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# Active workstations

## - a NEAT way to prevent and treat overweight and obesity?

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### Akademisk avhandling

som med vederbörligt tillstånd av Rektor vid Umeå universitet för  
avläggande av medicine doktorsexamen framläggs till offentlig  
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Avhandlingen kommer att försvaras på svenska.

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## **Abstract**

**Background** Modern society is triggering sedentary behaviours in different domains. Different strategies can be used to reduce the time spent sitting and increase physical activity in the office environment, which is one domain where sedentary time is often high. One such strategy could be to install treadmill workstations. With these, the office workers can walk on a treadmill while performing their usual work tasks at the computer. However, the long-term effects of these workstations are not known.

**Aim** The overall aim of this thesis was to investigate the long-term effects on sedentary behaviour, physical activity and associated health factors of installing treadmill workstations in offices compared to regular office work.

**Method** In this randomized controlled trial, 80 sedentary, middle-aged, healthy office workers with overweight or obesity were individually randomized into either an intervention or a control group. Those in the intervention group had a treadmill workstation installed at their sit-stand desk, to use for at least one hour per day for 13 months. They further received boosting e-mails at four time-points during the study. Participants in the control group continued to work as normal at their sit-stand office desk. All participants also received a health consultation at the beginning of the study, where they got to discuss physical activity and diet recommendations. Measurements reported include physical activity and sedentary behaviour, anthropometric measurements, body composition, metabolic outcomes, stress, depression and anxiety, cognitive function, structural brain images and interview data. Linear mixed models were used for the main statistical analyses of the quantitative data. An exploratory approach was also undertaken, using orthogonal partial least squares regression on the baseline data. Finally, interview data from participants in the intervention group were analysed using a modified Grounded Theory approach.

**Results** The intervention group increased their daily walking time and their number of steps at all follow-ups compared to the control group. Concomitantly, a decrease in moderate-to-vigorous intensity physical activity (MVPA) was observed within both groups, mainly during weekends. No intervention effects were observed on any of the body, cognitive or brain volume measurements. Our exploratory analyses revealed a significant association between smaller hippocampal volume and percentage sitting time among participants over 51 years of age. From the interview data, we discovered a core category, “The Capacity to Benefit”. The categories were described as the ideal types the Convinced, the Competitive, the Responsible and the Vacillating, based on the principal characteristics of the participants representing their different motivational status and strategies to reach the goal of benefitting from the intervention.

**Conclusion** It is possible to increase daily physical activity in office environments by introducing treadmill workstations. Future interventions should adapt strategies for the individuals based on their motivational level, but should also work with the social and physical environment and with factors within the organization to gain the best effects of these interventions.

## **Keywords**

Sedentary behaviour, light-intensity physical activity, treadmill workstations, office workers, obesity

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