ISRCTN14770939 https://doi.org/10.1186/ISRCTN14770939

# Comparing the health benefits of quick exercise snacks and sprint training in inactive men

**Submission date**
28/06/2025

**Recruitment status**
No longer recruiting

**Registration date**
01/07/2025

**Overall study status**
Completed

**Last Edited**
01/07/2025

**Condition category**
Other

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

## Plain English summary of protocol

Background and study aims
Despite mounting evidence that brief bouts of vigorous stairclimbing or other “exercise snacks” improve cardiorespiratory fitness and blood sugar control, research is dominated by tightly controlled, short-term laboratory trials. Crucially, no study has systematically assessed exercise snacking over months in free-living adults, nor has any work rigorously compared longer-term adaptations and adherence with traditional sprint-interval training (SIT). This study aims to determine, in a real-world setting, whether a 60-week exercise-snack regimen causes changes in aerobic capacity, metabolic health and affective responses that are the same as or better than SIT, while also measuring adherence, perceived acceptability and the factors that may help or hinder sustained engagement.

Who can participate?
Inactive and sedentary but otherwise healthy male individuals aged 18 to 22 years

What does the study involve?
The study involved two phases over 60weeks. The initial phase comprised a 12-week structured intervention during which participants randomly assigned to the exercise groups completed either exercise-snack (ES) bouts or sprint-interval training (SIT) in one-to-one sessions under direct supervision, 5 days per week. After completing the initial 12-week intervention phase, all participants in the intervention groups entered a 48-week free-living follow-up period without structured supervision. The control group will not undertake any exercise during the 60-week study. They will serve as a non-exercising comparison group, enabling us to evaluate the effects of the exercise interventions against a baseline of no exercise.

What are the possible benefits and risks of participating?
Participants are expected to benefit from improved health and the risks associated with the exercise intervention are minimal.

Where is the study run from?
Civil Aviation University of China

When is the study starting and how long is it expected to run for?
December 2023 to July 2025

Who is funding the study?
This study was funded by the Research on the Reform and Practice of College Physical Education Curriculum System for Flight Technology Majors under the Strategy of Building a Strong Civil Aviation Nation in the New Era (Project No. B231005911), supported by the Tianjin Municipal Education Commission in China

Who is the main contact?
Dr Hu Mingzhu, mz_hu@cauc.edu.cn

# Contact information

### Type(s)
Public, Scientific, Principal investigator

### Contact name
Dr Mingzhu Hu

### ORCID ID
https://orcid.org/0009-0002-8373-4888

### Contact details
Civil Aviation University of China
No. 2898 Jinbei Road
Dongli District
Tianjin
China
300300
+86 (0)13926992440
mz_hu@cauc.edu.cn

# Additional identifiers

### Clinical Trials Information System (CTIS)
Nil known

### ClinicalTrials.gov (NCT)
Nil known

### Protocol serial number
Nil known

# Study information

### Scientific Title
A 60-week randomized controlled trial benchmarking real-world exercise snacks vs sprint-interval training for cardiorespiratory and mental health gains in sedentary males

## Study objectives
It is hypothesised that a 60-week “exercise-snack” intervention would produce cardiometabolic and mental health benefits comparable to those attained with sprint-interval training (SIT). In addition, it is anticipated that participants would experience more favourable affective responses during the exercise-snack sessions than during SIT.

## Ethics approval required
Ethics approval not required

## Ethics approval(s)
Under the Civil Aviation University of China regulations, the interventions in this study (standard exercise sessions) pose minimal risk to participants. The University does not currently have a formal ethics committee for this type of non-invasive, exercise-based research. Upon review by the University’s relevant departments, it was determined that the study’s procedures are exempt from requiring additional ethics approval.

## Study design
Randomized controlled trial

## Primary study design
Interventional

## Study type(s)
Quality of life, Efficacy

## Health condition(s) or problem(s) studied
Physical fitness and mental health in sedentary males

## Interventions
This randomized controlled trial maintained concealed allocation until all baseline assessments had been completed. Afterwards, both exercise group participants and study personnel were unblinded to allow accurate delivery of the intervention protocol.

All participants provided written informed consent after receiving a detailed explanation of the experimental procedures. Subsequently, they were randomly allocated into one of three groups (n = 80 per group) using a computer-generated randomization schedule: a control group (CON), an exercise snack group (ES), and a SIT group.

This randomized control trial was organized into two sequential phases, spanning a total duration of 60weeks. The initial phase comprised a 12-week structured intervention during which participants assigned to the exercise arms completed either exercise-snack (ES) bouts or sprint-interval training (SIT) in one-to-one sessions under direct supervision, 5 days per week in an office room. After completing the initial 12-week intervention phase, all participants in the intervention groups entered a 48-week free-living follow-up period without structured supervision. They were encouraged, but not required, to maintain their assigned exercise protocols or adapt them according to personal preferences.

In each session, both ES and SIT groups performed two bouts of 30-second maximal-effort burpee intervals, aiming to complete as many repetitions as possible. The key difference among the ES and SIT is the timing of these intervals: SIT group performed two consecutive intervals within a single training session, separated by a 30-second passive recovery period, whereas the

ES group separated the two intervals by approximately 6 hours, performing one interval around midday and the other in the late afternoon, during extended sedentary periods.

The control group will not undertake any exercise during the 60-week study. They will serve as a non-exercising comparison group, enabling us to evaluate the effects of the exercise interventions against a baseline of no exercise.

### Intervention Type
Behavioural

### Primary outcome(s)
1. VO2max measured using maximal incremental exercise tests
2. Body mass measured using standardized procedures (i.e., participants wore light clothing and were barefoot) on a weighing scale
3. Maximal fat oxidation measured using maximal incremental exercise tests
4. Blood pressure measured using an electronic sphygmomanometer
5 .Heart rate variability assessed using a 12-lead electrocardiogram (ECG) system
6.Stress measured using the 10-item Perceived Stress Scale (PSS-10)
7.Anxiety measured using the 7-item Generalized Anxiety Disorder Scale (GAD-7)
8. Depression measured using the 21-item Beck Depression Inventory-II (BDI-II)
9. Sleep quality measured using the Pittsburgh Sleep Quality Index (PSQI)
10. Health-related quality of life measured using the 36-Item Short Form Health Survey (SF-36)
11. Affective responses measured using the Feeling Scale (FS) during each exercise session throughout the 60-week intervention
12. Enjoyment measured using the Physical Activity Enjoyment Scale (PACES) and the Exercise Enjoyment Scale (EES0 during each exercise session throughout the 60-week intervention

All assessments (1-10) were conducted at baseline and subsequently at 12-week intervals (i.e., baseline, weeks 12, 24, 36, 48, and 60) in a controlled laboratory environment.

### Key secondary outcome(s))
1. Heart rate measured using the heart rate sensor during each exercise session throughout the 60-week intervention
2. Perceived exertion measured by the Borg Rating Of Perceived Exertion during each exercise session throughout the 60-week intervention

### Completion date
01/07/2025

## Eligibility

### Key inclusion criteria
1. Sedentary: those reporting ≥7 h·day$^{1}$ of sitting
2. Inactive: no more than two 30-minute bouts of aerobic exercise per week
3. Male
4. Healthy: reported no medical condition or history likely to affect exercise performance or study outcome
5. Aged 18-22 years old

### Participant type(s)
Healthy volunteer, Learner/student

### Healthy volunteers allowed
No

### Age group
Adult

### Lower age limit
18 years

### Upper age limit
22 years

### Sex
Male

### Total final enrolment
240

### Key exclusion criteria
1. Medical history of chronic conditions, including type 2 diabetes, cardiovascular diseases, or any other illnesses or abnormalities that could potentially impact exercise performance
2. Obesity (defined as a BMI exceeding 35 kg/m²)
3. Classified as highly active according to the International Physical Activity Questionnaire (IPAQ)

### Date of first enrolment
01/01/2024

### Date of final enrolment
01/03/2024

## Locations

### Countries of recruitment
China

### Study participating centre
**Civil Aviation University of China**
No. 2898 Jinbei Road
Dongli District
Tianjin
China
300300

## Sponsor information

**Organisation**
Tianjin Municipal Education Commission

**ROR**
https://ror.org/01z7y3r39

# Funder(s)

**Funder type**
Government

**Funder Name**
Research on the Reform and Practice of College Physical Education Curriculum System for Flight Technology Majors under the Strategy of Building a Strong Civil Aviation Nation in the New Era (Project No. B231005911)

# Results and Publications

**Individual participant data (IPD) sharing plan**
The datasets generated during and/or analysed during the current study will be available upon request from Dr Hu Mingzhu (mz_hu@cauc.edu.cn).

**IPD sharing plan summary**
Available on request

**Study outputs**

| Output type | Details | Date created | Date added | Peer reviewed? | Patient-facing? |
|---|---|---|---|---|---|
| Participant information sheet | Participant information sheet | 11/11/2025 | 11/11/2025 | No | Yes |