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TITLE: Treatment of Memory Disorders in Gulf War Illness with High-Definition Transcranial Direct Cortical Stimulation

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CONTRACTING ORGANIZATION: The University of Texas at Dallas

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14. ABSTRACT

The present study consists of the application of 1 ma anodal HD tDCS over the preSMA for 20 minutes a session for 10 sessions over a two week period. The treatment is hypothesized to lead to improvement in verbal retrieval, detectable in both performance measures of verbal retrieval tasks and in ERP markers of verbal retrieval processing. Our objective is to determine if 10 sessions of 1 ma anodal HD tDCS to the preSMA for 20 minutes a session are an effective treatment for verbal retrieval deficits in GWI. We have established the research team, laboratory setting, obtained approval of all regulatory documents for the study, and established recruiting procedures. In the first half of the year, we screened 8 veterans and enrolled 5 in the baseline testing and treatment phase of the study. We were required to halt in person human subject research for the second half of the year due to the Covid-19 pandemic.

15. SUBJECT TERMS
Gulf War Illness; High Definition Transcranial Direct Current Stimulation; word finding; semantic memory

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1. INTRODUCTION:

The present study consists of the application of 1 ma anodal HD tDCS over the preSMA for 20 minutes a session for 10 sessions over a two-week period will lead to improvement in verbal retrieval that will be detectable in both performance measures of verbal retrieval tasks and in ERP markers of verbal retrieval processing. Our objective is to determine if 10 sessions of 1 ma anodal HD tDCS to the preSMA for 20 minutes a session are an effective treatment for verbal retrieval deficits in GWI.

2. KEYWORDS:

Gulf War Illness; High Definition Transcranial Direct Current Stimulation; word finding; semantic memory

3. ACCOMPLISHMENTS:

What were the major goals of the project?

1. Approval of Regulatory Documents for use of HD tDCS in Therapeutic Setting
    a. UTD IRB approval – 100% complete
    b. HRPO approval – 100% complete
    c. Obtain lab space, purchase and set-up HD tDCS and EEG, test units – 100% complete
    d. Train staff in EEG and HD tDCS – 100% complete
    e. Establish recruiting procedures – 100% complete, but we continue to expand all recruiting efforts
2. Recruiting and Screening Patients for Study
    a. Recruitment of patients – 60% complete (72 patients recruited and screened out of 120 goal)
    b. Screening of patients – 60% complete (72 patients recruited and screened out of 120 goal)
3. Performing Pre-Treatment Assessments
    a. Perform pre-treatment neuropsychological assessments - 31% completed (have completed 25 out of 80 goal)
    b. Perform pre-treatment EEGs - 31% completed (have completed 25 out of 80 goal)
4. Performing HD tDCS vs. Sham HD tDCS Treatment
    a. Randomize patients to 10 sessions of active or sham 1 ma anodal preSMA HD tDCS - 31% completed (have completed 25 out of 80 goal)
    b. Perform 20 minutes of active or sham 1 ma anodal HD tDCS over the preSMA region for 10 daily sessions - 21% completed (have completed 17 out of 80 goal)

5. Perform Follow-up Neuropsychological and EEG Studies of Treatment Effect
    c. Perform post-treatment neuropsychological assessments – 21% completed (have completed 17 out of 80 goal)
    d. Perform post-treatment EEG tests of word retrieval - 21% completed (have completed 17 out of 80 goal)
6. Data Analysis
    a. Perform longitudinal analyses of neuropsychological and EEG measures for treatment efficacy- 0% complete
7. Dissemination of Findings – Manuscript and Report Preparation – 0% complete

What was accomplished under these goals?

We started the first half of the year strong in our recruiting efforts by hiring a Veteran Outreach Coordinator, concentrating on recruiting, and increasing our presence at live Veteran events, on social media and through networking. We attended, presented, and volunteered at 15+ events and hosted approximately 10 lab tours to increase our visibility. On 20 March 2020, we suspended enrollment and treatment of patients due to the COVID-19 pandemic in accordance with our institutional policies. The pandemic has forced us to re-evaluate our recruitment strategy and seek new ways to stay in contact.

We continue to stay in touch with participants already enrolled in the study. We communicate regularly with organizations and programs for Veterans. Through social media, we are making weekly informational posts, promoting other Veteran organizations, and generally increasing our visibility. We updated our flyers and are contacting our network, including the VA, to post in the next quarter. We are working with other Veteran Research labs to learn how they are recruiting in this covid environment and to share ideas. We continue to have a strong relationship with the Boot Campaign for referrals and are working with the Texas VFW for ads in their upcoming magazine.

During the forced break in seeing participants, we focused on data entry, data clean-up and other tasks that could be handled remotely. The University recently allowed in-person human subject research to resume. We reviewed our processes and made modifications to mitigate the risk of spreading covid including migrating procedures to an on-line format where possible, practicing social distancing, reducing the number of study personnel interacting with participants, and relying on guidelines provided by the CDC.

Participants Screened, Consented, Enrolled, and Tested during this reporting period
Screened: 8
Consented, enrolled, and tested: 5
Completed: 1
In progress: 5

Stated Goals Not Met

Recruitment continues to be an issue. In the first half of the year, we saw growth in screening and enrollment, but we had to stop enrollment and treatment as of 20 March 2020 due to the COVID-19 pandemic. We resumed human subject research in September, but the pandemic continues to have an impact on enrollment. Veteran Organizations are not having live events where we can recruit and participants are reluctant to enroll due to the logistics required for 10 daily sessions of HD tDCS. We are redesigning our recruitment strategies to reflect the changed environment and are working with other Veteran Research labs to share ideas.

What opportunities for training and professional development has the project provided?

See Goal 1 above. Approval of Regulatory Documents for use of HD tDCS in Therapeutic Setting, Tasks 3-5 consisted of training of staff in EEG and HD tDCS usage as well as training in recruiting procedures and regulatory issues. Training in these tasks has been successfully completed.

How were the results disseminated to communities of interest?

Nothing to Report.

What do you plan to do during the next reporting period to accomplish the goals?

We will increase recruiting efforts and will continue to actively pursue partnerships for other avenues of recruitment. We will mitigate risks of Covid-19 by migrating procedures to an on-line format where possible, practicing social distancing, and increasing safety protocols.

4. IMPACT:

What was the impact on the development of the principal discipline(s) of the project?

Nothing to Report.

What was the impact on other disciplines?

Nothing to Report.

What was the impact on technology transfer?

Nothing to Report.

What was the impact on society beyond science and technology?

We have made presentations to various agencies about our project and Gulf War Illness to create awareness of both.

5. CHANGES/PROBLEMS:

Changes in approach and reasons for change

Nothing to Report.

Actual or anticipated problems or delays and actions or plans to resolve them

In March 2020, we were required to stop enrollment and in-person treatment due to the Covid-19 pandemic, and HRPO was notified of the suspension. In the next quarter, we will resume in person treatment in accordance with institutional policies at all sites while ensuring the health and safety of our subjects. While we are realistic about the lasting effects of the pandemic, we are working on minimizing its impact by exploring ways to safely administer screening and testing protocols. This includes migrating to an on-line format option for consent, lab tours, assessments and aspects of therapy, reconfiguring space for social distancing, wearing masks, gloves and goggles, providing access to hand washing or hand sanitizing stations, reducing touch points, and adding additional cleaning procedures.

We are constantly working to improve recruitment and reach our overall recruitment goals, and we are putting extra effort into recruitment efforts to adjust for delays.

Changes that had a significant impact on expenditures

Nothing to Report.

Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents

Significant changes in use or care of human subjects

Nothing to Report.

Significant changes in use or care of vertebrate animals

Nothing to Report.

Significant changes in use of biohazards and/or select agents

Nothing to Report.

6. PRODUCTS:

- **Publications, conference papers, and presentations**

  Journal publications.

  Nothing to Report.

  Books or other non-periodical, one-time publications.

  Nothing to Report.

- **Other publications, conference papers and presentations.**

  Nothing to Report.

- **Website(s) or other Internet site(s)**

Nothing to Report.

- **Technologies or techniques**

Nothing to Report.

- **Inventions, patent applications, and/or licenses**

Nothing to Report.

- **Other Products**

Nothing to Report.

7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

What individuals have worked on the project?

Name: John Hart, Jr., MD
Project Role: Principal Investigator
Nearest person month worked: 1
Contribution to Project: Dr. Hart oversees all aspects of the study and coordinates testing protocols and data analysis.

Name: Robert Haley, MD
Project Role: Subcontract Principal Investigator
Nearest person month worked: 1
Contribution to Project: Dr. Haley oversees the UT Southwestern aspects of the study and aids in patient recruitment

Name: Michael Motes, PhD
Project Role: Co-Investigator, PhD
Nearest person month worked: 2
Contribution to Project: Dr. Motes oversees the EEG protocol.

Name: Jeffrey Spence, PhD
Project Role: Co-Investigator
Nearest person month worked: 1
Contribution to Project: Dr. Spence participates in and advises on computational models and statistics.

Name: Maria Lewis
Project Role: Subcontract Project Coordinator
Nearest person month worked: 1
Contribution to Project: Ms. Lewis manages the UT Southwestern aspects of the study and aids in recruitment.

Name: Elizabeth Ellen Morris, PhD
Project Role: Project Coordinator
Nearest person month worked: 6
Contribution to Project: Dr. Morris oversees the clinical aspects of the study and manages the recruitment effort.

Name: Rachel O'Hair, BS
Project Role: Research Technician
Nearest person month worked: 6
Contribution to Project: Ms. O'Hair screens and consents participants, conducts neuropsychological assessments, administers EEG and HD tDCS.

Name: Justin Jacqmain, BS
Project Role: Research Technician
Nearest person month worked: 6
Contribution to Project: Mr. Jacqmain screens and consents participants, conducts neuropsychological assessments, administers EEG and HD tDCS.

Name: Kelsey Watson
Project Role: Research Assistant
Nearest person month worked: 3
Contribution to Project: Ms. Watson screens and consents participants, conducts neuropsychological assessments, administers EEG and HD tDCS.

Name: Tyler Rawlinson
Project Role: Veteran Outreach Coordinator
Nearest person month worked: 6
Contribution to Project: Mr. Rawlinson manages the recruitment effort.

Name: Jill Ritter
Project Role: Coordinator
Nearest Person Month Worked: 1
Contribution to Project: Ms. Ritter handles all IRB regulatory issues for the study and creates progress reports.

Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?

Nothing to Report.

What other organizations were involved as partners?

UTSW Department of Epidemiology 6000 Harry Hines Blvd. Dallas, TX 75235 Collaboration: Subject recruiting and enrollment.

8. SPECIAL REPORTING REQUIREMENTS

COLLABORATIVE AWARDS: *For collaborative awards, independent reports are required from BOTH the Initiating Principal Investigator (PI) and the Collaborating/Partnering PI. A duplicative report is acceptable; however, tasks shall be clearly marked with the responsible PI and research site. A report shall be submitted to* ***https://ers.amedd.army.mil*** *for each unique award.*

QUAD CHARTS: *If applicable, the Quad Chart (available on https://www.usamraa.army.mil) should be updated and submitted with attachments.*

9. APPENDICES: *Attach all appendices that contain information that supplements, clarifies or supports the text. Examples include original copies of journal articles, reprints of manuscripts and abstracts, a curriculum vitae, patent applications, study questionnaires, and surveys, etc.*