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Multiple daily exercise snacks can improve obesity by breaking sedentary habits

Submission date
17/04/2024

Recruitment status
No longer recruiting

Registration date
20/04/2024

Overall study status
Completed

Last Edited
30/06/2025

Condition category
Nutritional, Metabolic, Endocrine

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Obesity caused by long-term sedentary lifestyle is an important factor that endangers human health, affecting more than 10% of the world's population and has become a major health problem faced by countries around the world. The ectopic deposition of abdominal visceral fat and epicardial fat will further increase the risk of a series of metabolic complications such as hypertension, diabetes, fatty liver and cardiovascular disease. As a non-drug intervention therapy, exercise can play a positive role in reducing obesity and regulating body metabolism by increasing energy expenditure and promoting the secretion of lipolytic hormones.
Based on metabonomics, this study will explore the effect of 12 week "exercise snacks" intervention on the composition of obese adults. The aim is to provide more convenient and practical exercise prescription for obese people who are often in a sedentary state and provide the theoretical basis for the intervention of "exercise snacks" for relevant researchers.

Who can participate?
Daily energy expenditure <4 metabolic equivalents (METs), as measured by a continuous physical activity questionnaire (IPAQ)) adults, with a BMI over 25 kg/m2

What does the study involve?
This study is a single blind randomized controlled trial. Participants who met the inclusion criteria were randomly assigned to the Snack group for stair sprint exercise and the Control group by flipping a coin, and the supervisory personnel were unaware of any information from the other groups. Within one week prior to intervention, measure systemic and regional fat mass, epicardial adipose tissue (EAT), abdominal visceral (AVFA) and subcutaneous (ASFA) fat area, plasma metabolomics data, and maximum oxygen uptake. The snack group needs to engage in 12 weeks of stair climbing and sprinting exercise, with 4 days of exercise per week. The above indicators need to be tested again one week after the intervention is completed.

What are the possible benefits and risks of participating?
Participants can lose weight by participating in this study and get their own exercise prescription. The risk mainly includes delayed muscle soreness after exercise. Researchers will protect the safety of the whole sports meeting.

Where is the study run from?
Ocean University of China

When is the study starting and how long is it expected to run for?
From January 2021 to January 2023

Who is funding the study?
Investigator initiated and funded

Who is the main contact?
Wenbing yu, haiyangyuwenbing@163.com

Contact information

Type(s)
Public, Scientific, Principal investigator

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Additional identifiers

Protocol serial number
OUC-HM-2021023

Study information

Scientific Title
Effects of breaking up prolonged sitting with exercise snacks on body composition and plasma metabonomics among sedentary obese adults

Study objectives
Exercise snacks improve body composition and metabolomics among obese adults

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 15/10/2021, Ocean University of China (238 Songling Road, Laoshan District, Qingdao, 266101, China; +86 15231509262; 21211913076@ouc.edu.cn), ref: OUC-HM-2021023

Primary study design
Interventional

Study design
Randomized controlled trial

Study type(s)
Efficacy

Health condition(s) or problem(s) studied
Obesity

Interventions
Participants who met the inclusion criteria were randomly assigned to the Snack group for stair sprint exercise and the Control group by flipping a coin, and the supervisory personnel were unaware of any information from the other groups. From 3 weeks before the intervention to the end of the intervention, all participants are required to record their daily food intake and physical activity to monitor habitual energy intake and expenditure separately. Within one week prior to intervention, measure systemic and regional fat mass, epicardial adipose tissue (EAT), abdominal visceral (AVFA) and subcutaneous (ASFA) fat area, plasma metabolomics data, and maximum oxygen uptake. The snack group needs to engage in 12 weeks of stair climbing and sprinting exercise, with 4 days of exercise per week. The above indicators need to be tested again one week after the intervention is completed.

The intervention time was 12 weeks, and the randomization was performed by flipping a coin.

Intervention Type
Behavioural

Primary outcome(s)
1. Dual energy X-ray method was used to measure the body fat rate at baseline and after 12 weeks of intervention.
2. The areas of epicardial fat, abdominal visceral fat and subcutaneous fat were measured by computed tomography at baseline and after 12 weeks of intervention.

Key secondary outcome(s)
Plasma metabolites were measured by liquid chromatography-mass spectrometry at baseline and after 12 weeks of intervention.

Completion date
01/01/2023

Eligibility

Key inclusion criteria
Daily energy expenditure <4 metabolic equivalents (METs), as measured by a continuous physical activity questionnaire (IPAQ)

Participant type(s)
Learner/student

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 Years

Upper age limit
26 Years

Sex
All

Total final enrolment
28

Key exclusion criteria
Diseases such as cardiovascular disease that are not suitable for exercise

Date of first enrolment
16/10/2021

Date of final enrolment
25/10/2021

Locations

Countries of recruitment
China

Study participating centre
Ocean University of China
238 Songling Road
Laoshan District
Qingdao
China
266101

Sponsor information

Organisation
Ocean University of China

ROR
https://ror.org/04rdtx186

Funder(s)

Funder type
Government

Funder Name
Natural Science Fund of Shandong Province

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated and analysed during the current study will be published as a supplement to the results publication.

IPD sharing plan summary
Published as a supplement to the results publication

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		14/11/2024	30/06/2025	Yes	No