

Effects of non-invasive brain stimulation in stroke individuals

Location: People living in the Montreal or Laval area, Quebec.

Number of participants: 15

Recruitment period: August – December 2022

Description: This project studies the effects of non-invasive brain stimulation (NIBS), namely the transcranial alternating current stimulation (tACS) and the transcranial direct current stimulation (tDCS), on brain wave patterns and motor performance in stroke individuals using electroencephalography (EEG). Certain brain wave patterns that occur during movement (named movement-related beta resynchronization and beta bursts) are altered as a result of a stroke and have been shown to be associated with worse motor performance. This suggests that modulating MRBD and beta bursts towards more normal values may lead to improved motor performance.

The objectives of this research project are to:

- Analyze the patterns of brain oscillations throughout the execution of a movement in stroke.
- Analyze the effects of non-invasive brain stimulation on brain activity and motor performance.

Language: English and French

Eligibility:

To be eligible for inclusion in this project, participants must:

- Have had a stroke 6 months prior to entering the study
- Be able to grasp and exert force on a handgrip dynamometer

Participants will be excluded if they have:

- Severe hemineglect
- Severe spasticity in the arm and hand
- Significant cognitive impairments

Participant requirements:

Participation in this research project will last 3 consecutive weeks, starting with the first evaluation. The participation includes a total of 4 visits.

- 1st visit (2h): Participants will read and fill out the informed consent form. They will complete questionnaires and tests in order to collect data regarding their socio-demographic characteristics, as well as those pertaining to their stroke, their motor function, their grip strength, and their manual dexterity.
- 2nd, 3rd and 4th visit (2h30 each): Participants' brain activity will be recorded with an EEG throughout the session. They will perform the grip strength task with the affected hand. They will receive either brain stimulation or sham stimulation for 10 to 20 minutes

depending on the type of stimulation applied. They will then repeat the grip strength task right after the stimulation ends and again 30 minutes later.

Each of the last 3 visits, participants will be assigned to a different stimulation protocol at random (like heads or tails) such that they will experience all 3 protocols by the end:

- Transcranial alternating current stimulation (tACS)
- Transcranial direct current stimulation (tDCS)
- Sham stimulation

The exact date and time will be decided depending on the availability of the participants and of the student in charge of the project. A stipend of \$30 will be provided to the participant at the end of each session for a total of \$120.

Institution: McGill University

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