Clinical Trial Protocol
Iranian Registry of Clinical Trials

16 Sep 2026

The effect of high-intensity interval training and caffeine supplementation on exercise adaptations and ergogenicity of acute caffeine intake in young men

Protocol summary

Study aim

Determining the effect of high-intensity interval training and caffeine supplementation on exercise performance and adaptations as well as ergogenicity of acute caffeine intake

Design

double-blind, placebo-controlled, and randomized-controlled experimental design. n = 80, 20 in each group. After matching based on age, weight and V̇O2max, participants were randomized on a 1:1:1:1 basis to one of four groups. Phase 4

Settings and conduct

Eighty physically inactive men participated in a parallel, double-blind, placebo-controlled trial conducted in Istanbul, Turkey. Based on age, height, body mass and maximal oxygen consumption, the participants were assigned to 4 groups (n = 20 each): caffeine supplementation, caffeine supplementation + exercise training, placebo and placebo + exercise training. High-intensity interval training (HIT) was performed 5 times per week for 8 weeks. Caffeine supplementation (3 mg/kg/day) was started at the same time as the HIT. Data collection was done in 4 stages: pre-test, mid-test, post-test, and delayed post-test, each consisting of two separate experiment sessions (3 mg/kg of caffeine or placebo). In each experiment session, 45 min after consuming a placebo or caffeine, a 3-km running test was performed at first, followed by a Wingate power test with 20 min rest between assessments.

Participants/Inclusion and exclusion criteria

Inclusion criteria: healthy; inactive; lack of caffeine dependence Exclusion criteria: caffeine habituation; taking medicine or supplements

Intervention groups

Caffeine supplementation (3mg/kg/day) for 8 weeks. Cellulose intake (200mg/day) for 8 weeks. Caffeine supplementation (3mg/kg/day) + high-intensity interval training for 8 weeks. Cellulose intake (200mg/day) + high-intensity interval training for 8 weeks.

Main outcome variables

3-km running performance; power outputs; rate of perceived exertion; V̇O2max; body composition

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20231004059615N1**
Registration date: **2023-11-08, 1402/08/17**
Registration timing: **registered_while_recruiting**

Last update: **2023-11-08, 1402/08/17**
Update count: **0**

Registration date

2023-11-08, 1402/08/17

Registrant information

Name

Davar Khodadadi

Name of organization / entity

Country

Iran (Islamic Republic of)

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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2023-11-06, 1402/08/15

Expected recruitment end date

2023-11-11, 1402/08/20

Actual recruitment start date
empty
Actual recruitment end date
empty
Trial completion date
empty

Scientific title
The effect of high-intensity interval training and caffeine supplementation on exercise adaptations and ergogenicity of acute caffeine intake in young men

Public title
Effect of HIT and caffeine supplementation on exercise performance and adaptations
Purpose
Basic scienece
Inclusion/Exclusion criteria
Inclusion criteria:
Healthy Not consuming caffeine Physically inactive Non-smoker and non-alcoholic
Exclusion criteria:
Not taking any medicine or supplement Smoker and alcoholic Caffeine users Physically active
Age
From **19 years** old to **23 years** old
Gender
Male

Phase
4
Groups that have been masked

- Participant
- Investigator
- Outcome assessor
- Data analyser

Sample size
Target sample size: **80**
Randomization (investigator's opinion)
Randomized
Randomization description
To minimize possible group differences, first, the participants were categorized according to age, body mass, and $\dot{V}O_2max$. Then, the subjects of each category were randomized on a 1:1:1:1 basis to one of four groups: caffeine supplementation, caffeine supplementation + exercise training, placebo and placebo + exercise training.
Blinding (investigator's opinion)
Double blinded
Blinding description
Preparation of the supplement/placebo was done by someone outside the study. Also, all participants received capsules containing caffeine/placebo in the same appearance and weight for the same duration and frequency. In addition, for statistical analysis, the titles of the groups were not clear and only the numbers 1 to 4 were assigned to the groups.
Placebo
Used
Assignment
Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee
Name of ethics committee
Ethics Committee of Istanbul Esenyurt University
Street address
No:1, Adile Naşit Blv
City
Istanbul
Postal code
34513
Approval date
2023-09-28, 1402/07/06
Ethics committee reference number
2023/09-10

Health conditions studied

1

Description of health condition studied
Caffeine habituation
ICD-10 code
ICD-10 code description

Primary outcomes

1

Description
Caffeine habituation
Timepoint
Before starting the intervention (pre-test), After 4 weeks of intervention (mid-test), After 8 weeks of intervention (post-test).
Method of measurement
By food frequency questionnaire

2

Description
Training adaptations
Timepoint
Before starting the intervention (pre-test), After 4 weeks of intervention (mid-test), After 8 weeks of intervention (post-test).
Method of measurement
Power outputs (The 30 s Wingate Anaerobic Power Test) - Aerobic endurance (The 3-km running time-trial performance) - Body composition (InBody 970 Body Composition Analyzer).

3

Description
Effect of caffeine withdrawal after the 8-week supplementation on caffeine ergogenicity
Timepoint
After one week of caffeine withdrawal (delayed post-test)
Method of measurement
Anaerobic power response in the 30-second Wingate test at delayed post-test and comparison with post-test scores, Aerobic endurance response in the 3 km running performance at delayed post-test and comparison with post-test scores.

Secondary outcomes

empty

Intervention groups

1

Description
The first intervention group included the caffeine consumption group, which consumed caffeine supplement (3 mg/kg/day) for 8 weeks.
Category
Lifestyle

2

Description
The second intervention group included the exercise training group that performed the high-intensity interval training program 5 sessions per week for 8 weeks.
Category
Lifestyle

3

Description
The third intervention group received a combination of exercise training and caffeine supplementation. They followed a high-intensity interval training program and took caffeine supplements for 8 weeks.
Category
Lifestyle

4

Description
The fourth group was the control group that did not participate in exercise training and received a daily capsule containing 200 mg of cellulose.
Category
Placebo

Recruitment centers

1

Recruitment center
Name of recruitment center
Istanbul Esenyurt University
Full name of responsible person
Abdorreza Eghbal Moghanlou
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Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Islamic Azad University
Full name of responsible person
Satar Jadari Salami
Street address
Faculty of Physical Education and Sports Sciences, Velayat University Complex, Sohani St., Sohank
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Phone
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Web page address
https://ctb.iau.ir/sport/fa
Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
No
Title of funding source
Personal
Proportion provided by this source
100
Public or private sector
Private
Domestic or foreign origin
Domestic
Category of foreign source of funding
Sponsor: country of origin
Country of origin
TR
Type of organization providing the funding
Persons

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
Exercise physiology

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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
No - There is not 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
Not applicable

Data Dictionary
Not applicable