

# Clinical Trial Protocol

## Iranian Registry of Clinical Trials

10 Jun 2026

### Assessment of performance in elite athletes (bodybuilders) through transcranial direct current stimulation; A quantitative electroencephalography and surface electromyography included investigation

#### Protocol summary

##### Study aim

Assessment of performance in elite athletes (bodybuilders) through transcranial direct current stimulation; A quantitative electroencephalography and surface electromyography included investigation

##### Design

Two arm parallel group randomised trial with blinded postoperative care and outcome assessment.

##### Settings and conduct

40 professional bodybuilders were randomly assigned to two arms receiving either sham or real tDCS for 13 minutes in the first session. After 72 hours, both groups received the inverse stimulation. After the brain stimulation, cerebral hemodynamic response (using frontopolar hemoencephalography) was examined upon taking three computer-based cognitive tasks i.e. reasoning, memory and verbal ability using the Cambridge Brain Science-Cognitive Platform. Subsequently, the bodybuilders performed knee extension exercise while performance indicators including maximal muscular strength (1RM), muscular endurance (SEI), heart rate (ECG), motivation (VAS), surface electromyography over quadriceps femoris muscle (sEMG) and perceived exertion (RPE) were evaluated.

##### Participants/Inclusion and exclusion criteria

Those who enrolled in the study were males aging 18 to 40 with weight between 60 to 120 kg who were regularly training weightlifting exercise (at least 3 times a week) not on doping drugs for at least 3 months prior to enrollment.

##### Intervention groups

Sham and tDCS

##### Main outcome variables

Investigation of Transcranial Direct Current Stimulation in athletes

#### General information

##### Reason for update

##### Acronym

##### IRCT registration information

IRCT registration number: **IRCT20181104041543N1**

Registration date: **2018-12-23, 1397/10/02**

Registration timing: **retrospective**

Last update: **2018-12-23, 1397/10/02**

Update count: **0**

##### Registration date

2018-12-23, 1397/10/02

##### Registrant information

##### Name

Ali-Mohammad Kamali

##### Name of organization / entity

##### Country

Iran (Islamic Republic of)

##### Phone

+98 71 3628 8814

##### Email address

ali.kamali321@gmail.com

##### Recruitment status

**Recruitment complete**

##### Funding source

##### Expected recruitment start date

2017-04-03, 1396/01/14

##### Expected recruitment end date

2018-10-22, 1397/07/30

##### Actual recruitment start date

2017-04-03, 1396/01/14

##### Actual recruitment end date

2018-11-04, 1397/08/13

##### Trial completion date

2018-11-04, 1397/08/13

### Scientific title

Assessment of performance in elite athletes (bodybuilders) through transcranial direct current stimulation; A quantitative electroencephalography and surface electromyography included investigation

### Public title

Assessment of performance in elite athletes through transcranial direct current stimulation

### Purpose

Supportive

### Inclusion/Exclusion criteria

#### Inclusion criteria:

males aging 18 to 40 not on doping drugs for at least 3 months prior to enrollment. Weight between 60 to 120 kg who were regularly training weightlifting exercise (at least 3 times a week) The participants were assured not to have psychological or neurological disorders or a history of alcohol or drug use.

#### Exclusion criteria:

### Age

From **18 years** old to **40 years** old

### Gender

Male

### Phase

N/A

### Groups that have been masked

- Participant
- Investigator
- Outcome assessor
- Data analyser

### Sample size

Target sample size: **40**

Actual sample size reached: **40**

### Randomization (investigator's opinion)

Randomized

### Randomization description

A researcher who was blinded to data collection process randomly assigned the participants to sham and real tDCS arms using consecutive randomization.

### Blinding (investigator's opinion)

Double blinded

### Blinding description

A researcher who was blinded to data collection process randomly assigned the participants to sham and real tDCS arms using consecutive randomization.

### Placebo

Used

### Assignment

Parallel

### Other design features

## Secondary Ids

empty

## Ethics committees

## 1

### Ethics committee

#### Name of ethics committee

Ethics committee of Shiraz University of Medical Sciences

#### Street address

School of Medicine, Imam Hussain Square, Zand St., Shiraz, Iran

#### City

Shiraz

#### Province

Fars

#### Postal code

7184737798

### Approval date

2017-04-03, 1396/01/14

### Ethics committee reference number

IR.SUMS.REC.1396.147

## Health conditions studied

## 1

### Description of health condition studied

Transcranial Direct Current Stimulation to Enhance Athletic Performance Outcome in Professional Bodybuilders

### ICD-10 code

### ICD-10 code description

## Primary outcomes

## 1

### Description

One-Repetition Maximum (1RM)

### Timepoint

Data were obtained over two sessions with the interval of 72 hours

### Method of measurement

Epley formula

## 2

### Description

Surface Electromyography (sEMG)

### Timepoint

Data were obtained over two sessions with the interval of 72 hours

### Method of measurement

Electromyography device

## 3

### Description

Heart Rate (HR) recording

### Timepoint

Data were obtained over two sessions with the interval of 72 hours

### Method of measurement

Electrocardiography

## 4

### Description

Cognitive performance

### Timepoint

Data were obtained over two sessions with the interval of 72 hours

### Method of measurement

Cambridge Brain Science Cognitive Platform

## 5

### Description

Brain map

### Timepoint

Data were obtained over two sessions with the interval of 72 hours

### Method of measurement

Quantitative electroencephalography

## Secondary outcomes

empty

## Intervention groups

### 1

#### Description

Intervention group: Transcranial Direct Current Stimulation

#### Category

Rehabilitation

### 2

#### Description

Control group: Placebo stimulants

#### Category

Placebo

## Recruitment centers

### 1

#### Recruitment center

##### Name of recruitment center

Bodybuilding gyms across the city of Shiraz

##### Full name of responsible person

Mohammad Nami

##### Street address

School of Medicine, Imam Hussain Square, Zand St., Shiraz, Iran

##### City

Shiraz

##### Province

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##### Postal code

71348-14336

##### Phone

+98 71 3628 8814

##### Email

ali.kamali321@gmail.com

## Sponsors / Funding sources

### 1

#### Sponsor

##### Name of organization / entity

Shiraz University of Medical Sciences

##### Full name of responsible person

Younes Ghasemi

##### Street address

Central building of Shiraz University of Medical Sciences Zand St., Shiraz, Iran

##### City

Shiraz

##### Province

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##### Postal code

71348-14336

##### Phone

+98 71 3230 5410

##### Email

vcrdep@sums.ac.ir

#### Grant name

#### Grant code / Reference number

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

Yes

#### Title of funding source

Shiraz University of Medical Sciences

#### Proportion provided by this source

100

#### Public or private sector

Public

#### Domestic or foreign origin

Domestic

#### Category of foreign source of funding

empty

#### Country of origin

#### Type of organization providing the funding

Academic

## Person responsible for general inquiries

#### Contact

##### Name of organization / entity

Shiraz University of Medical Sciences

##### Full name of responsible person

Ali-Mohammad Kamali

##### Position

PhD candidate

##### Latest degree

Master

##### Other areas of specialty/work

Neuroscience

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Alley 3, Sattarkhan Street,

##### City

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##### Province

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## Person responsible for scientific inquiries

### Contact

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Shiraz University of Medical Sciences  
**Full name of responsible person**  
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**Other areas of specialty/work**  
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## Person responsible for updating data

### Contact

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Shiraz University of Medical Sciences  
**Full name of responsible person**  
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**Position**  
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**Other areas of specialty/work**

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## Sharing plan

### Deidentified Individual Participant Data Set (IPD)

Yes - There is a plan to make this available

### Study Protocol

Yes - There is a plan to make this available

### Statistical Analysis Plan

Yes - There is a plan to make this available

### Informed Consent Form

Yes - There is a plan to make this available

### Clinical Study Report

Yes - There is a plan to make this available

### Analytic Code

Yes - There is a plan to make this available

### Data Dictionary

Yes - There is a plan to make this available

### Title and more details about the data/document

The all potential data can be shared after unidentifiable people

### When the data will become available and for how long

Six months after the publication of the article

### To whom data/document is available

Only for researchers

### Under which criteria data/document could be used

For research

### From where data/document is obtainable

ali.kamali321@gmail.com

### What processes are involved for a request to access data/document

10 Day

### Comments