

# Clinical Trial Protocol

## Iranian Registry of Clinical Trials

09 Jun 2026

### Assessment of The Effect of Oral Potassium Nitrate Supplementation on Post-Exercise Delayed Onset Muscle Soreness (DOMS) Indices Among Sedentary Individuals Between 18 to 40 Years old: A Double-Blind Randomized Cross-Over Clinical Trial

#### Protocol summary

##### Study aim

Assessing the effect of potassium nitrate supplement (as a source of nitrate) on Post-exercise delayed onset muscle soreness (DOMS)

##### Design

This study is a Double-Blind Randomized Cross-Over Clinical Trial. For randomization, block randomization will be used.

##### Settings and conduct

This study is performed in three stages, the first stage is for the initial evaluation of demographic, anthropometric characteristics and one repetition maximum of the volunteer. Second and third stages (two weeks apart) include the measurement of variables. All stages of this study were performed in the sports medicine department of Imam Khomeini Hospital and in this study both volunteers and researchers will be blind.

##### Participants/Inclusion and exclusion criteria

Inclusion criteria includes age between 18 and 40 years old; consent to enter the study; no physical or mental illness which increase the risk of disruption in the study process; sedentary lifestyle, no addiction to drugs, narcotics and tobacco, no pregnancy or breastfeeding, and no injury or pain in the biceps brachii muscle which will be evaluated. Exclusion criteria includes the use of different drugs during the week before the study, use of tonics and sports supplements during the month before the study, history of musculoskeletal injury during three months prior to participation in the study, the consumption of high nitrate containing foods before implementation of the research protocol

##### Intervention groups

The intervention in this study includes the use of 1000 mg of potassium nitrate (containing about 600 mg of nitrate and 400 mg of potassium) in form capsules, 20 minutes before exercise and the control section

(placebo) includes the use of capsules containing stevia similar to the intervention section.

##### Main outcome variables

Elbow passive and active range of motion; strength of biceps brachii muscle; tenderness of biceps brachii muscle

#### General information

##### Reason for update

##### Acronym

##### IRCT registration information

IRCT registration number: **IRCT20210512051273N1**

Registration date: **2021-10-23, 1400/08/01**

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

Last update: **2021-10-23, 1400/08/01**

Update count: **0**

##### Registration date

2021-10-23, 1400/08/01

##### Registrant information

##### Name

Mohammad Mahdi Tavana

##### Name of organization / entity

##### Country

Iran (Islamic Republic of)

##### Phone

+98 21 2281 8672

##### Email address

tavana-m@razi.tums.ac.ir

##### Recruitment status

**Recruitment complete**

##### Funding source

##### Expected recruitment start date

2021-09-23, 1400/07/01  
**Expected recruitment end date**  
2022-03-20, 1400/12/29  
**Actual recruitment start date**  
empty  
**Actual recruitment end date**  
empty  
**Trial completion date**  
empty

**Scientific title**  
Assessment of The Effect of Oral Potassium Nitrate Supplementation on Post-Exercise Delayed Onset Muscle Soreness (DOMS) Indices Among Sedentary Individuals Between 18 to 40 Years old: A Double-Blind Randomized Cross-Over Clinical Trial

**Public title**  
Assessment of The Effect of Oral Potassium Nitrate Supplementation on Post-Exercise Delayed Onset Muscle Soreness Indices

**Purpose**  
Prevention

**Inclusion/Exclusion criteria**  
**Inclusion criteria:**  
Age between 18 to 40 years Consent to enter the study Not having physical or mental illness which increase the risk of impaired study progress Sedentary lifestyle (less than 3 days of sports activity for 30 minutes a week in the last 3 months) No addiction to drugs, narcotics and tobacco No pregnancy and breastfeeding No pain or injury in the biceps brachii muscle that will be studied  
**Exclusion criteria:**  
Taking different types of drugs during the week before the study Taking tonics and sports supplements during 1 month before History of musculoskeletal injury during the last three months Using foods containing more than 50 mg of nitrate per 100 g of food within 24 hours before the research protocol

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

**Gender**  
Both

**Phase**  
N/A

**Groups that have been masked**

- Participant
- Investigator

**Sample size**  
Target sample size: **20**

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

**Randomization description**  
The allocation of volunteers will be determined by block randomization method with double, quadruple or sextet variable blocks (one group with symbol A and the other group with symbol B) and using the random number table of Random Allocation Software. Blocking and allocation sequencing for concealment will be done by someone other than the researcher (Allocation Concealment). The allocation ratio of samples will be 1:1

and the volunteers will be divided into two groups receiving potassium nitrate or placebo (Assignment). Then, based on the obtained blocks and order of allocation, one of the two types of capsules with unknown content for the researcher and the volunteer (potassium nitrate or placebo) will be given to group A for and the other capsule will be given to group B for consumption. After the wash-out period, each participant will take a capsule that they did not receive in the first round.

**Blinding (investigator's opinion)**

Double blinded

**Blinding description**

The appearance of the intervention and control group capsules is completely the same and only the contents of the capsules are different from each other. All capsules will be given to a third party before the start of the study, and the capsules will be given to the volunteers by a third party before each stage of the study, based on randomization blocks. Only the third party is aware of the contents of the capsules delivered (neither the researcher nor the volunteers will be aware) and the researcher will not be aware of the contents of the capsules given to each candidate until the final analysis of the data. The final analysis of the information will be done by the researcher.

**Placebo**

Used

**Assignment**

Crossover

**Other design features**

**Secondary Ids**

empty

**Ethics committees**

**1**

**Ethics committee**

**Name of ethics committee**

Imam Khomeini Hospital Complex - Tehran University of Medical Sciences (Research Ethics Committee)

**Street address**

Deputy of Research and Technology, Imam Khomeini Hospital Complex, Gharib Street, Keshavarz Boulevard

**City**

Tehran

**Province**

Tehran

**Postal code**

۱۴۱۹۷۳۳۱۴۱

**Approval date**

2021-09-01, 1400/06/10

**Ethics committee reference number**

IR.TUMS.IKHC.REC.1400.206

**Health conditions studied**

## 1

### Description of health condition studied

Post-Exercise Delayed Onset Muscle Soreness

### ICD-10 code

M63

### ICD-10 code description

Disorders of muscle in diseases classified elsewhere

## Primary outcomes

### 1

#### Description

Biceps Brachii Muscle Tenderness

#### Timepoint

Before Exercise, Days 2 and 4 Post-Exercise

#### Method of measurement

Placing a wooden ball with a diameter of 3 cm, 3 cm above the crease of the elbow and place a sphygmomanometer on it and inflate the cuff up to 250 mm Hg and record the amount of pain on graded paper (Visual Analogue Scale)

### 2

#### Description

Strength of Biceps Brachii Muscle

#### Timepoint

Before Exercise, Days 2 and 4 Post-Exercise

#### Method of measurement

Measuring muscle force with a dynamometer

### 3

#### Description

Elbow Passive and Active Range of Motion

#### Timepoint

Before Exercise, Days 2 and 4 Post-Exercise

#### Method of measurement

Measuring angles with goniometer

## Secondary outcomes

empty

## Intervention groups

### 1

#### Description

Intervention group: The intervention in this study includes the consumption of 1000 mg of potassium nitrate (containing about 600 mg of nitrate and 400 mg of potassium) made by Qatran Shimi Tajhiz Company in the form of capsules, 20 minutes before exercise.

#### Category

Prevention

### 2

#### Description

Control group: The control section (placebo) includes the

use of capsules containing Stevia made by Roboudian Company with the same appearance as the potassium nitrate capsule, which will be consumed similar to the intervention section (20 minutes before exercise).

#### Category

Placebo

## Recruitment centers

### 1

#### Recruitment center

##### Name of recruitment center

Imam Khomeini Hospital Complex

##### Full name of responsible person

Mohammad Mahdi Tavana

##### Street address

Imam Khomeini Hospital Complex, Gharib Street, Keshavarz Boulevard

##### City

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##### Province

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tavana.md@yahoo.com

## Sponsors / Funding sources

### 1

#### Sponsor

##### Name of organization / entity

Tehran University of Medical Sciences

##### Full name of responsible person

Mohammad Ali Sahraian

##### Street address

Vice chancellor for research and technology, 6th floor, Central building of Tehran University of Medical Sciences, Ghods street, Keshavarz boulevard

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##### Web page address

<https://vcr.tums.ac.ir/>

#### Grant name

#### Grant code / Reference number

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

No

#### Title of funding source

Vice chancellor for research and technology, Tehran

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**  
Tehran University of Medical Sciences  
**Full name of responsible person**  
Mohammad Mahdi Tavana  
**Position**  
Resident  
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## Person responsible for scientific inquiries

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## Person responsible for updating data

**Contact**  
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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

No - There is not 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

The present study has been registered as a proposal for the thesis of sports medicine residency. The dissertation resulting from this proposal including participants' data (all data), study protocol, statistical analysis and study report (including all variables) will be provided to Tehran University of Medical Sciences and Sports Medicine Department. It should be noted that after the dissertation is approved, an article containing all the items mentioned will be published in one of the journals relevant to the research topic. It should be noted that

access to detailed data that were not published in the final report or article, requires communication with the researcher in charge of the study.

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

The present study started on 23/9/2021 and for all stages until the submission of the dissertation, a period of two years is predicted. The data obtained from this research will be presented in the form of an article after the dissertation is approved (end of 2 years) for publication. Access to the detailed data that were not published in the final report or article will be possible after the publication of the article through direct contact with the researcher in charge of the study.

**To whom data/document is available**

The data obtained from this research will be available to all applicants and there will be no restrictions.

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

There is no restriction on the use, dissemination or processing of the data in this study, provided that correspondence is sent via email or other means to the researcher in charge of the study and the necessary permission is issued by the researcher in charge.

**From where data/document is obtainable**

To access the information in this study, the applicant can contact the researcher in charge of this study by e-mail or telephone.

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

The license to use the information is issued to the applicant as soon as possible after receiving and viewing the e-mail or making a phone call, and then the requested information will immediately sent to the applicant via e-mail.

**Comments**