

# Clinical Trial Protocol

## Iranian Registry of Clinical Trials

25 Jul 2026

### The Effect of Four Weeks of Neuromuscular Exercise and Transcranial Direct Current Stimulation (tDCS) on Balance and Lower Limb Muscles Electromyography of Martial Arts Athletes with Dynamic Knee Valgus at the Moment of Landing

#### Protocol summary

##### Study aim

The Effect of Four Weeks of Neuromuscular Exercise and Transcranial Direct Current Stimulation (tDCS) on Balance and Lower Limb Muscles Electromyography of Martial Arts Athletes with Dynamic Knee Valgus at the Moment of Landing.

##### Design

This study is a one-way blind randomized trial with parallel groups and pre-test post-test design. Participants: 34 healthy women aged 15 to 35 years have dynamic knee valgus at landing.

##### Settings and conduct

After completing the written consent forms, explanations will be given about the testing procedures. In the first stage, after 10 minutes of warming up, first the electrical activity test of the lower limbs. In the second step, balance test with a foot pressure scanner. Then, after performing the pre-tests, the subjects take the envelope related to the random allocation of the subjects, which is done in advance by the supervisor and is given to the researcher. It will be held in the laboratory of Razi University of Kermanshah, Faculty of Sports Sciences.

##### Participants/Inclusion and exclusion criteria

Inclusion criteria: female athletes, being healthy at the time of study, at least three years of continuous attendance at martial arts (Taekwondo, Karate, Wushu, etc.) and a history of knee or ankle injuries in a Not reported in recent years. Athletes with more than 12 degrees of knee valgus are considered to have dynamic knee valgus. Exclusion criteria: Athletes with acute injuries in the past six months who have been barred from physical activity.

##### Intervention groups

Transcranial direct current stimulation exercises, neuromuscular exercises. There are neuromuscular exercises in both the main and control groups, the main

group has transcombinational direct current stimulation

##### Main outcome variables

nee dynamic valgus, electrical activity of lower limb muscles in landing and lateral jumping skills, Assessment balance test with plantar pressure scanner

#### General information

##### Reason for update

##### Acronym

##### IRCT registration information

IRCT registration number: **IRCT20220614055164N1**

Registration date: **2022-10-09, 1401/07/17**

Registration timing: **retrospective**

Last update: **2022-10-09, 1401/07/17**

Update count: **0**

##### Registration date

2022-10-09, 1401/07/17

##### Registrant information

##### Name

Mozhdeh Sadat Moshashaei Hajeabadei

##### Name of organization / entity

The University of Kermanshah Razi

##### Country

Iran (Islamic Republic of)

##### Phone

+98 83 3429 2216

##### Email address

m.moshashaei@stu.razi.ac.ir

##### Recruitment status

**Recruitment complete**

##### Funding source

##### Expected recruitment start date

2022-08-06, 1401/05/15  
**Expected recruitment end date**  
 2022-10-07, 1401/07/15  
**Actual recruitment start date**  
 empty  
**Actual recruitment end date**  
 empty  
**Trial completion date**  
 empty

**Scientific title**  
 The Effect of Four Weeks of Neuromuscular Exercise and Transcranial Direct Current Stimulation (tDCS) on Balance and Lower Limb Muscles Electromyography of Martial Arts Athletes with Dynamic Knee Valgus at the Moment of Landing

**Public title**  
 The Effect of Four Weeks of Neuromuscular Exercise and Transcranial Direct Current Stimulation on Balance and Lower Limb Muscles Electromyography of Martial Arts Athletes with Dynamic Knee Valgus at the Moment of Landing.

**Purpose**  
 Prevention

**Inclusion/Exclusion criteria**  
**Inclusion criteria:**  
 Being healthy female athletes At the time of study, at least three years of continuous and regular participation in martial arts training (Taekwondo, Karate, Wushu, etc.) A history of knee or ankle injuries in the last year has not been reported. Athletes with more than 12 degrees of knee valgus are considered to have dynamic knee valgus.  
**Exclusion criteria:**  
 Athletes with an acute injury in the last six months that prevented them from doing physical activity. History of fracture or surgery in the lower limb. Having strengthening interventions in addition to martial arts sports activities

**Age**  
 From **15 years** old to **35 years** old

**Gender**  
 Female

**Phase**  
 N/A

**Groups that have been masked**

- Participant

**Sample size**  
 Target sample size: **34**

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

**Randomization description**  
 This study is a one-way blind randomized trial with parallel groups and a pretest-posttest design, which uses a randomized list from random.org to investigate the feasibility of direct extracorporeal flow stimulation and neuromuscular training. In people with dynamic Volgus, it deals with the knee.

**Blinding (investigator's opinion)**  
 Single blinded

**Blinding description**  
 This study is a one-way blind randomized trial in which participants are considered a blind group, selected using a random list from random.org.

**Placebo**  
 Used

**Assignment**  
 Parallel

**Other design features**

## Secondary Ids

empty

## Ethics committees

### 1

#### Ethics committee

##### Name of ethics committee

Ethics Committee of Kermanshah University of Razi

##### Street address

Razi University, University Street, Bostan Arch

##### City

kermanshah

##### Province

Kermanshah

##### Postal code

6714414971

#### Approval date

2022-04-16, 1401/01/27

#### Ethics committee reference number

IR.RAZI.REC.1401.003

## Health conditions studied

### 1

#### Description of health condition studied

Dynamic knee valgus

#### ICD-10 code

#### ICD-10 code description

## Primary outcomes

### 1

#### Description

Dynamic knee valgus

#### Timepoint

Before pre-test and post-test

#### Method of measurement

To do this, participants with inclusion criteria will be tested for the jump-landing test, and while doing so, a Canon camcorder will be used - in the front view and at a distance of two meters from the subject. Approximate time of this test is 10 to 15 It's a minute. The prepared video is given to kinoveia software and the knee valgus angle will be extracted at the moment of landing.

## Secondary outcomes

### 1

#### Description

Lower Limb Muscles Electromyography

#### Timepoint

After 10 minutes of warm-up, the lower limb electrical activity test is approximately 60 minutes long.

#### Method of measurement

After heating, test the electrical activity of the lower limb with an EMG device that after skin preparation (skin shaving, use of 70% alcohol and sandpaper) at the installation site of electrodes for the muscles of gluteus medius, vestus medialis and vestus lateralis, toxic membrane Biceps, electrical activity of the mentioned muscles and valgus angle of the knee are measured in two landing skills from a 30 cm box and lateral jump.

### 2

#### Description

Sole pressure scanner

#### Timepoint

Balance test with foot pressure scanner The approximate time of this test is 10 to 15 minutes.

#### Method of measurement

Balance test with foot sole pressure scanner, which is initially taken using a digital scale (SKA, made in Germany) to weigh the subject's weight and height. Subjects with the guidance of the researcher with bare feet on two legs and one foot with eyes open and closed on the marked area on the screen of the foot pressure device and the hand will be hanging next to the body.

## Intervention groups

### 1

#### Description

"Intervention group:" The interventions performed in this group include: TDCS transcranial direct current stimulation, after coming to the laboratory, the subject will be asked to sit on a comfortable chair that has already been placed in the desired location. Then, the direction of installation of the electrodes will be marked using a special EEG cap, and then the electrodes will be installed in the marked areas. To stimulate the right M1 area, the anode electrode will be placed in the FC2 area and the cathode electrode will be placed on the left shoulder. After the electrodes are installed, the subjects will be seated and without any verbal communication for 20 minutes for anodal electrical stimulation with an intensity of 2 They will receive milliamps. After that, neuromuscular exercises such as resistance training, plyometrics, dynamic stability, central body strength are used. The subjects are required to complete 1-hour training sessions, three times a week for 4 weeks. This program includes a 10-minute dynamic warm-up that includes multi-planar movement, mobility, coordination, balance, plyometrics, and jogging with the goal of increasing body temperature. After the dynamic warm-

up, the subjects perform initial exercises focusing on muscle strength, lower body strength, upper body strength, and core strength. As the subjects get used to the exercises, the volume is gradually increased. Exercises include the use of body mass, barbells, dumbbells, resistance bands and weight plates. Subjects will perform the exercises between 3 to 4 sets of 10 to 15.

#### Category

Prevention

### 2

#### Description

"Control group:" The interventions of this group include: TDCS transcranial direct current stimulation exercises. In this group, the method of recording the electrodes will be similar to the anodal electrical stimulation mode (intervention group), with the difference that sham stimulation will be used. In this stimulation, the electric current will be gradually increased for 30 seconds to create a state similar to anode stimulation, and then it will return to the initial state and practically no stimulation will be received in the target areas. After that, neuromuscular exercises such as resistance training, plyometrics, dynamic stability, central body strength are used. The subjects are required to complete 1-hour training sessions, three times a week for 4 weeks. This program includes a 10-minute dynamic warm-up that includes multi-planar movement, mobility, coordination, balance, plyometrics, and jogging with the goal of increasing body temperature. After the dynamic warm-up, the subjects perform initial exercises focusing on muscle strength, lower body strength, upper body strength, and core strength. As the subjects get used to the exercises, the volume is gradually increased. Exercises include the use of body mass, barbells, dumbbells, resistance bands and weight plates. Subjects will perform the exercises between 3 to 4 sets of 10 to 15.

#### Category

Placebo

## Recruitment centers

### 1

#### Recruitment center

##### Name of recruitment center

Hajj Zavareh Academy

##### Full name of responsible person

Mozhdeh Sadat Moshashaei Hajeabadei

##### Street address

Haji Zavareh Academy, behind Pasargad Pool, Asranqalab Street

##### City

Kermanshah

##### Province

Kermanshah

##### Postal code

6715778314

##### Phone

+98 83 3423 2580

**Email**

m.moshashaei@stu.razi.ac.ir

## Sponsors / Funding sources

### 1

**Sponsor**

**Name of organization / entity**

Razi University of Kermanshah

**Full name of responsible person**

Farzanh Gandomi

**Street address**

Razi University, University Street, Bostan Arch

**City**

Kermanshah

**Province**

Kermanshah

**Postal code**

6714414971

**Phone**

+98 83 3427 7605

**Email**

gandomi777@gmail.com

**Grant name**

**Grant code / Reference number**

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

Yes

**Title of funding source**

Razi University of Kermanshah

**Proportion provided by this source**

100

**Public or private sector**

Private

**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 of Kermanshah

**Full name of responsible person**

Mozhdeh Sadat Moshashaei Hajeabadei

**Position**

MSc student

**Latest degree**

Master

**Other areas of specialty/work**

Others

**Street address**

Razi University, University Street, Bostan Arch

**City**

Kermanshah

**Province**

Kermanshah

**Postal code**

6714414971

**Phone**

+98 83 3427 7605

**Email**

m.moshashaei@stu.razi.ac.ir

## Person responsible for scientific inquiries

**Contact**

**Name of organization / entity**

Razi University of Kermanshah

**Full name of responsible person**

Farzanh Gandomi

**Position**

Assistant Professor

**Latest degree**

Ph.D.

**Other areas of specialty/work**

Sport Medicine

**Street address**

Razi University, University Street, Bostan Arch

**City**

Kermanshah

**Province**

Kermanshah

**Postal code**

6714414971

**Phone**

+98 83 3427 7605

**Email**

gandomif@razi.ac.ir

## Person responsible for updating data

**Contact**

**Name of organization / entity**

Razi University of Kermanshah

**Full name of responsible person**

Mozhdeh Sadat Moshashaei Hajeabadei

**Position**

Senior students

**Latest degree**

Master

**Other areas of specialty/work**

Pathologist and corrective exercises

**Street address**

Razi University, University Street, Bostan Arch

**City**

Kermanshah

**Province**

Kermanshah

**Postal code**

6714414971

**Phone**

+98 83 3427 7605

**Email**

m.moshashaei@stu.razi.ac.ir

## Sharing plan

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

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

### **Study Protocol**

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

### **Statistical Analysis Plan**

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

### **Informed Consent Form**

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

### **Clinical Study Report**

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

### **Analytic Code**

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

### **Data Dictionary**

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