Clinical Trial Protocol
Iranian Registry of Clinical Trials

09 Nov 2026

Effect of temporal pattern of caffeine supplementation on resistance training adaptations and caffeine responsiveness in young men

Protocol summary

Study aim
This study will compare the temporal patterns of caffeine supplementation on resistance training adaptations and caffeine responsiveness in caffeine-naïve young men.

Design
A randomized, double-blind, placebo-controlled, parallel-group, phase 3 study on 90 young men. The RAND function of Excel will be used for randomization.

Settings and conduct
Ninety caffeine-naïve, recreationally resistance-trained men will be randomly assigned to PLA, CAFCD, or CAFTDO. Following a free-caffeine week, participants will complete 12 weeks of supervised resistance training (3 sessions/week; 70–85% 1RM). The study will be conducted in Ankara, Turkey.

Participants/Inclusion and exclusion criteria
Inclusion criteria: recreationally resistance-trained men with 6 to 12 months of experience; aged between 18 and 25 years; naïve-caffeine consumers. Exclusion criteria: suffering from pathology or injury, utilizing medications, supplements, or ergogenic aids, and missing > 5% of the training trials.

Intervention groups
Intervention group 1) Constant daily caffeine (CAFCD) group: intake of 4 mg/kg/day caffeine; Intervention group 2) Training-day-only caffeine (CAFTDO) group: intake of 4 mg/kg caffeine on training days and 300 mg microcrystalline cellulose on non-training days; Control group, Placebo (PLA) : intake of 300 mg/day microcrystalline cellulose.

Main outcome variables
Maximal strength; muscular endurance; neuromuscular function; muscle thickness; lean mass; muscle mass; acute exercise performance response to caffeine; exercise-induced catecholamine response to caffeine.

General information

Reason for update

Acronym

IRCT registration information
IRCT registration number: **IRCT20231004059615N13**
Registration date: **2026-09-09, 1405/06/18**
Registration timing: **prospective**

Last update: **2026-09-09, 1405/06/18**
Update count: **0**

Registration date
2026-09-09, 1405/06/18

Registrant information
Name
Davar Khodadadi
Name of organization / entity
Country
Iran (Islamic Republic of)
Phone
+98 21 2263 3583
Email address
davar.khodadadi@yahoo.com

Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2026-09-19, 1405/06/28

Expected recruitment end date
2026-09-30, 1405/07/08

Actual recruitment start date
empty

Actual recruitment end date
empty

Trial completion date
empty

Scientific title
Effect of temporal pattern of caffeine supplementation on resistance training adaptations and caffeine responsiveness in young men

Public title
Effect of temporal pattern of caffeine supplementation on resistance training adaptations
Purpose
Basic scienece
Inclusion/Exclusion criteria
Inclusion criteria:
Have complete physical and mental health. Daily caffeine intake be less than 25 mg. Have 6 to 12 months of resistance training experience.
Exclusion criteria:
Suffering from any pathology or injury Taking any medications or nutritional supplements within the past three months A history of caffeine intolerance
Age
From **18 years** old to **25 years** old
Gender
Male

Phase
3
Groups that have been masked

- Participant
- Care provider
- Investigator
- Outcome assessor
- Data analyser

Sample size
Target sample size: **90**
Randomization (investigator's opinion)
Randomized
Randomization description
To minimize potential differences between groups, participants will first be grouped based on their average one-repetition maximum strength in the squat, bench press, and lat pull-down exercises. The names of the subjects in each group will be entered into an Excel column; each subject will be randomly assigned a number using the RAND function (=RAND()); the numbers will then be sorted from smallest to largest. Subjects in each group will then be randomly assigned to one of three groups in a 1:1:1 ratio: daily caffeine supplementation, training-day-only caffeine supplementation, or placebo.
Blinding (investigator's opinion)
Double blinded
Blinding description
Someone outside the study will prepare the supplement and placebo and will not be known to the participants or researchers until after the data analysis. Also, subjects will receive the supplement and placebo in an opaque capsule with a completely similar appearance and weight, and at the same time of day.
Placebo
Used
Assignment
Parallel
Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee
Name of ethics committee
Ethics Committee of the International Science and Technology University
Street address
Metromall Business F Block Office, Dumlupınar 30 Ağustos Cad. No:2, Tunahan Mah.
City
Ankara
Postal code
21,06824
Approval date
2026-08-12, 1405/05/21
Ethics committee reference number
202608-02

Health conditions studied

1

Description of health condition studied
Exercise adaptations
ICD-10 code
ICD-10 code description

Primary outcomes

1

Description
Mascular strength
Timepoint
Pre-test and post-test
Method of measurement
By one repetition maximum (1RM) test

2

Description
Skeletal muscle hypertrophy
Timepoint
Pre-test and post-test
Method of measurement
By an ultrasound instrument

3

Description
Lean body mass (LBM)
Timepoint
Pre-test and post-test
Method of measurement
By dual-energy X-ray absorptiometry

4

Description
Total fat mass
Timepoint
Pre-test and post-test
Method of measurement
By dual-energy X-ray absorptiometry

Secondary outcomes

1

Description
Cumulative training volume-load
Timepoint
During the intervention period (all training sessions)
Method of measurement
Calculated as the sum of lifted load using the formula (kilograms × repetitions × sets) accumulated during each training session.

2

Description
Muscular endurance
Timepoint
Pre-test and post-test
Method of measurement
By a repetitions-to-failure test on the back squat using a load corresponding to 60% of the current 1RM.

3

Description
Jump height
Timepoint
Pre-test and post-test
Method of measurement
By the countermovement jump (CMJ) test on a force plat.

4

Description
The flight-time-to-contraction-time (FT:CT) ratio
Timepoint
Pre-test and post-test
Method of measurement
By the countermovement jump (CMJ) test on a force plat.

5

Description
Serum concentrations of testosterone
Timepoint
Pre-test and post-test
Method of measurement
By enzyme-linked immunosorbent assay (ELISA) kits

6

Description
Serum concentrations of cortisol
Timepoint
Pre-test and post-test
Method of measurement
By enzyme-linked immunosorbent assay (ELISA) kits

7

Description
Serum concentrations of IGF-1
Timepoint
Pre-test and post-test
Method of measurement
By enzyme-linked immunosorbent assay (ELISA) kits

8

Description
Serum concentrations of myostatin
Timepoint
Pre-test and post-test
Method of measurement
By enzyme-linked immunosorbent assay (ELISA) kits

9

Description
Sleep quality
Timepoint
Pre-test and post-test
Method of measurement
By the Pittsburgh Sleep Quality Index (PSQI)

10

Description
Training session rating of perceived exertion (sRPE)
Timepoint
After each supervised training session during the study.
Method of measurement
By the Borg CR10 scale

11

Description
Perceived recovery status (PRS)
Timepoint
Immediately before each training session during the study.
Method of measurement
By the validated 0–10 Perceived Recovery Status Scale

12

Description
Catecholamine responses to resistance exercise
Timepoint
During the first training session of Week 1 and the final training session of Week 10, at three time points: (1) pre-supplementation, (2) immediately before exercise and (3) immediately after exercise.
Method of measurement
By enzyme-linked immunosorbent assay (ELISA) kits

13

Description
Anabolic state
Timepoint
Pre-test and post-test
Method of measurement
By the testosterone to cortisol ratio

Intervention groups

1

Description
Intervention group 1: Constant daily caffeine (CAFCD) group: intake of 4 mg/kg/day caffeine and perform 12 weeks of resistance training.
Category
Treatment - Drugs

2

Description
Intervention group 2: Training-day-only caffeine (CAFTDO) group: intake of 4 mg/kg caffeine on training days and 300 mg microcrystalline cellulose on non-training days, and perform 12 weeks of resistance training.
Category
Treatment - Drugs

3

Description
Control group: Placebo (PLA) group: intake of 300 mg/day microcrystalline cellulose and perform 12 weeks of resistance training.
Category
Placebo

Recruitment centers

1

Recruitment center
Name of recruitment center
International Science and Technology University
Full name of responsible person
Heidar Sajedi
Street address
Metromall Business F Block Office, Dumlupınar 30 Ağustos Cad. No:2, Tunahan Mah.
City
Ankara
Postal code
21,06824
Phone
+90 312 475 76 15
Email
heidar.sajedi@istu.edu.pl

Sponsors / Funding sources

1

Sponsor
Name of organization / entity
International Science and Technology University
Full name of responsible person
Erdal Dursun
Street address
Metromall Business F Block Office, Dumlupınar 30 Ağustos Cad. No:2, Tunahan Mah.
City
Ankara
Postal code
21,06824
Phone
+90 312 475 76 15
Email
heidar.sajedi@istu.edu.pl
Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
International Science and Technology University
Proportion provided by this source
100
Public or private sector
Private
Domestic or foreign origin
Foreign
Category of foreign source of funding
Sponsor: country of origin
Country of origin
IR
Type of organization providing the funding
Academic

Person responsible for general inquiries

Contact
Name of organization / entity
Islamic Azad University
Full name of responsible person
Davar Khodadadi
Position
Assistant professor
Latest degree
Ph.D.
Other areas of specialty/work
Physiology
Street address
Faculty of Physical Education and Sports Sciences - Velayat University Complex - Shahid Sohani St. - Sohank
City
Tehran
Province
Tehran
Postal code

1955847781

Phone
+98 21 2263 3583

Fax

Email
davar.khodadadi@yahoo.com

Person responsible for scientific inquiries

Contact

Name of organization / entity
Islamic Azad University

Full name of responsible person
Davar Khodadadi

Position
Assistant professor

Latest degree
Ph.D.

Other areas of specialty/work
Physiology

Street address
Faculty of Physical Education and Sports Sciences - Velayat University Complex - Shahid Sohani St. - Sohank

City
Tehran

Province
Tehran

Postal code
1955847781

Phone
+98 21 2263 3583

Fax

Email
davar.khodadadi@yahoo.com

Person responsible for updating data

Contact

Name of organization / entity
Islamic Azad University

Full name of responsible person
Davar Khodadadi

Position
Assistant professor

Latest degree
Ph.D.

Other areas of specialty/work
Physiology

Street address
Faculty of Physical Education and Sports Sciences - Velayat University Complex - Shahid Sohani St. - Sohank

City
Tehran

Province
Tehran

Postal code
1955847781

Phone
+98 21 2263 3583

Fax

Email
davar.khodadadi@yahoo.com

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
All data collected during the study will be shareable after de-identifying the subjects.

When the data will become available and for how long
The data will be published after the extracted articles are accepted.

To whom data/document is available
All people

Under which criteria data/document could be used
All data collected during the study will be shareable after de-identifying the subjects. The requester will only be permitted to use the data for meta-analysis reviews.

From where data/document is obtainable
Corresponding author: Davar Khodadadi, Faculty of Physical Education and Sports Sciences, Islamic Azad University Central Tehran Branch, Tehran, Iran. Email: davar.khodadadi@yahoo.com

What processes are involved for a request to access data/document
Sending an email request to the corresponding author: Davar Khodadadi, Email: davar.khodadadi@yahoo.com

Comments