Clinical Trial Protocol
Iranian Registry of Clinical Trials

22 Nov 2026

The acute effect of pre-anaerobic workout sodium bicarbonate intake on heart rate, heart rate variability, rating perceived exertion and anaerobic power of male athletes under hypoxic and normoxic conditions

Protocol summary

Study aim
Comparison of heart rate variability in hypoxia and normoxia training conditions and the effect of sodium bicarbonate supplement

Design
This study will be performed in four days with a rest interval of 72 hours. Subjects will first be classified into two groups of intervention (1 or 2) and control (3 or 4) based on the date of enrollment in the Excel spreadsheet. At the end of the test, Subjects will take the test as a crossover in the other group.

Settings and conduct
The test will be performed in the exercise physiology laboratory of the Faculty of Physical Education and Sports Sciences of Guilan University. This study is a double-blind study so that subjects and researchers will be unaware of supplementation in different conditions (hypoxia and normoxia).

Participants/Inclusion and exclusion criteria
Trained athlete Physical health Physical preparation to perform the anaerobic activity Cardiorespiratory health

Intervention groups
Sodium bicarbonate consumption group and anaerobic activity under normoxia (intervention) Sodium bicarbonate consumption group and anaerobic activity in hypoxia (intervention) Placebo group and anaerobic activity under normoxia (control) Placebo group and anaerobic activity in hypoxia (control)

Main outcome variables
Heart rate variability; Blood pressure; Anaerobic power of lower limb; Rate of perceived exertion; Muscle fatigue

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20190720044283N3**
Registration date: **2021-10-23, 1400/08/01**
Registration timing: **retrospective**

Last update: **2021-10-23, 1400/08/01**
Update count: **0**

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

Registrant information

Name
Siamand Abdollahpour

Name of organization / entity
Guilan university of medical sciences

Country
Iran (Islamic Republic of)

Phone
+98 13 3369 0274

Email address
siamand.abp1@gmail.com

Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2021-10-02, 1400/07/10

Expected recruitment end date
2021-10-21, 1400/07/29

Actual recruitment start date
empty

Actual recruitment end date
empty

Trial completion date
empty

Scientific title
The acute effect of pre-anaerobic workout sodium bicarbonate intake on heart rate, heart rate variability,

rating perceived exertion and anaerobic power of male athletes under hypoxic and normoxic conditions

Public title
Effect of sodium bicarbonate on anaerobic capacity under hypoxia and normoxia
Purpose
Other
Inclusion/Exclusion criteria
Inclusion criteria:
Physical health and with no disease No medication and exercise supplements 6 months before the test No smoking and alcohol consumption Have regular exercise 3 days a week for the past year Age range 18 to 25 years
Exclusion criteria:
Inability to perform intense anaerobic activity Sensitivity to sodium bicarbonate
Age
From **18 years** old to **25 years** old
Gender
Male

Phase
N/A
Groups that have been masked

- Participant

Sample size
Target sample size: **12**
Randomization (investigator's opinion)
Randomized
Randomization description
Use the random selection method by Excel software. In this method, we first enter the names of the subjects in Excel, and then in another part, we specify the position of the desired groups in two separate sections of 6 subjects. Then in these two sections, we will execute the following code so that people are randomly placed in groups of 6 subjects.
=INDEX($A$3:$A$12,RANDBETWEEN(1,ROWS($A$3:$A$12)),1)
Blinding (investigator's opinion)
Single blinded
Blinding description
In this study, the subjects were not aware of how the supplement or placebo was distributed. The G-physician was aware of the subjects receiving the supplement to take action if any possible allergies to the supplement occurred. Then, the physician weighed the supplement and placebo using the determined amount per weight of each subject and delivered it to the subjects for consumption in his presence by coding on each day of the test.
Placebo
Used
Assignment
Crossover
Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee
Name of ethics committee
Research Ethics Committee of Sports Science Institute (SSRI)
Street address
Fifth Alley, Mir Emad St., Ostad Motahhari St.
City
Tehran
Province
Tehran
Postal code
1587958711
Approval date
2021-09-22, 1400/06/31
Ethics committee reference number
IR.SSRC.REC.1400.095

Health conditions studied

1

Description of health condition studied
Muscle fatigue during exercise activity
ICD-10 code
ICD-10 code description

Primary outcomes

1

Description
Heart rate variability
Timepoint
Before and immediately after the activity in the period of 10 minutes to 30 minutes after the activity
Method of measurement
Polar heart rate monitor (H10)

2

Description
Muscle Power
Timepoint
Before supplementation and at each point of the fatigue protocol and after completion of the activity
Method of measurement
Monark ergometer cycle and by Wingate protocol

3

Description
Systolic and diastolic blood pressure
Timepoint
Before and immediately after the activity in the period of 10 minutes to 30 minutes after the activity
Method of measurement
Beurer blood pressure monitor

4

Description
Rate of Perceived Exertion (RPE)
Timepoint
Immediately after each bout
Method of measurement
Borg scale (6-20)

5

Description
Muscle Pain
Timepoint
Immediately after each bout
Method of measurement
Visual Analogue Scale (VAS)

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group: Subjects will consume 0.3 grams of sodium bicarbonate per kilogram of body weight one hour before the start of the activity. After the initial measurements and warm-up, the anaerobic activity of the Wingate will be performed by the Monark cycle ergometer and by a training mask (Phantom Athletics 001 model) in hypoxic conditions. The test process will take 9 minutes and then 30 minutes at rest (sitting) the desired variables will be monitored.
Category
Other

2

Description
Intervention group: Subjects will consume 0.3 grams of sodium bicarbonate per kilogram of body weight one hour before exercise. After the initial measurements and warm-up, the anaerobic activity of the Wingate will be performed by the Monark cycle ergometer under normoxic conditions and without a mask. The test process will take 9 minutes and then 30 minutes at rest (sitting) the desired variables will be monitored.
Category
Other

3

Description
Control group: Subjects will receive the same amount of placebo, which contains dextrose. After the initial measurements and warm-up, the anaerobic activity of the Wingate will be performed by the Monark cycle ergometer and by a training mask (Phantom Athletics 001 model) in hypoxic conditions. The test process will take 9 minutes and then 30 minutes at rest (sitting) the desired variables will be monitored.
Category
Other

4

Description
Control group: Subjects will receive the same amount of placebo, which contains dextrose. After the initial measurements and warm-up, the anaerobic bouts of the Wingate will be performed by the Monark cycle ergometer under normoxic conditions and without a mask. The test process will take 9 minutes and then 30 minutes at rest (sitting) the desired variables will be monitored.
Category
Other

Recruitment centers

1

Recruitment center
Name of recruitment center
Guilan university
Full name of responsible person
Siamand Abdolahpour
Street address
District 5, Rasht, Gilan Province
City
Rasht
Province
Guilan
Postal code
4199843653
Phone
+98 13 3369 0274
Email
Siamand.abp1@gmail.com

Sponsors / Funding sources

1

Sponsor
Name of organization / entity
University of Guilan
Full name of responsible person
Seyed Ziaaldein MirHossini
Street address
District 5, Rasht, Gilan Province
City
Rasht
Province
Guilan
Postal code
4199843653
Phone
+98 13 3369 0274
Email
mehrabanij@guilan.ac.ir
Grant name

Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
University of Guilan
Proportion provided by this source
1
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
Faculty of Physical Education and Sports Sciences, University of Guilan
Full name of responsible person
Dr. Javad Mehrabani
Position
Associate Professor
Latest degree
Ph.D.
Other areas of specialty/work
Exercise physiology
Street address
8 km of Tehran road, Faculty of Physical Education and Sports Sciences, University of Guilan
City
Rasht
Province
Guilan
Postal code
4199843653
Phone
+98 911 230 9074
Email
mehrabanij@guilan.ac.ir

Person responsible for scientific inquiries

Contact
Name of organization / entity
Faculty of Physical Education and Sports Sciences, University of Guilan
Full name of responsible person
Dr. Javad Mehrabani
Position
Assistant Professor
Latest degree
Ph.D.
Other areas of specialty/work
Exercise physiology
Street address
8 km of Tehran road, Faculty of Physical Education and Sports Sciences, University of Guilan
City
Rasht
Province
Guilan
Postal code
4199843653
Phone
+98 911 230 9074
Email
mehrabanij@guilan.ac.ir

Person responsible for updating data

Contact
Name of organization / entity
University of Guilan
Full name of responsible person
Siamand Abdolahpour
Position
Student
Latest degree
Bachelor
Other areas of specialty/work
Physical Education and Sport Science
Street address
District 5, Rasht, Gilan Province
City
Rasht
Province
Guilan
Postal code
4199843653
Phone
+98 13 3369 0274
Email
Siamand.abp1@gmail.com

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
Yes - There is a plan to make this available
Informed Consent Form
Yes - There is a plan to make this available
Clinical Study Report
Yes - There is 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
Yes - There is a plan to make this available
Title and more details about the data/document
After analyzing the data, only part of the data related to the main outcome will be shared.
When the data will become available and for how

long

After approval by the journal publishing the study report

To whom data/document is available

Journal publisher of study reports

Under which criteria data/document could be used

By getting permission from the journal publish the study report

From where data/document is obtainable

Journal publisher of study reports

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

Public and private terms Journal of the study report

Comments