Clinical Trial Protocol
Iranian Registry of Clinical Trials

07 Nov 2026

Comparison of different caffeine administration methods (capsule, gum, and mouth rinse) on fatigue induced by small-sided games in young professional male football players: A randomized, double-blind, crossover study

Protocol summary

Study aim

To compare caffeine capsule, chewing gum, and mouth rinse with placebo on fatigue, anaerobic power, passing accuracy, jump performance, and psychophysiological responses after small-sided games in young professional male football players.

Design

Randomized, double-blind, placebo-controlled crossover trial. Sixteen players are assigned to four random sequences; each completes all four conditions with a 7-day washout.

Settings and conduct

Sessions will be held at the Faculty of Sport Sciences and Health, University of Tehran, with practical tests on the standard grass field. Before testing, a familiarization session and a habitual caffeine questionnaire will be completed. Experimental sessions include five 4-min 4v4 sets with 2-min recovery. Five minutes later, RPE, EES, and MF are assessed first, followed by CMJ, SJ, McDonald test, and RAST.

Participants/Inclusion and exclusion criteria

Inclusion: male football players aged 15–18 years with ≥3 years of national league experience; no injury in the past 6 months; no caffeine/supplements for 48 h or tobacco/psychotropic drugs for 72 h before testing; similar 24-h pre-test diet. Exclusion: new injury, caffeine adverse reaction, protocol non-compliance, absence, or withdrawal.

Intervention groups

Four crossover conditions: (1) 400 mg caffeine capsule, consumed 30 min before warm-up; (2) 400 mg caffeinated gum (2×200 mg), chewed for 5 min starting 5 min before warm-up; (3) 750 mg caffeine mouth rinse used before the first set and between sets; and (4) placebo consisting of a cellulose capsule, caffeine-free gum, and caffeine-free mouth rinse with similar taste. Sessions are 7 days apart.

Main outcome variables

Fatigue index, peak and mean power by RAST; passing accuracy by McDonald test; jump performance by CMJ and SJ; rating of perceived exertion (RPE), exercise enjoyment (EES), and mental fatigue (MF).

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20230131057292N4**
Registration date: **2026-09-03, 1405/06/12**
Registration timing: **prospective**

Last update: **2026-09-03, 1405/06/12**
Update count: **0**

Registration date

2026-09-03, 1405/06/12

Registrant information

Name

Shima Mojtahedi

Name of organization / entity

The University of Tehran

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Recruitment status

recruiting

Funding source

Expected recruitment start date
2026-09-16, 1405/06/25
Expected recruitment end date
2026-11-16, 1405/08/25
Actual recruitment start date
empty
Actual recruitment end date
empty
Trial completion date
empty

Scientific title
Comparison of different caffeine administration methods (capsule, gum, and mouth rinse) on fatigue induced by small-sided games in young professional male football players: A randomized, double-blind, crossover study

Public title
Comparison of the Effects of Different Caffeine Consumption Methods on Game-Induced Fatigue in Small-Sided Games in Young Professional Male Football Players
Purpose
Other
Inclusion/Exclusion criteria
Inclusion criteria:
Having at least 3 years of playing experience in national football leagues No history of musculoskeletal injuries in the past 6 months Refraining from using ergogenic supplements (such as creatine, beta-alanine, caffeine, etc.) for at least 48 hours before each test session No consumption of tobacco products and psychoactive substances within 72 hours before the start of the study protocols Commitment to recording and replicating the exact 24-hour dietary intake before the first test session for all subsequent sessions
Exclusion criteria:
Occurrence of any new injury during the study that prevents continuing the protocol History of caffeine allergy/sensitivity in medical records or observation of any adverse side effects during the trial Unwillingness of the participant to continue cooperation at any stage of the study
Age
From **15 years** old to **18 years** old
Gender
Male

Phase
N/A
Groups that have been masked

- Participant
- Investigator
- Outcome assessor
- Data analyser

Sample size
Target sample size: **16**
Randomization (investigator's opinion)
Randomized
Randomization description
The sequence of interventions (caffeine capsule, caffeine gum, caffeine mouth rinse, and their respective placebos) for each participant was determined using a simple lottery/drawing method. Different sequences were written on identical cards and placed in sequentially numbered, opaque, sealed envelopes. An envelope was drawn for each football player to determine the sequence of conditions across the crossover trials, thereby controlling for potential order and carryover effects.
Blinding (investigator's opinion)
Double blinded
Blinding description
Caffeine and matching placebo formulations (capsules, gums, and mouth rinses) are prepared to be identical in appearance, color, smell, taste, and packaging. The interventions are coded and packaged by an independent third party not involved in data collection. Both the participants (football players) and outcome assessors remain blinded to the intervention assignments until the completion of testing and statistical analysis.
Placebo
Used
Assignment
Crossover
Other design features
Randomized, double-blind, crossover study. All participants receive all interventions (capsule, gum, mouthrinse, and placebo) with an appropriate washout period between sessions.

Secondary Ids

empty

Ethics committees

1

Ethics committee
Name of ethics committee
Research Ethics Committee of the Faculty of Physical Education and Sport Sciences, University of Teh
Street address
Tehran - North Kargar St. - Above Jalal Al-e Ahmad Intersection - Between 15th and 16th Streets - Opposite University of Tehran Dormitory (Koye Daneshgah)
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Province
Tehran
Postal code
1439813117
Approval date
2026-08-25, 1405/06/03
Ethics committee reference number
IR.UT.SPORT.REC.1405.071

Health conditions studied

1

Description of health condition studied
Small-sided game-induced fatigue in young professional male football players
ICD-10 code
ICD-10 code description

Primary outcomes

1

Description
Fatigue index measured by the RAST following the small-sided game protocol
Timepoint
After the small-sided game protocol in each of the four experimental sessions
Method of measurement
Using the RAST consisting of six maximal 35-m sprints with 10 s recovery between sprints

2

Description
Peak power assessed by RAST after the small-sided game
Timepoint
After the small-sided game protocol in each experimental session
Method of measurement
Assessed using RAST consisting of six maximal 35-m sprints

3

Description
Mean power assessed by RAST after the small-sided game
Timepoint
After the small-sided game protocol in each experimental session
Method of measurement
Assessed using RAST consisting of six maximal 35-m sprints

4

Description
Passing performance and accuracy after the small-sided game
Timepoint
After the small-sided game protocol in each experimental session
Method of measurement
Using the McDonald Soccer Skill Test, the number of successful passes during a 30-s trial is recorded

5

Description
Countermovement jump (CMJ) performance after the small-sided game
Timepoint
After questionnaire completion, following the small-sided game in each session
Method of measurement
Using the CMJ test and the My Jump 2 application, with hands placed on the hips

6

Description
Squat jump (SJ) performance after the small-sided game
Timepoint
After questionnaire completion, following the small-sided game in each session
Method of measurement
SJ performed from a 90° knee-flexion position with hands on the hips

Secondary outcomes

1

Description
Rating of perceived exertion (RPE) after the small-sided game
Timepoint
Five minutes after the fifth set in each session
Method of measurement
15-point Borg scale ranging from 6 to 20

2

Description
Exercise enjoyment (EES) after the small-sided game
Timepoint
Five minutes after the fifth set in each session
Method of measurement
Exercise Enjoyment Scale with 8 items rated on a 7-point Likert scale

3

Description
Mental fatigue (MF) after the small-sided game
Timepoint
Five minutes after the fifth set in each session
Method of measurement
Visual Analogue Scale (VAS) from 0=no fatigue to 10=severe fatigue

Intervention groups

1

Description
Intervention group: 400 mg caffeine capsule consumed 30 minutes before the start of warm-up
Category
Other

2

Description
Intervention group: Two caffeinated chewing gums containing 200 mg each (400 mg total), chewed for 5 minutes, starting 5 minutes before warm-up
Category
Other

3

Description
Intervention group: 750 mg caffeine mouth rinse for 15 seconds immediately before the first set and during the recovery periods between sets, followed by expectoration
Category
Other

4

Description
Control group: Placebo consists of a caffeine-free cellulose capsule, caffeine-free chewing gum with a similar flavor, and caffeine-free mouth rinse with a similar taste, administered according to the timing of the corresponding caffeine conditions
Category
Placebo

Recruitment centers

1

Recruitment center
Name of recruitment center
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Full name of responsible person
Shima Mojtahedi
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Sponsors / Funding sources

1

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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
University of Tehran
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
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Sharing plan

Deidentified Individual Participant Data Set (IPD)
No - There is not a plan to make this available

Justification/reason for indecision/not sharing IPD
To protect participants' confidentiality and privacy, there is no plan to publicly share individual participant data. Study results will be reported only in aggregate form without identifying information.

Study Protocol
No - There is not a plan to make this available

Statistical Analysis Plan
No - There is not a plan to make this available

Informed Consent Form
No - There is not a plan to make this available

Clinical Study Report
No - There is not a plan to make this available

Analytic Code
No - There is not a plan to make this available

Data Dictionary
No - There is not a plan to make this available