Effects of sitting interruption frequency on cognitive function and glucose metabolism:
A randomized, controlled cross-over study involving young sedentary adults

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The aim is to investigate the effects of breaking up sitting with different frequencies of PA bouts on cognitive function and glucose metabolism in young sedentary adults.

Ethical review	Approved WMO
Status	Recruiting
Health condition type	Other condition
Study type	Interventional

Summary

ID

NL-OMON57014

Source
ToetsingOnline

Brief title
Frequency of Interrupting Sitting and Cognitive Function

Condition

- Other condition

Synonym
Breaking up sitting and cognitive function, glucose metabolism

Health condition

Breaking up sitting with walking breaks

Research involving
Human

Sponsors and support

Primary sponsor: Universiteit Maastricht
Source(s) of monetary or material Support: China Scholarship Council (CSC)

Intervention

Keyword: breaks, cognitive function, Frequency, glucose metabolism, physical activity, sitting

Outcome measures

Primary outcome

The primary outcome is mental flexibility assessed using the computer-based

Trial Making Test.

Secondary outcome

The secondary outcomes, as further measure of cognitive function, are

interference and memory respectively assessed by the computer-based Stroop

task, n-Back Test and attention measured by paper-based d2 attention test.

Moreover, as secondary outcomes variables characterizing the glucose metabolism

will be measured (e.g., plasma glucose, and serum insulin). Serum brain-derived

neurotrophic factor (BDNF), serum triacylglycerol (TAG), and mood are the

exploratory outcomes.

Study description

Background summary

Sedentary behavior (SB) has been associated with impaired cognitive function in elderly, and negatively impacts glucose metabolism. Interrupting sitting with physical activity (PA) bouts probably exerts beneficial effects on cognitive

function via an improved glucose metabolism. Nevertheless, the impacts of breaking up prolonged sitting with various frequencies of PA bouts remain unexplored in young sedentary adults. Moreover, we hypothesize that the pattern of the breaks modifies the effects. Thus, randomized controlled trials (RCTs) are highly needed to investigate the effects of interrupting sitting with different frequencies of PA breaks on cognitive function and glucose metabolism. We hypothesize that interrupting sitting with different frequencies of walking breaks differentially affect cognitive function and glucose metabolism.

Study objective

The aim is to investigate the effects of breaking up sitting with different frequencies of PA bouts on cognitive function and glucose metabolism in young sedentary adults.

Study design

A randomised, controlled cross-over study will be performed, consisting of four interventions: uninterrupted prolonged sitting (SIT), short breaks (SBR), moderate breaks (MBR), and long breaks (LBR).

Intervention

Participants will complete four conditions in a randomized, counterbalanced order: SIT (uninterrupted prolonged sitting without any interruptions), SBR (walk 1 minute every 10 minutes), MBR (walk 3 minutes every 30 minutes), and LBR (walk 27 minutes during the intervention). Each condition lasts about 6 hours.

Study burden and risks

During the screening period, participants will wear the activPAL for seven consecutive days on the right thigh to measure sedentary behaviour and physical activity. On the four test days, cognitive function and mood will be assessed, and blood samples will be drawn. Participants will receive a 4.5-hour SIT, LBR, MBR, or LBR regime. Each condition including steady state and measurement time requires about 6 hours. The walking intensity during the sitting breaks will be set at 3.6 km/h. These regimens are safe and acceptable. Participants will have to stay at the university and are not allowed to eat or do other activities than prescribed in the protocol. Insertion of the cannula can cause some discomfort and possibly a hematoma or bruise. Some participants may also report pain during the insertion of the cannula. Other measurements are routine and are not expected to lead to physical side effects. The data from the participants who do not fully adhere to the study protocol will only be included in intention to treat statistical analyses. Finally, this study will

provide insights into the potential beneficial effect of interrupting sitting with different frequencies of walking breaks on cognitive function and glucose metabolism in young sedentary adults. One benefit for the study population is the opportunity to obtain guidelines for SB and PA with varying frequencies of sitting interruptions.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)

Inclusion criteria

- Men and women aged 18-35 years;
- BMI between 18.5-24.9 kg/m2;
- SB, i.e. sitting for an average of at least 9 hours per day assessed by activPAL;
- Physically inactive, i.e. engaging in exercise for less than 2 to 3 times per week;

- Stable body weight (weight gain or loss < 3 kg in the past three months);
- Willingness to engage in four 6-hour laboratory visits;
- No difficult cannulation.

Exclusion criteria

- Current smoker, or smoking cessation within the last 12 months;
- Individuals diagnosed with diabetes, cardiovascular disease, or other significant medical conditions, including epilepsy, asthma, kidney failure or renal insufficiency, chronic obstructive pulmonary disease, inflammatory bowel diseases, autoinflammatory diseases, and rheumatoid arthritis;
- Not sedentary, i.e. sitting for less than an average of 9 hours per day assessed by activPAL;
- Physically active, i.e. engaging in exercise for more than 3 times a week;
- Abuse of drugs;
- Use medication to treat BP, lipid, or glucose metabolism;
- Pregnant females.

Study design

Design

Study type:	Interventional
Intervention model:	Crossover
Allocation:	Randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Treatment

Recruitment

NL

Recruitment status:	Recruiting
Start date (anticipated):	03-10-2024
Enrollment:	33
Type:	Actual

Medical products/devices used

Registration:	No

Ethics review

Approved WMO Date:	09-09-2024
Application type:	First submission
Review commission:	METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL86254.068.24