOPUS, Web of Science, Saudi Digital Library, EBSCO, DOAJ, Google Scholar and CINHAHL will be used for conducting the search. And additional systematic review database such as the JBI database of systematic reviews and Implementation Reports will also be used for search will be used for search strategy. Contacts from the authors also will be done to obtain the necessary information. Even unpublished grey literature from the university websites or by personal communications will be included if needed.

Main outcome(s): Upper Limb Motor Function in terms of Activities of Daily Living or depicting any functional activities will be the main outcome measures.

Additional outcome(s): Some of the basics motor functions like Range of Motion, Spasticity, Coordination, Reaction time, Reflex nature, Strength, and Muscle length will be of interest. Moreover, the participation of the subjects with stroke in their day to day activities and their influence on the quality of life was also of interest to this review.

Data management: The reviewer team of four researchers will make a judgment by the title, year, and abstract they will be blinded to publishers, journals, and authors. Discrepancies will be discussed by all the members of the review team. Full papers of included abstracts will be again reviewed by the reviewer team. Then two reviewers will extract the data independently with the help of a data extraction form for reporting Overview review of the systematic reviews as outlined in the JBI methodology. Any disagreement will be resolved through discussion with the reviewer team.

Quality assessment / Risk of bias analysis: Methodological quality assessment of all the included systematic reviews, meta-analysis, reviews with meta-analysis will be done by using the tool AMSTAR checklist. Additional tool Critical Appraisal Skills Program systematic review checklist also will be used for the quality assessment if required.

Strategy of data synthesis: A flow diagram of the study inclusion process will be there. Descriptive (or) qualitative data such as findings and conclusions from the existing included reviews will be described in a narrative form including tables and charts. If any analysis is required then we will be using SPSS version 21 software. The level of significance will be less than 0.05 and 95% will be the confidence interval. Descriptive statistics will be used to do any univariate analysis.

Subgroup analysis: Subgroup analysis based on the chronicity of stroke or type of tDCS intervention will be done if there is a sufficient number of studies available.

Sensibility analysis: The sensibility of individual studies included in the review process will be analyzed by the reviewer's team by using the standard protocol and AMSTER checklist.

Language: Articles published in English language were only considered for this overview review.

Country(ies) involved: Saudi Arabia.

Keywords: tDCS; stroke; hemiplegia; cerebrovascular accident; upper limb motor function; systematic reviews; meta-analysis.

Dissemination plans: The results of the Overview review will be published in the peer-reviewed international journal.

Contributions of each author:

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