

# Clinical Trial Protocol

## Iranian Registry of Clinical Trials

18 Jun 2026

### The effect of motor cortex and cerebellum regions trans cranial direct current stimulation on implicit motor learning in healthy individuals; a comparative study

#### Protocol summary

##### Summary

The purpose of the present study was to investigate the efficacy of trans-cranial direct current stimulation (TDCS) application over the motor cortex compared to the cerebellum region on the implicit motor learning in the healthy individuals. This study has clinical trial design. Participants will be randomly allocated in to three groups included; Group I who received 20 minutes TDCS over the motor cortex, Group II who received 20 minutes TDCS over the cerebellum region and Group III who served as placebo group (mounted TDCS electrodes over the motor cortex and cerebellum region randomly without any TDCS currents for 2 minutes). The healthy participants with 18-35 years with right dominant hand will be included. Participants who have history of neurological diseases or musculoskeletal disorders, severe perceptual and memorial problems, brain diseases, visual and auditory problems, upper extremity pathology and range of motion limitation will be excluded. All participants will be asked to perform a serial reaction time task (SRTT) during experiment. The SRTT will be repeated for 35 minutes and then two days after applying TDCS. Decreasing reaction time of the SRTT in the first session will be considered as the online learning and in the second session as the offline learning. Accordingly, the obtained data will be analyzed.

#### General information

##### Acronym

##### IRCT registration information

IRCT registration number: **IRCT2015030221294N1**

Registration date: **2015-05-28, 1394/03/07**

Registration timing: **registered\_while\_recruiting**

Last update:

Update count: **0**

##### Registration date

2015-05-28, 1394/03/07

##### Registrant information

###### Name

Fatemeh Ehsani

###### Name of organization / entity

Semnan University of Medical Sciences

###### Country

Iran (Islamic Republic of)

###### Phone

+98 23 3365 4180

###### Email address

f.ehsani@semums.ac.ir

##### Recruitment status

###### Recruitment complete

##### Funding source

Neuromuscular Rehabilitation Research Center, Semnan University of Medical Sciences, Semnan, Iran

##### Expected recruitment start date

2015-04-01, 1394/01/12

##### Expected recruitment end date

2015-10-01, 1394/07/09

##### Actual recruitment start date

empty

##### Actual recruitment end date

empty

##### Trial completion date

empty

##### Scientific title

The effect of motor cortex and cerebellum regions trans cranial direct current stimulation on implicit motor learning in healthy individuals; a comparative study

##### Public title

The effect of motor cortex and cerebellum regions trans-cranial direct current stimulation on implicit motor

learning in healthy individuals; a comparative study

### **Purpose**

Basic science

### **Inclusion/Exclusion criteria**

The main conditions of inclusion criteria: Participants (male or female) who have mean age of 18-35 years; Participants are right dominant hand. The main conditions of exclusion criteria: Participants who have a history of neurological diseases or musculoskeletal disorders; Participants with severe perceptual and memorial problems that based on mini mental status examination (MMSE) have scale less than 21; Having a history of brain diseases, especially Parkinson and Alzheimer's; Having visual and auditory problems; Having upper extremity pathology and range of motion limitations.

### **Age**

From **18 years** old to **35 years** old

### **Gender**

Both

### **Phase**

2

### **Groups that have been masked**

*No information*

### **Sample size**

Target sample size: **30**

### **Randomization (investigator's opinion)**

Randomized

### **Randomization description**

### **Blinding (investigator's opinion)**

Not blinded

### **Blinding description**

### **Placebo**

Used

### **Assignment**

Parallel

### **Other design features**

## **Secondary Ids**

empty

## **Ethics committees**

### 1

#### **Ethics committee**

##### **Name of ethics committee**

Ethics committee of Semnan university of medical science

##### **Street address**

Semnan, 5 kilometer in Damghan Road

##### **City**

Semnan

##### **Postal code**

##### **Approval date**

2015-05-24, 1394/03/03

##### **Ethics committee reference number**

94/25/583

## **Health conditions studied**

### 1

#### **Description of health condition studied**

Healthy individual

#### **ICD-10 code**

#### **ICD-10 code description**

## **Primary outcomes**

### 1

#### **Description**

Reaction time

#### **Timepoint**

Before, 35 minute and two days after intervention

#### **Method of measurement**

Color Matching Test Software

## **Secondary outcomes**

### 1

#### **Description**

Error meaning

#### **Timepoint**

Before, 35 minute and two days after intervention

#### **Method of measurement**

Color Matching Test Software

## **Intervention groups**

### 1

#### **Description**

Before using TDCS, the participants will be asked to do SRT task containing 2 blocks. Then, anodal and cathodal electrodes will be positioned on motor cortex and contra-lateral buccinator muscle, respectively. Stimulation will be used with 2 Mili Ampere intensity for 20 minutes. The participants concurrently will be asked to do SRT task containing 8 blocks. 35 minute and two days after test, the participants will be asked to repeat doing SRT task containing 2 blocks.

#### **Category**

Treatment - Other

### 2

#### **Description**

Before using TDCS, the participants will be asked to do SRT task containing 2 blocks. Then, anodal and cathodal electrodes will be positioned on cerebellum and ipsi-lateral buccinator muscle, respectively. Stimulation will be used with 2 Mili Ampere intensity for 20 minutes. The participants concurrently will be asked to do SRT task containing 8 blocks. 35 minute and two days after test, the participants will be asked to repeat doing SRT task containing 2 blocks.

#### **Category**

Other

**3**

### Description

Before using sham TDCS, the participants will be asked to do SRT task containing 2 blocks. Then, electrodes will be positioned randomly on motor cortex and cerebellum of any participant. Stimulation will be used with 2 Milli Ampere intensity for 2 second. The participants concurrently will be asked to do SRT task containing 8 blocks. 35 minute and two days after test, the participants will be asked to repeat doing SRT task containing 2 blocks.

### Category

Placebo

## Recruitment centers

**1**

### Recruitment center

#### Name of recruitment center

Neuromuscular Rehabilitation Research Center

#### Full name of responsible person

Fatemeh Ehsani

#### Street address

Mashahir Square, Blvd. Ghods

#### City

Semnan

## Sponsors / Funding sources

**1**

### Sponsor

#### Name of organization / entity

Vice chancellor for research, Semnan University of Medical Sciences

#### Full name of responsible person

Dr. Asghary

#### Street address

Vice chancellor for research, Semnan University of Medical Sciences, Blvd. Basigh, Semnan, Iran

#### City

Semnan

#### Grant name

#### Grant code / Reference number

#### Is the source of funding the same sponsor organization/entity?

Yes

#### Title of funding source

Vice chancellor for research, Semnan University of Medical Sciences

#### Proportion provided by this source

100

#### Public or private sector

*empty*

#### Domestic or foreign origin

*empty*

#### Category of foreign source of funding

*empty*

### Country of origin

### Type of organization providing the funding

*empty*

## Person responsible for general inquiries

### Contact

#### Name of organization / entity

Neuromuscular Rehabilitation Research Center

#### Full name of responsible person

Fatemeh Ehsani

#### Position

Ph.D. student of Physical Therapy, Faculty scholarship

#### Other areas of specialty/work

#### Street address

Blvd. Ghods, Mashahir Square, Semnan, Iran

#### City

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#### Postal code

#### Phone

+98 233340867

#### Fax

+233 340867

#### Email

f.ehsani@semums.ac.ir

#### Web page address

## Person responsible for scientific inquiries

### Contact

#### Name of organization / entity

Neuromuscular Rehabilitation Research Center, Semnan University of Medical Sciences

#### Full name of responsible person

Fatemeh Ehsani

#### Position

Ph.D. Student in physical Therapy, Faculty Scholarships

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## Person responsible for updating data

### Contact

#### Name of organization / entity

Neuromuscular Rehabilitation Research Center, Semnan University of Medical Sciences

#### Full name of responsible person

Fatemeh Ehsani

#### Position

Ph.D. student of Physical Therapy, Faculty  
Scholarships

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**Web page address**

## Sharing plan

**Deidentified Individual Participant Data Set (IPD)**

*empty*

**Study Protocol**

*empty*

**Statistical Analysis Plan**

*empty*

**Informed Consent Form**

*empty*

**Clinical Study Report**

*empty*

**Analytic Code**

*empty*

**Data Dictionary**

*empty*