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

| Submission date | Recruitment status No longer recruiting | Prospectively registered | | |
|-------------------|--|--|--|--|
| 11/07/2025 | | ☐ Protocol | | |
| Registration date | Overall study status | Statistical analysis plan | | |
| 23/09/2025 | Completed Condition category | ☐ Results | | |
| Last Edited | | Individual participant data | | |
| 23/09/2025 | Circulatory System | [X] 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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Additional identifiers

Clinical Trials Information System (CTIS)

Nil known

ClinicalTrials.gov (NCT)

Nil known

Protocol serial number

Nil known

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

Study design

Pre-post training study

Primary study design

Interventional

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

Date of final enrolment 01/12/2023

Locations

Countries of recruitmentGermany

Study participating centre University of Konstanz Universitätsstraße 10 Konstanz Germany 78464

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)

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 |
| Participant information sheet | | 11/11/2025 | 11/11/2025 | No | Yes |