

Parent Consent Form

Title of Research Study: Effects of single-session transcranial direct current stimulation in children with cerebral palsy

Researcher Team Contact Information: Bernadette Gillick, PhD, MSPT, PT

For questions about research appointments, the research study, research results, or other concerns, call the study team at:

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Key Information About This Research Study

The following is a short summary to help you decide whether or not to be a part of this research study. More detailed information is listed later on in this form.

What is research?

Doctors and researchers are committed to your child's care and safety. There are important differences between research and treatment plans:

- The goal of research is to learn new things in order to help groups of people in the future. Researchers learn things by following the same plan with a number of participants, so they do not usually make changes to the plan for individual research participants. You, as an individual, may or may not be helped by volunteering for a research study.
- The goal of treatment is to help you get better or to improve your quality of life. Doctors can make changes to your treatment plan as needed.

Research and clinical care are often combined. One purpose of this informed consent document is to provide you clear information about the specific research activities of this study.

Why am I being asked to take part in this research study?

We are asking your child to take part in this research study because s/he has weakness on one side of his/her body and is between 7 and 17 years of age, or s/he has typical development and matches the age and sex of one of the individuals with weakness on one side of the body.

What should I know about a research study?

- Someone will explain this research study to you.
- Whether or not your child takes part is up to you and your child.
- You or your child can choose not to take part.
- You or your child can agree to take part and later change your mind.
- Your decisions will not be held against you.
- You and your child can ask all the questions you want before you decide.

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Why is this research being done?

Hemiparesis, or weakness of one side of the body, can happen when an infant has an injury in the part of the brain that controls movement. In hemiparesis, one hand can be weaker than the other hand.

This study is being performed to understand more about how one type of non-invasive brain stimulation, called transcranial direct current stimulation (tDCS), produces changes in brain activity. Changes due to tDCS may be a potential future therapy for people with hemiparesis. Hemiparesis can be caused by a brain injury, like stroke. At the moment, tDCS is an investigational device and is not approved by the FDA to treat any disease or condition.

We will test how a single session of tDCS impacts brain connectivity and function, and also how your child uses and moves his/her hands. From previous research, we know that tDCS is safe and tolerated in single and multiple daily sessions. Each participant will receive either real tDCS or sham tDCS (the control group). Because the individual response to tDCS is varied, we hope to gain valuable knowledge in a controlled setting. We are conducting this study to try to understand what factors may influence how children and young adults with weakness due to early brain injury respond to this type of stimulation.

Your child will likely not directly benefit from the effects of a single exposure to tDCS used in this study. Your child may experience a temporary increase in how well s/he moves his/her hand from participating in the study. The knowledge gained from this study is essential toward establishing the most effective use of this technology. This may benefit someone like your child in the future.

How long will the research last?

We expect that your child will be in this research study for one day lasting 4.5 hours, or if you choose, two separate days lasting 1.5 and 3 hours. The MRI will last approximately 1.5 hours and the testing and intervention will last approximately 3 hours.

What will I need to do to participate?

Your child will be asked to complete an assessment that involves a machine that takes pictures of his/her brain. This will involve your child lying down on a table that moves into a long tunnel that takes the pictures. Your child will have to remain as still as possible, but will be allowed to watch a movie. We may also ask your child to make certain movements while we take pictures.

Then s/he will be asked to sit in a chair and relax while we complete assessments involving magnetic pulses that allow us to see how the brain communicates with his/her muscles. Then, we will use one form of non-invasive brain stimulation which involves two sponges placed on his/her head. During this time, s/he will practice a movement activity. After the brain stimulation, we will perform more assessments with magnetic pulses while s/he sits in a chair.

More detailed information about the study procedures can be found under ***“What happens if I say yes, I want to be in this research?”***

Is there any way being in this study could be bad for me?

There are no anticipated negative effects from participating in this study. There may be a chance that the form of brain stimulation used will cause itchiness and/or skin irritation, but these generally go away by the end of the study.

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More detailed information about the risks of this study can be found under ***“What are the risks of this study? Is there any way being in this study could be bad for me? (Detailed Risks)”***

Will being in this study help me in any way?

We cannot promise any benefits to you or others from your taking part in this research. However, possible benefits include a short-term improvement in how well your child moves or uses his/her hand. Possible benefits to others include the gained knowledge of how tDCS effects the brain and movement that may help develop future clinical trials involving brain stimulation.

Detailed Information About This Research Study

The following is more detailed information about this study in addition to the information listed above.

How many people will be studied?

We expect about 40 people with weakness on one side of the body and 10 people without weakness on one side of the body will be in this research study.

What happens if I say *“Yes, I want to be in this research”*?

Once you agree to participate, we will work to schedule a time to visit our facilities to complete the study. You can either complete the study in two separate days or one day. In total, the study will take 4.5 hours.



First component: Magnetic Resonance Imaging (MRI)

Location: Center for Magnetic Resonance Research (CMRR), University of Minnesota East Bank

Duration: 1.5 hours

(For the following procedures, “you” refers to your child.)

You will receive a magnetic resonance imaging (MRI) test. MRI is a way to look at the brain using a powerful magnet. The MRI machine is shaped like a big tunnel. It has FDA approval. Long term effects of exposure to 3.0 Tesla high magnetic fields are unknown.

1. First, we will help you lie down comfortably on a table with wheels. We will help position you so you are able to keep your head still.
2. We will put in earplugs and earphones for you to make the MRI less noisy. The earphones help us communicate with you and will play music or videos during the test if you would like. A microphone inside the magnet will allow us to hear you. You will hold a soft ball during the test, which you can squeeze if you want to communicate or stop the test.
3. Next, we will move you into the MRI machine.
4. First, we will take pictures of your brain while you are holding still. These are to confirm the kind of injury you had.
5. Next, you will hold still for about 40 minutes, but we will talk to you every 5-10 minutes to see

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how you are doing. The MRI machine will take pictures of your brain.

6. The images or pictures created during this study are for research purposes only and are not intended to provide health care to you. However, if the results from the magnetic resonance imaging show something unusual in the pictures, a Radiologist trained in reading the pictures will look at them. The pictures will not contain any personal information except your age and pertinent medical history collected as part of the research. There will be no charge to you for having the Radiologist look at your pictures. The investigator in charge of this study will contact you if the recommendation of the Radiologist is to further investigate the unusual results of the pictures with your own physician. However, further medical follow up is not a part of this study and the study does not have funds set aside for this purpose. Therefore, if the results do show something unusual, any medical follow up cost will be your responsibility and/or the responsibility of your health insurance carrier.
7. Notification of Significant New Findings about the Effects of MRI on Human Health. You will be told of any important new information that is learned during the course of this research study, which might affect your condition or your willingness to continue participation in this study.

Second component: Non-invasive brain stimulation testing and intervention.

Location: Clinical and Translational Science Institute, University of Minnesota East Bank

Duration: 3 hours

Baseline testing (90 minutes)

1. You will be interviewed for about 20 minutes. You will be asked questions about your health history, and treatments you have had for hemiparesis and other health problems. The investigator will answer any questions you have regarding the study.
2. All pubescent female participants are required to have a urine pregnancy test. To do this test, you will urinate into a cup.
3. You will have a transcranial magnetic stimulation (TMS) test. This test measures how strongly your brain is sending signals to the muscles and helps us determine the organization of your brain. The TMS equipment is a magnetic stimulation coil that the investigator holds on your head. When the TMS machine is turned on, it gives a painless pulse, and makes a clicking sound. You might feel this as a tapping feeling.
4. To do this test, you will sit in a reclining chair. Special sticky pads called electrodes will be placed on your hand and arm. These electrodes measure when and how much your muscles move during the test. We will tape a piece of plastic to your forehead that our computer can track, like a videogame.
5. Your heart rate and blood pressure will be measured and recorded using adhesive electrocardiography (ECG) electrodes attached to different areas of the chest and back, and a small cuff placed on one finger. We will measure blood pressure by putting a small cuff on your finger and measure how fast your heart beats by taping small discs to your chest.
6. The research team will ask you a series of questions regarding how you are feeling.
7. You will wear earplugs during the test to make it less noisy.
8. The researcher will hold the magnetic stimulation coil on different places on your head. While the researcher holds the coil, it will give one pulse every 10 seconds. This test tells us the precise place in your brain that controls the weaker hand's finger muscles. We will use this TMS

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assessment to determine the exact location for the application of tDCS during the intervention. This test also tells us the lowest possible level of stimulation that will activate this part of your brain.

9. Next, the researcher will hold the magnetic stimulation coil on your head and ask you to move your finger at the same time.
10. Your vital signs will be measured and recorded.
11. The research team will ask you a series of questions regarding how you are feeling.
12. During some of the testing, you will be able to watch a movie of your choice.
13. You will also do some testing that just involves moving your hands and arms.

Intervention: Transcranial Direct Current Stimulation (30 minutes)

14. After the testing, we will use the second form of brain stimulation called transcranial direct stimulation (tDCS). This will involve putting two electrodes on the surface of the head. The stimulation will last 20 minutes, and you will also be doing a movement activity during this time.
15. We will ask you how the stimulation feels at the beginning, in the middle, and at the end of the 20-minute stimulation period.

Post-intervention Testing (60 minutes)

16. Immediately after stimulation, we will take the electrodes off and perform more testing using TMS and movement assessments. You can continue watching your movie during this part. This will last 60 minutes.

For all parts of the study, you will accompany your child at all times. You will also see members of our research team who help with the assessments.

With your permission, we may take pictures and/or videos of your child during participation. You and your child have the option of telling us if you will allow us to take pictures and videos, and how we may use these pictures and videos.

The type of tDCS (real or sham) your child receives will be chosen by chance, like flipping a coin. Neither you nor the study doctor will be told what type of tDCS you get. Your child will have an equal chance receiving either intervention.

What are my responsibilities if I take part in this research?

If you take part in this research, you and/or your child will be responsible to:

1. Inform the investigators if your child is feeling ill or experiencing discomfort

What happens if I say “Yes”, but I change my mind later?

You can leave the research at any time. Leaving will not be held against you.

Choosing not to be in this study or to stop being in this study will not result in any penalty to you or loss of benefit to which you are entitled. This means that your choice not to be in this study will not negatively affect your right to any present or future medical care, your academic standing as a student, or your present or future employment.

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What are the risks of being in this study? Is there any way being in this study could be bad for me?

Magnetic Resonance Imaging (MRI)

MRI machines use a strong magnet and radiofrequency magnetic fields to take images of your body. The scanning process is similar to an x-ray or CT scan, but MRI does not use ionizing radiation (high-energy radiation that can potentially cause damage to DNA) like x-rays or CT scans. The risks associated with MRI scans are:

1. **Projectiles:** Objects with magnetic properties can be pulled into the magnet and turn into projectiles. To minimize this risk we ask that subjects remove all metallic items (watches, cell phones, hair pins, etc.) prior to entering the scanner and by controlling access to the scanner.
2. **Claustrophobia:** The scanner is a long narrow tube that may cause some people to feel claustrophobic.
3. **Hearing Damage:** The noise generated by the operation of the scanner during a study is loud enough to cause hearing damage if you do not wear hearing protection. Hearing protection is required and is provided by the investigator.
4. **Nerve Stimulation:** Some people experience localized tingling, twitching, or muscle contractions during MRI scans. This is expected, but if it is uncomfortable please notify the investigator.
5. **Disruption of Devices:** Some devices can be damaged by magnetic fields and should not be brought into the scanner room. This includes some implanted devices such as pacemakers, cochlear implants, insulin pumps, nerve stimulators, etc. If you have any implanted device notify the investigator.
6. **Heating of Devices:** The radiofrequency waves used in MRI can heat conductive materials such as metal implants (screws, plates, rods, wires, artificial joints, etc.), certain tattoo inks, certain clothing fabrics, jewelry, medication patches, wigs, etc. You will be asked to remove these items if possible. If they cannot be removed you will be asked to provide more information to allow MRI staff to be able to make determination on the safety of proceeding with the scan.

A thorough pre-scan questionnaire will allow us to minimize the risk of device disruption and heating. You will be in constant contact with the investigator and should notify the investigator immediately, via the squeeze ball, if you notice anything unusual, become claustrophobic, think that your hearing protection is not adequate, or if you experience nerve stimulation that is uncomfortable.

In addition, there is a risk of unknown effects related to participation in MRI research. Long-term effects of exposure to high magnetic fields are unknown. Most people experience no short-term ill effects from the strong magnetic field, but some people report dizziness, mild nausea, headache, a metallic taste in their mouth, or sensations of flashing lights. These symptoms, if present, subside shortly after leaving the magnet. If any sensations experienced during participation cause discomfort or pain, notify the researcher right away and your participation will stop and you will be taken out of the magnetic field. The risks of exposure to high magnetic fields are unknown for fetuses. Therefore, if you are a female who is capable of becoming pregnant, and you have any reason to believe that you might be pregnant, you should not participate in this study.

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Transcranial Magnetic Stimulation (TMS) and transcranial direct current stimulation (tDCS)

Likely Risks

1. Headache: The tDCS secure-strap may cause a mild discomfort or headache. The stimulation itself may also cause a mild temporary headache.
2. Fainting: The TMS testing may cause fainting. We will measure your blood pressure before and after each treatment. To avoid fainting, we will ask you to eat a full meal and drink extra fluids before study visits. We will also give the treatment in a reclining chair.
3. Fatigue: tDCS and the TMS testing series may cause fatigue or a tired feeling.
4. Itching, tingling and burning sensation in the area of the electrodes: The tDCS stimulation may cause discomfort at the site of the electrode placement on the head.
5. Pain: If pain is reported during the study, the electrodes will be repositioned for comfort. We will also assess pain at the testing component of each session.
6. Skin Redness: The area of electrode placement will be assessed prior to electrode placement for any prior skin irritation or irregularity. If the skin is intact and the study proceeds and redness still occurs, the electrode placement and contact will be assessed. The area of redness will be monitored at all testing sessions.

Unlikely Risks

1. Seizure: People with brain injury may have a higher risk of seizure from non-invasive brain stimulation. There have been no reported seizures with the forms of testing and intervention with TMS and tDCS which we are using in this study. If however, a seizure does occur, doctors and nurses will be available to treat you right away.
2. Hearing impairment: The TMS testing makes a clicking sound, which could cause hearing loss. One rTMS study reports a hearing loss in one person that lasted for 10 months. To prevent this, you will wear earplugs during the treatment.
3. Concentration or mood change
4. Temporary numbness or twitching of the face: The TMS testing may cause temporary numbness or twitching of the face for up to one hour. The therapists will watch your face very carefully for any signs of twitching. We will ask you to let us know right away if you have any changes in your face during the treatment. If this happens, we will stop the test or treatment.
5. Skin Burn: Skin integrity will be assessed prior to intervention. Electrode placement may need to be adjusted.
6. Stimulation in subject with reduced sensation
7. Temporary mania or intense mood: Studies have reported mood swings in patients being treated with rTMS for bipolar disorder, post-traumatic stress disorder, or depression. Symptoms varied across patients and included euphoria, sensitivity to criticism, rage, restlessness, over-optimism, grandiose ideas, and reduced sleeping. The duration of these symptoms lasted from hours up to 5 days.
8. Temporary difficulty with movement, or motor control impairment: Possible movement problems include a tingly feeling, stiffness, or twitching of muscles in the arm that may last minutes to hours.
9. Temporary neck pain or scalp pain: Stiffness or a dull ache in the neck may last for minutes to hours. tDCS electrodes may need to be adjusted.

Rare Risks for TMS Testing

1. Dental pain: One person being treated for depression experienced a pulsating pain in the teeth

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of the left upper jaw. The pain stopped after the treatment.

Other risks

1. The effects of tDCS/TMS on thinking, memory and mood in subjects with stroke are not known. The effects of tDCS on hormones are also unknown. The long-term effects of tDCS are unknown.
2. ECG Electrodes: The adhesives from the electrodes may cause slight irritation to the skin. In rare occasions, the adhesive electrodes may cause an allergic reaction. Let the principal investigator or study personnel know if you are feeling any itching or burning sensations from the electrodes.
3. Fatigue or spasm from movement assessment or intervention: There is a chance that you will experience muscle fatigue or spasms from frequent movement of your hand and arm during the study, especially if you have experience these in the past. If these occurs, we will take rest breaks, alternate activities and provide water/snacks as needed to allow symptoms to relieve.

What do I need to know about reproductive health and/or sexual activity if I am in this study?

The research may also hurt a pregnancy or fetus in ways that are unknown. These may be a minor inconvenience or may be so severe as to cause death.

Your child should not be pregnant while in this research study.

Will it cost me anything to participate in this research study?

Taking part in this research study will not lead to any costs to you.

What happens to the information collected for the research?

Efforts will be made to limit the use and disclosure of your personal information, including research study and medical records, to people who have a need to review this information. We cannot promise complete confidentiality. Organizations that may inspect and copy your information include the Institutional Review Board (IRB), the committee that provides ethical and regulatory oversight of research, and other representatives of this institution, including those that have responsibilities for monitoring or ensuring compliance.

We will not ask you about child abuse, but if you tell us about child abuse or neglect, we may be required or permitted by law or policy to report to authorities.

A description of this clinical trial will be available at <http://www.ClinicalTrials.gov>, as required by U.S. Law. This Web site will not include information that can identify your child. At most, the Web site will include a summary of the results. You can search this Web site at any time.

Will anyone besides the study team be at my consent meeting?

You may be asked by the study team for your permission for an auditor to observe your consent meeting. Observing the consent meeting is one way that the University of Minnesota makes sure that your rights as a research participant are protected. The auditor is there to observe the consent meeting, which will be carried out by the people on the study team. The auditor will not document any personal (e.g. name, date of birth) or confidential information about you. The auditor will not observe your consent meeting without your permission ahead of time.

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Who do I contact if I have question, concerns or feedback about my experience?

This research has been reviewed and approved by an Institutional Review Board (IRB) within the Human Research Protections Program (HRPP). To share feedback privately with the HRPP about your research experience, call the Research Participants' Advocate Line at [612-625-1650](tel:612-625-1650) or go to <https://research.umn.edu/units/hrpp/research-participants/questions-concerns>. You are encouraged to contact the HRPP if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research participant.
- You want to get information or provide input about this research.

Will I have a chance to provide feedback after the study is over?

The Human Research Protection Program may ask you to complete a survey that asks about your experience as a research participant. You do not have to complete the survey if you do not want to. If you do choose to complete the survey, your responses will be anonymous.

You will also be asked to complete a study satisfaction survey by the research team. Your responses will be anonymous and not reviewed until the completion of the study.

If you are not asked to complete a survey, but you would like to share feedback, please contact the study team or the Human Research Protection Program (HRPP). See the "Investigator Contact Information" section of this form for study team contact information and "Whom do I contact if I have questions, concerns, or feedback about my experience?" section of this form for HRPP contact information.

Can I be removed from the research without my OK?

The person in charge of the research study or the sponsor can remove your child from the research study without your approval. Possible reasons for removal include seizure, anxiety, or other change in health status that affects safety.

What happens if I am injured while participating in this research?

In the event that this research activity results in an injury, treatment will be available, including first aid, emergency treatment and follow-up care as needed. Care for such injuries will be billed in the ordinary manner, to you or your insurance company. If you think that you have suffered a research related injury let the study team/physicians know right away.

Will I be compensated for my participation?

If you agree to take part in this research study, we will pay you \$50 for your time and effort.

Payment will be made using a pre-paid debit card called Greenphire ClinCard. It works like a bank debit card. We will give you a debit card and money will be added to the card after completing the study.

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You may use this card at any store that accepts MasterCard or you can use a bank machine to remove cash. However, there may be fees drawn against the balance of the card for cash withdrawals (ATM use) and inactivity (no use for 3 months). We will give you the ClinCard Frequently Asked Questions information sheet that answers common questions about the debit card. You will also receive letters with additional information on how you can use this card and who to call if you have any questions. Be sure to read these letters, including the cardholder agreement, for details about fees.

The debit card system is administered by an outside company. The company, Greenphire, will be given your name. They will use this information only as part of the payment system. Your information will not be used for any other purposes and will not be given or sold to any other company. Greenphire will not receive any information about your health status or the study in which you are participating.

Any demographic information collected and provided to Greenphire is stored in a secure fashion and will be kept confidential, except as required by law.

Payment you receive as compensation for participation in research is considered taxable income. If payment to an individual equals or exceeds \$600 in any one calendar year, the University of Minnesota is required to report this information to the Internal Revenue Service (IRS). Research payments to study participants that equal or exceed \$600.00 during any calendar year will result in a FORM 1099 (Miscellaneous Income) being issued to you and a copy sent to the IRS.

Use of Identifiable Health Information

We are committed to respect your privacy and to keep your child's personal information confidential. When choosing to take part in this study, you are giving us the permission to use your child's personal health information that includes health information in his/her medical records and information that can identify him/her. For example, personal health information may include your name, address, phone number or social security number. Those persons who get your health information may not be required by Federal privacy laws (such as the Privacy Rule) to protect it. Some of those persons may be able to share your information with others without your separate permission. Please read the HIPAA Authorization form that we have provided and discussed.

The results of this study may also be used for teaching, publications, or for presentation at scientific meetings.

Optional Elements:

The following research activities are optional, meaning that you do not have to agree to them in order to participate in the research study. Please indicate your willingness to participate in these optional activities by placing your initials next to each activity.

**Yes,
I agree**

**No,
I disagree**

The investigator may audio or video record me to aid with data analysis.
The investigator will not share these recordings with anyone outside of
the immediate study team.

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The investigator may audio or video record me for use in scholarly presentations or publications. My identity may be shared as part of this activity, although the investigator will attempt to limit such identification. I understand the risks associated with such identification.

_____ The investigator may contact me in the future to see whether I am interested in participating in other research studies by Dr. Bernadette Gillick, PhD, MSPT, PT

_____ I would like to receive reminders using Greenphire.

If yes, provide the following contact information:

Email Address: _____

Phone Number: _____

Signature Block for Capable Adult:

Your signature documents your permission for the named participant to take part in this research.

Printed Name of Participant

Signature of Legally Authorized Representative

Date

Printed Name of Legally Authorized Representative

Date

Signature of Person Obtaining Consent

Date

Printed Name of Person Obtaining Consent

Date