

Clinical Trial Protocol

Iranian Registry of Clinical Trials

16 Sep 2026

Comparison of the effects of transcranial direct current and transcranial pulsatile current stimulation on anaerobic performance and neurophysiological responses in basketball girls

Protocol summary

Study aim

Comparison of the effects of transcranial direct current and transcranial pulsatile current stimulation on anaerobic performance and neurophysiological responses in basketball girls

Design

A clinical trial with a control group, with a within-group design, reciprocal balance, double-blind, randomized, on 15 subjects. Latin square was used for randomization.

Settings and conduct

This study will be done in Razi University. After selecting the subjects and familiarizing themselves with the research process, each subject will be exposed to 3 different conditions of electrical stimulation of the brain in a random order and then will perform the anaerobic test.

Participants/Inclusion and exclusion criteria

Basketball girls with at least two years of club sports experience in the field of basketball Age range from 18 to 30 years A resident of Kermanshah Body mass index (BMI) 18.5 to 24.9 kg/m² Obtaining a certificate of non-prohibition of participation in sports training program from the doctor

Intervention groups

This study is an intra-group and counterbalanced study, in which subjects are exposed to 3 different conditions of brain stimulation, including: 1) direct anodal stimulation of the left posterior lateral prefrontal cortex, 2) anodal pulse stimulation of the left posterior lateral prefrontal cortex , 3) sham stimulation (placebo effect) will be placed. The duration of stimulation will be 20 minutes and the intensity of direct anodal stimulation will be 2 mA and the intensity of pulse stimulation will be 1.5 mA.

Main outcome variables

Anaerobic peak power, average anaerobic power, fatigue index, EMG amplitude of the quadriceps muscle, pressure perception, pain sensation, heart rate, pleasure

sensation, felt arousal sensation

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20231126060186N1**

Registration date: **2023-12-20, 1402/09/29**

Registration timing: **registered_while_recruiting**

Last update: **2023-12-20, 1402/09/29**

Update count: **0**

Registration date

2023-12-20, 1402/09/29

Registrant information

Name

mastoure salimi

Name of organization / entity

Razi university

Country

Iran (Islamic Republic of)

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+98 83 3429 4268

Email address

mastoure77.salimi@gmail.com

Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2023-12-20, 1402/09/29

Expected recruitment end date

2024-01-05, 1402/10/15

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date
empty

Scientific title
Comparison of the effects of transcranial direct current and transcranial pulsatile current stimulation on anaerobic performance and neurophysiological responses in basketball girls

Public title
Comparisons of transcranial direct current and transcranial pulsed current motion on anaerobic performance and neurophysiological responses.

Purpose
Supportive

Inclusion/Exclusion criteria
Inclusion criteria:
Basketball girls with at least two years of experience in club sports in the field of basketball age range 18 to 30 years resident of Kermanshah city body mass index 18.5 to 24.9 weight per square meter certificate of non-prohibition of participation in sports training program from a doctor.
Exclusion criteria:
Suffering from various chronic cardiovascular, pulmonary and metabolic diseases History of seizures, epilepsy or other types of neurological diseases Abnormalities or musculoskeletal disorders Smoking and alcohol consumption

Age
From **18 years** old to **30 years** old

Gender
Female

Phase
3

Groups that have been masked

- Participant
- Investigator

Sample size
Target sample size: **15**

Randomization (investigator's opinion)
Randomized

Randomization description
In this study, the order of subject exposure to 3 different conditions (3 different types of electrical brain movement) will be randomized by Latin methods. For this purpose, first, using the www.random.org website, a number between 1 and 15 will be randomly assigned to each of the subjects as an identification code. Then, the English letters B, A and C will be assigned to the three intervention conditions and a Latin square will be created. In this case, a Latin square with three rows and three columns is created. Finally, participants number 1 to 5 are placed in the sequence of the first row, participants number 6 to 10 are placed in the sequence of the second row, and participants number 11 to 15 are placed in the sequence of the third row.

Blinding (investigator's opinion)
Double blinded

Blinding description

In this double-blind study, the researcher and participants will be blinded to the type of transcranial electrical stimulation used and the location of stimulation in each session. In the present study, the neurostimulator device was used to induce electrical stimulation of the brain in three separate sessions and three different modes including: 1) direct anodal current stimulation of the left posterior-lateral prefrontal cortex (DLPFC), 2) anodal pulse current stimulation of the posterior cortex - Left lateral prefrontal (DLPFC), 3) sham stimulation (placebo effect) will be used. For this purpose, a person outside the research team will be responsible for applying electrical stimulation during the experimental session. In order to blind the participants, after they sit on a special chair, the electrical stimulation device of the brain is hidden from their sight and covered by a cover completely, and the electrodes will be placed on the desired areas by the examiner. In order to blind the researcher, before the intervention, the researcher leaves the laboratory and returns to the test site after the stimulation period has passed and the electrodes are removed and the stimulation device is turned off. Also, in the sham stimulation mode, according to standard protocols, the active current is induced on the head for 30 seconds to induce the same sensation as the active stimulation mode, and then the current is cut off and the stimulation is deactivated.

Placebo
Used

Assignment
Crossover

Other design features

Secondary Ids
empty

Ethics committees

1

Ethics committee
Name of ethics committee
Razi University Research Ethics Committee
Street address
Taghboostan Blvd., Koi 110, in front of No. 54
City
Kermanshah
Province
Kermanshah
Postal code
6714918787
Approval date
2023-10-18, 1402/07/26
Ethics committee reference number
IR.RAZI.REC.1402.068

Health conditions studied

1

Description of health condition studied

Participants are healthy and trained basketball players.

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description

Peak anaerobic power

Timepoint

During the anaerobic test

Method of measurement

Monarch wheel (Monark ergomedic 894E)

2

Description

Average anaerobic power

Timepoint

During the anaerobic test

Method of measurement

Monarch wheel (Monark ergomedic 894E)

3

Description

Fatigue index

Timepoint

During the anaerobic test

Method of measurement

Monarch wheel (Monark ergomedic 894E)

4

Description

Rating of perceived exertion

Timepoint

During the performance of the anaerobic test, during the active recovery period after the performance of the anaerobic test

Method of measurement

Using a pressure perception scale of 6 to 20 borg

5

Description

Amplitude of muscle electromyography

Timepoint

During the performance of the anaerobic test

Method of measurement

16-channel wireless electromyography device (Noraxon model, Scottsdale, AZ85260)

6

Description

feeling pain

Timepoint

During the performance of the anaerobic test, during the active recovery period after the performance of the anaerobic test

Method of measurement

Using a scale of 0 to 10

7

Description

heart beat

Timepoint

During the performance of the anaerobic test, during the active recovery period after the performance of the anaerobic test

Method of measurement

Monarch wheel (Monark ergomedic 894E)

8

Description

sense of pleasure

Timepoint

During the performance of the anaerobic test, during the active recovery period after the performance of the anaerobic test

Method of measurement

Using an 11-item emotion scale

9

Description

Arousal level

Timepoint

During the performance of the anaerobic test, during the active recovery period after the performance of the anaerobic test

Method of measurement

Using a 6-item scale of perceived arousal

Secondary outcomes

empty

Intervention groups

1

Description

Intervention group: Intervention group: In this study, all the subjects were exposed to two intervention conditions with an interval of one week, including 1) direct electrical stimulation of the left posterior-lateral prefrontal anodal cortex (DLPFC), 2) electrical pulse electrical stimulation of the posterior-lateral prefrontal anodal cortex. The left frontal (DLPFC) will be located. In both conditions, the duration of stimulation is 20 minutes and the intensity of direct electrical stimulation is 2 milliamperes, and the intensity of pulsed stimulation is 1.5 milliamperes. In order to stimulate, the Neurostim stimulation device manufactured by Medina Teb Company will be used. The target areas in the brain are identified using the international brain mapping system 10-20, and the target areas are stimulated using two special stimulation electrodes and a special electroencephalogram cap.

Category

Treatment - Devices

2

Description

Control group: In this research, in addition to two intervention sessions, all subjects are exposed to a control session including electrical brain movement in sham mode (placebo effect). All the details of the implementation of the protocol will be similar to the intervention mode, with the difference that in the control mode, electromagnetic is not performed and the electric current of the drive motor is deactivated after 30 seconds. The duration of the control condition will be 20 minutes.

Category

Placebo

Recruitment centers

1

Recruitment center

Name of recruitment center

دانشگاه رازی

Full name of responsible person

Mastoure Salimi

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Razi University, Faculty of Sports Sciences

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Province

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Email

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Razi University

Full name of responsible person

Farzaneh Ghadami

Street address

Taq Bostan, University Street, Razi University

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Grant name

Grant code / Reference number

Is the source of funding the same sponsor

organization/entity?

Yes

Title of funding source

Razi University

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

Razi University

Full name of responsible person

Vahid Tadibi

Position

Associate Professor

Latest degree

Ph.D.

Other areas of specialty/work

Physiology

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Taq Bostan, University Blvd., Razi University, Faculty of Sports Sciences

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Person responsible for scientific inquiries

Contact

Name of organization / entity

Razi University

Full name of responsible person

Vahid Tadibi

Position

Associate Professor

Latest degree

Ph.D.

Other areas of specialty/work

Physiology

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Person responsible for updating data**Contact****Name of organization / entity**

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Full name of responsible person

Mastoure Salimi

Position

Student

Latest degree

Bachelor

Other areas of specialty/work

Physiology

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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

Not applicable

Informed Consent Form

Undecided - It is not yet known if there will be a plan to make this available

Clinical Study Report

Yes - There is a plan to make this available

Analytic Code

Not applicable

Data Dictionary

Not applicable

Title and more details about the data/document

All data can be shared after de-identifying the subjects.

When the data will become available and for how long

6 months after the results are published

To whom data/document is available

researchers

Under which criteria data/document could be used

For meta-analysis research

From where data/document is obtainable

If you need to receive documents, send an email to Mastoure Salimi, research researcher, at the email address: mastoure77.salimi@gmail.com.

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

In case of official request, announcement of the relevant reasons and full details, the data will be sent via email after 72 hours.

Comments