Title: Intermittent Theta Burst Stimulation to Promote Motor Re-education After Upper Limb Reconstruction in Tetraplegia

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RESEARCH PARTICIPANT INFORMATION AND CONSENT FORM

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VCU IRB PROTOCOL NUMBER: HM20010643

INVESTIGATOR: Dr. Carrie L. Peterson

SPONSOR: National Center for Neuromodulation for Rehabilitation

ABOUT THIS CONSENT FORM

You are being invited to participate in a research study. **It is important that you carefully think about whether being in this study is right for you and your situation.**

This consent form is meant to assist you in thinking about whether or not you want to be in this study. **Please ask the investigator or the study staff to explain any information in this consent document that is not clear to you.** You may take home an unsigned copy of this consent form to think about or discuss with family or friends before making your decision.

Your participation in this study is voluntary. You may decide to not participate in this study. Your decision not to take part will involve no penalty or loss of benefits to which you are otherwise entitled. If you do participate, you may freely withdraw from the study at any time. Your decision to with draw will involve no penalty or loss of benefits to which you are otherwise entitled.

AN OVERVIEW OF THE STUDY AND KEY INFORMATION

A repetitive, non-invasive brain stimulation technique referred to as theta burst stimulation can modulate corticomotor excitability and therefore has great rehabilitative potential for individuals with neurologic deficits, including individuals with spinal cord injury (SCI). In particular, intermittent theta burst stimulation (iTBS) can increase corticomotor excitability and may be a useful adjunct to physical rehabilitation to promote motor re-education after upper limb reconstruction in individuals with tetraplegia. Upper limb reconstruction involves surgical transfer of a non-paralyzed tendon or nerve with a redundant or less important function to perform a more critical function. Upper limb reconstruction is intended to help individuals achieve their goals related to activities of daily living and independence in the community. Outcomes after reconstruction are variable and depend largely on the efficacy of motor re-education of the transferred muscle to perform a new function. The long-term goal of our research is to determine whether iTBS combined with physical rehabilitation can improve motor re-education after reconstruction. As a first step, the purpose of this proposal is to determine the effect of iTBS on corticomotor excitability of proximal muscles in nonimpaired individuals and two groups of individuals with tetraplegia: individuals with and without upper limb reconstruction.

Why is this study being done?
The purpose of this research study is to test the effectiveness of a non-invasive brain stimulation technique called intermittent theta burst stimulation when used to treat individuals with sensorimotor impairments. You are being asked to participate in this study because you may meet the study entry requirements or you are a healthy volunteer.

What will happen if I participate?
In this study, intermittent theta burst stimulation will be compared to sham (a look-alike inactive stimulation).

Your participation in this study will last up to 3 hours, and you may participate in up to three sessions, each on different days. Approximately 30 individuals will participate in this study.

Significant new findings developed during the course of the research which may relate to your willingness to continue participation will be provided to you.

If you decide to be in this research study, you will be asked to sign this consent form after you have had all your questions answered.

At your first study visit (Visit 1), you will be seated in your wheelchair (if applicable) or a comfortable chair. Your arm will be supported against gravity. Surface electrodes will be located on your muscles. Electrical stimulation will be applied to one electrode locate on your arm while your arm is at rest. Several stimuli will be applied to generate a stimulus-response curve. Next, we will use non-invasive brain stimulation to record muscle activity (from electrodes on your arm) in response to stimulation. The non-invasive brain stimulation we use, called transcranial magnetic stimulation, consists of a stimulating coil being held over your head. When a stimulus pulse is delivered, it feels like a quick, light tap on your head. Single pulse non-invasive brain stimulation trials will be applied to determine stimulation parameters for the intermittent theta burst stimulation (iTBS) protocol. You may be asked to contract your muscles to a moderate level (20% effort) during single pulse non-invasive brain stimulation trials. Next, iTBS will be applied for 3.2 minutes. iTBS is a repetitive non-invasive brain stimulation protocol. iTBS feels like many quick, light taps on your head. Following one session of iTBS, single pulse non-invasive brain stimulation trials will be recorded during 3 intervals, each 10 minutes apart. The single and repetitive stimulation protocols will then be repeated.

You will not know whether you are receiving active brain stimulation, or inactive brain stimulation. This is done (blinding) so that a fair evaluation of results may be made.

Visit 2 will take place at least 3 days after Visit 1. The experimental procedures for Visit 2 will be identical to those in Visit 1.

Visit 3 will take place at least 3 days after Visit 2. The experimental procedures for Visit 3 will be identical to those in Visit 2.

What alternative treatments or procedures are available?
Your alternative is not to participate in this study.

What are the risks and benefits of participating?
Possible side effects associated with non-invasive brain stimulation include:

- Local pain, headache, discomfort
- Rare risk of seizure or syncope
- Affected hearing (transient increases in auditory thresholds)
- Loss of confidentiality

This research involves an investigational device, and the procedure may involve risks to the participant which are currently unforeseeable.

As the study procedures might injure an unborn child, pregnant women may not participate. Women who might become pregnant should use a medically accepted form of birth control such as total abstinence, birth control pills, an IUD, diaphragm, progesterone injections or implants, or condoms plus a spermicide. Methods of birth control other than total abstinence are not 100% effective, and should a women become pregnant there is a risk of injury to an unborn child. For similar reasons, women who are nursing an infant may not participate. If you are a woman of childbearing potential, you will need to provide a negative pregnancy test result in order to participate.

Your condition may not get better or may become worse while you are in this study.

This is not a treatment study, and you are not expected to receive any direct medical benefits from your participation in the study. The information from this research study may lead to a better treatment in the future for people with neurologic deficits (e.g., spinal cord injuries or post-stroke).

What are the costs?
There are no charges for the study visits.

Will I be paid to participate in the study?
You will be paid $_180_ if you complete all scheduled study visits. If you withdraw from the study before completion, you will be paid $_60_ per completed study visit. You will be reimbursed for the cost of travel and parking for each visit. Total payments within one calendar year that exceed $600 will require the University to annually report these payments to the IRS and you. This may require you to claim the compensation you receive for participation in this study as taxable income. VCU is required by federal law to collect your social security number. Your social security number will be kept confidential and will

only be used to process payment.

What happens if I am injured or become sick because I took part in the study?
If you are injured by, or become ill, from participating in this study, please contact your study doctor immediately. Medical treatment is available at the Virginia Commonwealth University Health System (VCU Health System). Your study doctor will arrange for short-term emergency care at the VCU Health System or for a referral if it is needed.

Fees for such treatment may be billed to you or to appropriate third party insurance. Your health insurance company may or may not pay for treatment of injuries or illness as a result of your participation in this study.

To help avoid research-related injury or illness it is very important to follow all study directions.

Can I stop being in the study?
Your participation in this study is voluntary. You may decide to not participate in this study. Your decision not to take part will involve no penalty or loss of benefits to which you are otherwise entitled. If you do participate, you may freely withdraw from the study at any time. Your decision to with draw will involve no penalty or loss of benefits to which you are otherwise entitled.

Your participation in this study may be stopped at any time by the study doctor or the sponsor without your consent. The reasons might include:
- the study doctor thinks it necessary for your health or safety;
- you have not followed study instructions;
- the sponsor has stopped the study; or
- administrative reasons require your withdrawal.

How will information about me be protected?
Potentially identifiable information about you will consist of data abstracted from the medical record.

Your data will be identified by ID numbers, not names, and stored separately from medical records in a locked research area. All personal identifying information will be kept in password protected files and these files will be deleted 5 years after the completion of this study. Other records, including the link between your ID and name, will be kept in a locked file cabinet for 5 years after the study ends and will be destroyed at that time. Access to research data will be limited to study personnel. A data and safety monitoring plan is established.

VCU and the VCU Health System have established secure databases to help with monitoring and oversight of clinical research. Your information may be maintained in these databases

but are only accessible to individuals working on this study or VCU/VCUHS officials who have access for specific research related tasks. Identifiable information in these are not released outside VCU unless stated in this consent or required by law. Personal information about you might be shared with or copied by authorized officials of the Federal Food and Drug Administration or the Department of Health and Human Services.

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

Although results of this research may be presented at meetings or in publications, identifiable personal information pertaining to participants will not be disclosed.

In general, we will not give you any individual results from the study. If we find something of medical importance to you, we will inform you, although we expect that this will be a very rare occurrence.

In the future, identifiers might be removed from the information you provide in this study, and after that removal, the information could be used for other research studies by this study team or another researcher without asking you for additional consent.

What type of health information will be used or shared with others during this research?

The following types of information may be used for the conduct of this research:

☒ Complete health record	☐ Diagnosis & treatment codes	☐ Discharge summary
☐ History and physical exam	☐ Consultation reports	☐ Progress notes
☐ Laboratory test results	☐ X-ray reports	☐ X-ray films / images
☐ Photographs, videotapes	☐ Complete billing record	☐ Itemized bill
☐ Information about drug or alcohol abuse	☐ Information about Hepatitis B or C tests	
☐ Information about mental health	☐ Information about sexually transmitted diseases	
☐ Other physical or mental health information (specify):		

Who will use or share protected health information about me?

VCU and VCU Health are required by law to protect your identifiable health information. By consenting to this study, you authorize VCU/VCU Health to use and/or share your health information for this research. The health information listed above may be used by and/or shared with the following people and groups to conduct, monitor, and oversee the research:

Principal Investigator and Research Staff	Study Sponsor
Health Care Providers at VCU Health	Data Coordinators
Institutional Review Boards	Research Collaborators
Government/Health Agencies	Data Safety Monitoring Boards
Others as Required by Law	

Once your health information has been disclosed to anyone outside of this study, the information may no longer be protected under this authorization.

When will this authorization (permission) to use my protected health information expire?
This authorization will expire when the research study is closed, or there is no need to review, analyze and consider the data generated by the research project, whichever is later.

Statement of Privacy Rights
You may change your mind and revoke (take back) the right to use your protected health information at any time. However, even if you revoke this authorization, the researchers may still use or disclose health information they have already collected about you for this study. If you revoke this Authorization, you may no longer be allowed to participate in the research study. To revoke this Authorization, you must write to the Principal Investigator at:

Dr. Carrie L Peterson, Principal Investigator
737 N 5th Street
Biotech Eight, Room 440
Richmond VA 23219

Optional Storage for future research studies
I give permission for my name, address, phone number, information about my neurologic injury (if applicable), and whether I would like to be contacted for potential participation in future research studies to be stored in a locked file cabinet indefinitely. The purpose of this registry is for our research team to be able to contact you if you may qualify for participation in future studies in our laboratory. We will contact you via telephone if you qualify for a future study. Our registry is maintained in a locked file cabinet located in our laboratory. Only members of my laboratory have access to enter our laboratory, and only individuals with IRB approval have access to the registry in the locked cabinet. If you choose to withdraw your information from the registry, you can do so at any time as indicated by a written statement. Participation in the registry is not required for participation in this study.

YES _____ NO _____

I give permission for videos and/or photographs to be taken during my participation in this study. I understand that the videos and photographs will not include my face or other identifying marks, and will be stored on a password protected computer which is located in a room with restricted access. The videos and photographs will be destroyed at the end of the study.

YES _____ NO _____

Whom should I contact if I have questions about the study?
If you have any questions, complaints, or concerns about your participation in this research, contact:

Dr. Carrie L Peterson, Principal Investigator
737 N 5th Street
Biotech Eight, Room 440
Richmond VA 23219
(804) 827- 5270
and/or
Mr. Joshua Arenas, Research Lab Technician
737 N 5th Street
Biotech Eight, Room 428
Richmond VA 23219
(804) 827-0232

The researcher/study staff named above is the best person(s) to call for questions about your participation in this study.

If you have general questions about your rights as a participant in this or any other research, or if you wish to discuss problems, concerns or questions, to obtain information, or to offer input about research, you may contact:

Virginia Commonwealth University Office of Research
800 East Leigh Street, Suite 3000, Box 980568
Richmond, VA 23298
(804) 827-2157 ; https://research.vcu.edu/human_research/volunteers.htm

Do not sign this consent form unless you have had a chance to ask questions and have received satisfactory answers to all of your questions.

Statement of Consent

I have been provided with an opportunity to read this consent form carefully. All of the questions that I wish to raise concerning this study have been answered.

By signing this consent form, I have not waived any of the legal rights or benefits, to which I otherwise would be entitled. My signature indicates that I freely consent to participate in this research study. I will receive a copy of the consent form once I have agreed to participate.

_____

Participant Name, printed

_____ _____

Participant Signature Date

_____

Name of Person Conducting Informed Consent Discussion
(Printed)

_____

Signature of Person Conducting Informed Consent Discussion Date

_____

Principal Investigator Signature (if different from above) Date