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Testing whether brief bouts of stair climbing during daily life, guided by a smartwatch, can improve health

Submission date
11/07/2025

Recruitment status
No longer recruiting

Registration date
23/09/2025

Overall study status
Completed

Last Edited
23/09/2025

Condition category
Circulatory System

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

Plain English summary of protocol

Background and study aims
This study aims to test a time-efficient exercise method called “exercise snacking”, which involves brief bouts of stair-climbing (less than 1 minute) performed several times a day. The goal is to determine whether using a smartwatch to guide and supervise these sessions makes the program feasible and acceptable for everyday life. The study also investigated whether this form of exercise can improve aerobic and anaerobic fitness.

Who can participate?
Adults aged 18 to 59 years who are generally healthy, physically inactive (engaging in less than 1 hour of structured physical activity per week), and capable of stair climbing.

What does the study involve?
Participants complete a 6-week exercise snacking intervention, which includes: six 30-minute sessions with a personal trainer, and self-administered bouts of stair-climbing (“exercise snacks”) performed during the intervention period and recorded via a smartwatch.
The study assesses:
1. Feasibility (frequency, duration and intensity) of exercise snacks, measured using the smartwatch app.
2. Acceptability of exercise snacks in daily life with smartwatch, evaluated through interviews after 2 and 4 weeks, and a self-developed questionnaire after 6 weeks.
3. Changes in anaerobic performance and aerobic performance before and after the intervention.

What are the possible benefits and risks of participating?
Participants may improve their fitness and discover a convenient, time-efficient way to stay active without requiring gym access or trainer supervision.
As with any high-intensity exercise, there is a small risk of muscle soreness or injury, especially during stair climbing. However, the short duration of exercise snacks and supervision help minimise these risks.

Where is the study run from?
University of Konstanz (Germany)

When is the study starting and how long is it expected to run for?
July 2023 to January 2024

Who is funding the study?
University of Konstanz (Germany)

Who is the main contact?
Yvonne Ritter, yvonne.ritter@uni-konstanz.de

Contact information

Type(s)
Public, Scientific

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Study information

Scientific Title
Effects of brief, smartwatch-guided stair-climbing "exercise snacks" on physical activity levels and cardiovascular health in inactive adults: a proof-of-concept study

Study objectives
The primary objectives of this proof-of-concept study were to evaluate the feasibility and acceptability of a newly developed stair-climbing Exercise Snacking (ES) training program. Secondary objectives included examining pre- to post-intervention changes in aerobic and anaerobic fitness following 6 weeks of ES training.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 12/07/2023, Ethics Committee of the University of Konstanz (Universitätsstraße 10, Konstanz, 78464, Germany; +49 (0)7531885037; marcel.leist@uni-konstanz.de), ref: IRB23KN07-005w

Primary study design
Interventional

Study design
Pre-post training study

Study type(s)
Prevention

Health condition(s) or problem(s) studied
Cardiovascular fitness

Interventions
Participants receive an exercise snacking intervention consisting of six 30-minute sessions with a personal trainer over the course of 6 weeks, and self-administered exercise snacks (brief stair-climbing bouts, >9 per week) performed independently during the training intervention period, guided by a smartwatch.

Intervention Type
Behavioural

Primary outcome(s)
1. Feasibility of the smartwatch-guided Exercise Snacking intervention assessed based on the frequency, duration, and intensity of completed exercise snacks. Each exercise snack was recorded from the smartwatch app for analysis.
2. Acceptability of the intervention in daily life was evaluated through semi-structured interviews conducted after 2 and 4 weeks, and a self-developed questionnaire administered at the end of the 6-week training period. The questionnaire included both Likert-scaled items and open-ended questions to capture participants’ subjective experiences.

Key secondary outcome(s)
Measured before and after the 6-week Exercise Snacking intervention:
1. Anaerobic performance assessed using the Counter Movement Jump (CMJ) and the Stair Climb Power Test (SCP)
2. Aerobic performance measured via a Cardiopulmonary Exercise Test (CPET)

Completion date
31/01/2024

Eligibility

Key inclusion criteria
1. Healthy (Physical Activity Readiness Questionnaire, PAR-Q+)
2. Physically inactive (self-reported <1 hour of structured physical activity per week)

Participant type(s)
Employee, Learner/student

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 Years

Upper age limit
59 Years

Sex
All

Total final enrolment
10

Key exclusion criteria
1. Cardiometabolic or orthopedic diseases
2. Other conditions contraindicating intensive endurance training

Date of first enrolment
01/09/2023

Date of final enrolment
01/12/2023

Locations

Countries of recruitment

Germany

Study participating centre
University of Konstanz
Universitätsstraße 10
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Sponsor information

Organisation
University of Konstanz

ROR
https://ror.org/0546hnb39

Funder(s)

Funder type
University/education

Funder Name
Universität Konstanz

Alternative Name(s)
University of Konstanz, unikonstanz

Funding Body Type
Government organisation

Funding Body Subtype
Universities (academic only)

Location
Germany

Results and Publications

Individual participant data (IPD) sharing plan

The datasets generated during and/ or analyzed during the current study will be available upon request from Yvonne Ritter (Yvonne.ritter@uni-konstanz.de)

IPD sharing plan summary

Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet		27/09/2023	14/07/2025	No	Yes