



Treating Depression in Parkinson's Disease with Transcranial Direct Current Stimulation

DEFINITION

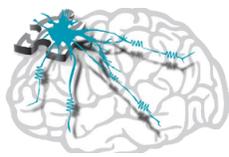
Transcranial Direct Current Stimulation (tDCS) is a non-invasive neurostimulation technique where a low direct current is applied to the scalp through electrodes placed over a targeted area. Powered by a small battery, tDCS uses a low current from electrode to electrode that establishes an electrical pathway within the brain influencing neuronal activity. This change in neuronal activity can be sustained and can have a therapeutic effect on brain function. Depending on the brain area being stimulated, studies have suggested that tDCS can be used for improving behaviour, cognitive performance, and/or mood.

Previous research has shown that tDCS can be used to treat depression in people without Parkinson's Disease (PD), and some studies have found that tDCS can improve motor and cognitive abilities in people with PD. In this study, we will also examine whether treatment with a course of tDCS can improve depression in PD as well as help with motor functioning in PD.

For more information on Transcranial Direct Current Stimulation (tDCS) specifically, please visit our tDCS modality page [HERE](#).

HOW IT WORKS

The mechanism in which tDCS improves mood and/or cognitive function is not fully understood. Investigations into tDCS treatment targeting a specific part of the brain (the left prefrontal cortex) have shown improvements in mood in depressed patients. Decreased activity in the left prefrontal cortex has been correlated with negative mood. In addition, when targeting similar areas of the brain (prefrontal cortex), tDCS has shown improvement in bradykinesia, a common symptom of Parkinson's Disease. Repeated, daily tDCS treatments may improve mood in PD patients as well as improve motor function. Increasing activity in the left prefrontal cortex using tDCS may improve mood and motor functioning in PD patients.



WHY IS IT NEEDED?

There is no standard treatment for depression in Parkinson's Disease. The use of antidepressant medications may be limited because many PD patients are on medications treating their PD symptoms. Physicians hope to avoid drug + drug interactions that may induce or increase medication side effects. A non-invasive neurostimulation such as tDCS may provide a safer and inexpensive alternative for treating depression in people with PD.

RISKS

tDCS is considered a safe and painless procedure for most people. The treatment is non-invasive, so it does not involve any incisions, surgery, or anaesthesia.

Common Side Effects:

The stimulation is not usually considered painful, but some people find it uncomfortable. Side effects may include: headaches, tenderness at the site of stimulation, and fatigue.

Uncommon Side Effects:

Less common side effects include nausea (< 3%) and insomnia (< 1%).

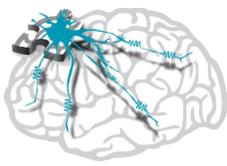
Treating Depression in Parkinson's Disease with Transcranial Direct Current Stimulation (tDCS) – STUDY

WHY ARE WE DOING THIS STUDY?

Depression is the most common mood disorder that patients with Parkinson's Disease (PD) are diagnosed with in their lifetime, with an occurrence of 30-40%. Transcranial Direct Current Stimulation (tDCS) is a non-invasive neurostimulation that has shown promise in the treatment of depression for non-PD patients and in improving motor function in PD patients. In this study, we will investigate if tDCS can treat depressive symptoms in PD patients and improve motor functioning as well.

WHAT HAPPENS IN THIS STUDY?

We expect to enroll 50 people in this study at UBC.



The purpose of this study will be to compare active tDCS to sham (inactive) tDCS. Each participant will be randomized (i.e. assigned by chance/flip of a coin) to either the active or sham tDCS group. Participants will not be told which treatment group they will be in, but this information will be readily available to research staff in the event of an emergency. Both groups will receive 15 consecutive days of study treatment, which will happen once per day for 20 minutes. Some treatments will take place at UBC Hospital to ensure correct placement of the tDCS device, but most treatments will be done at home. All participants will receive full instructions at the beginning of the study.

Up to 20 participants will be invited to take part in the neuroimaging (brain scans) portion of the study. A MRI (magnetic resonance imaging) scan and a PET (positron emission tomography) scan will be used to create an image of your brain and map a brain chemical called Dopamine. Dopamine is a brain chemical involved in depression and our study will investigate if tDCS has an effect on it.

WHO IS CONDUCTING THIS STUDY?

The study is a collaboration between the NINET lab and the Pacific Parkinson's Research Centre at UBC Hospital. The principal investigator for this study is Dr. Jon Stoessl, director of the Pacific Parkinson's Research Centre.

WHO CAN PARTICIPATE?

You may be able to participate if:

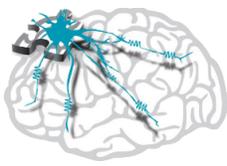
- You are 19 years of age or more
- You have a diagnosis of Parkinson's Disease
- You are experiencing depressive symptoms
- You are willing to be treated with tDCS, complete questionnaire about your mood and cognition, and brain scans (optional).

WHO CANNOT PARTICIPATE IN THIS STUDY?

Anyone considering the study will be thoroughly screened to help decide if this is the right study for you.

FOR THIS REASON, PLEASE INFORM US:

- If you are pregnant, or thinking of becoming pregnant
- Of all medications that you are taking, including herbal supplements and over the counter medication. If possible bring a list of medications, including how often you take them and the dosages.



• If you have had any past injuries or surgeries, or other physical or mental health problems, including:

- Aneurysm clips or coils
- Stents in the neck or brain
- Implanted stimulators
- Cardiac pacemakers or implantable cardioverter defibrillator (ICD)
- Metallic implants in your ears and eyes, (ex: dental implants, cochlear implants)
- Hearing Aid
- Shrapnel or bullet fragments in or near the head
- Facial tattoos with metallic or magnetic-sensitive ink
- Other metal devices or object implanted in or near the head
- History of seizures and/or family history of seizures

COMMONLY ASKED QUESTIONS ABOUT THE STUDY:

Q: Will my medical information be kept confidential?

A: Your confidentiality will be respected. No information or records that disclose your identity will be published without consent, nor will any of your information or records that disclose your identity be removed or released without your consent, unless required by law. All participants and their research data will receive a unique study code, and never be identified by name or any other personal information.

Q: How much will the treatment cost?

A: There is no cost to participants for the treatment during the study.

Q: Are there benefits to participating in the study?

A: You may find that your symptoms improve, however this is not guaranteed. Information gathered from this study will add to the knowledge of tDCS and may help other people with Parkinson's Disease and depression in the future.

For more commonly asked questions for Transcranial Direct Current Stimulation (tDCS), please visit our tDCS FAQ page [HERE](#).

WHAT DOES THE TDCS TREATMENT INVOLVE?

Each tDCS treatment is 20 minutes, with 5-10 minutes needed for set up. Participants will be given instructions on how to use the device on the first treatment day and throughout the study. Treatment will take place once a day for 15 consecutive days; most of the treatments will take place at home with two check-in days occurring via computer webcam or telephone to ensure proper placement of the device. Two on-site visits (day 7 and day 15 of treatment) will also take place to observe depressive and motor



symptoms and to ensure proper procedures with the tDCS device. All follow-up visits will occur on-site at UBC Hospital.

WHAT HAPPENS DURING STUDY VISITS AT UBC HOSPITAL?

If invited to take part in the optional brain imaging portion of the study, participants will be asked to suspend their PD medication, aside from Rasagline, for 12-18 hours before the scans. You will limit your fluids and eat a light breakfast before coming to UBC Hospital. Detailed instructions will be provided.

During these imaging visits you will have:

- A MRI scan
- A motor assessment
- A PET scan
- A light lunch
- tDCS treatment
- A PET scan
- A motor assessment

Imaging visits are at the beginning and end of the tDCS treatment course. All other visits during the tDCS treatment course will be to ensure proper placement of the tDCS device and to assess depressive symptoms.

If you are willing to take part in the optional brain imaging portion of this study, you must be agreeable to do the scans and to be temporarily off PD medication for these 2 visits. **Participation in the brain imaging visits is voluntary and you can still take part in the study if you choose not to take part in this portion of the study.**