INPLASY PROTOCOL

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Support: NA

Review Stage at time of this submission: Formal screening of search results against eligibility criteria.

Conflicts of interest: None.

Addition of transcranial direct current stimulation to walking training for improving walking activity in individuals with Parkinson's Disease: Protocol for a systematic review

Nascimento, LR[1]; do Carmo, WA[2]; de Oliveira, GP[3]; Dias, FMV[4].

Review question / Objective: The specific research questions are: 1. In people with Parkinson's disease, does walking training associated with tDCS improve walking (i.e., speed, cadence and step length) and reduce falls and freezing, compared with no intervention/placebo? 2. Is walking training associated with tDCS superior to walking training alone? 3. Are benefits carried over to social participation and/or maintained beyond the intervention period?

Condition being studied: Parkinson's Disease is the second most common degenerative disease of the central nervous system and the most common movement disorder, resulting from the death of dopamine-producing cells in the substantia nigra. As disease progresses over time, individuals face impaired balance and walking limitations.

INTRODUCTION

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carried over to social participation and/or maintained beyond the intervention period?

Rationale: Non-invasive brain stimulation by transcranial direct current stimulation (tDCS), which modulates cortical excitability by applying a direct current to the skull, could be associated with walking training and has the potential to enhance its benefits in individuals with Parkinson's Disease. This systematic review will examine the efficacy of the addition of tDCS to walking training for improving walking activity in those individuals.

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METHODS

Search strategy: Search terms included words related to Parkinson's Disease, transcranial direct current stimulation and walking, as follows: 1 Parkinson. (52114) 2 Parkinson$.tw. (297135) 3 (PD or IPD).tw. (342702) 4 (Parkinson$ adj5 Diseas$).tw. (245056) 5 exp Parkinson Disease/ (207189) 6 1 or 2 or 3 or 4 or 5 (556904) 7 Electric Stimulation Therapy/ (20754) 8 Electric Stimulation/ (192506) 9 Electrodes/ (143952) 10 (transcranial adj5 direct current adj5 stimulation).tw. (11402) 11 (transcranial adj5 DC adj5 stimulation).tw. (163) 12 (transcranial adj5 electric$ adj5 stimulation).tw. (2612) 13 (tDCS or A-tDCS or C-tDCS or S-tDCS or electrode$ or anode or anodes or anodal or cathode or cathodes or cathodal).tw. (378017) 14 7 or 8 or 9 or 10 or 11 or 12 or 13 (598442) 15 Walking/ or Walking.mp. (226545) 16 Gait.mp. or Gait/ (160324) 17 Locomotion.mp. or Locomotion/ (141510) 18 Range of Motion, Articular/ (59049) 19 (walk$ or gait$ or ambulat$ or mobil$ or locomotor$ or balanc$ or stride or step).mp. (3277925) 20 15 or 16 or 17 or 18 or 19 (3388490) 21 6 and 14 and 20 (1447) 22

limit 21 to humans [Limit not valid in AMED,CDSR,PsycINFO; records were retained] (1044).

Participant or population: Individuals diagnosed with Parkinson's Disease.

Intervention: Walking training associated with tDCS.

Comparator: The control intervention is defined according to the research questions: (1) to examine the efficacy of tDCS plus walking training, the control intervention could be nothing/placebo/sham-tDCS intervention; (2) to examine the superiority of tDCS plus walking training over walking training alone, the control intervention could be walking training alone.

Study designs to be included: Randomized clinical trials.

Eligibility criteria: Design: Randomized controlled trials; Participants: Adults diagnosised with Parkinson's Disease; Intervention: Walking training associated with tDCS; Outcomes measures: Measures of walking (i.e., speed, step length and cadence), falls / fear of falling and/or freezing of gait.

Information sources: Searches will be conducted on MEDLINE, AMED, EMBASE, Cochrane, PsycINFO and PEDro databases for relevant studies without date or language restrictions.

Main outcome(s): The primary outcomes are walking spatiotemporal parameters: walking speed, cadence and step length, typically obtained using a timed walk test or movement analysis systems. Secondary outcomes are number of falls, fear of falling and freezing of gait, typically obtained using diaries or questionnaires. The timing of the measurements and the procedure used to measure the outcomes will be recorded to assess the appropriateness of combining studies in a meta-analysis.

Data management: Information about the method (i.e., design, participants,

intervention, measures) and results (i.e., number of participants and means (SD) of outcomes) will be extracted by two reviewers and checked by a third reviewer. Additional information may be requested from the corresponding author.

Quality assessment / Risk of bias analysis: The quality of the included trials will be assessed by extracting the PEDro scores from the Physiotherapy Evidence Database (www.pedro.org.au) The Grading of Recommendations Assessment, Development and Evaluation (GRADE) system was used to summarize the overall quality of evidence for each outcome. The GRADE system ranges from high to very low quality.

Strategy of data synthesis: The change or post-intervention scores will be used to obtain the pooled estimate of the effect of the intervention, using a random effects model. For all outcome measures, the critical value for rejecting H0 will be set at a level of .05 (two-tailed). The pooled data for each outcome will be reported as the weighted mean difference (95% CI) between the groups.

Subgroup analysis: None planned.

Sensibility analysis: None planned..

Language: English

Country(ies) involved: Brazil.

Dissemination plans: Conference abstracts and peer-reviewed journal.

Keywords: Parkinson; electrical stimulation; gait; rehabilitation.

Contributions of each author:
Author 1 - Study design; data collection; statistical analyses; writing of manuscript.
Author 2 - Study design; data collection; statistical analyses; writing of manuscript.
Author 3 - Study design; data collection; statistical analyses; writing of manuscript.
Author 4 - Study design; data collection; statistical analyses; writing of manuscript.