Treadmill workstations versus sit–stand desks for increasing physical activity

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Sedentary behaviour for several hours per day is associated with health problems.[1] Office workers spend a lot of their working hours sitting,[2] and interventions for reducing their sitting time have foremost involved the implementation of sit–stand desks.[2,3] Short-term reductions in sitting time from implementation of sit–stand desks are reported, but with small or no health effects.[4]

Physical activity seems to buffer the harmful health effects of excessive sedentary time.[5] Thus, active workstations have been developed, which enable office workers not only to sit less, but also to be more physically active (eg, walking or cycling) while working.[6] An example of these developments is integrated treadmill workstations for sit–stand desks, permitting office workers to walk while working. However, the effects of treadmill workstations had not been investigated in long-term randomised controlled trials.

In *The Lancet Public Health*, Bergman and colleagues[7] did a randomised controlled trial to investigate whether treadmill workstations in office workplace environments increase objectively measured daily walking time among healthy overweight and obese office workers over 13 months. 80 participants were individually randomly assigned to the intervention group that received treadmill workstations or the control group that continued working at existing sit–stand desks. The intervention group was instructed to use the treadmill at a self-chosen walking speed for at least 1 h per day, and preferably more. The primary outcome of walking time and the secondary outcomes of number of steps, standing time, and sitting time were measured by an activPAL accelerometer on the participant's thigh for 7 consecutive days at baseline and at 2, 6, 10, and 13 months. Several health-related measures (anthropometric measurements, body composition, metabolic measurements, energy intake, salivary cortisol, subjective stress and energy, and depression or anxiety) were collected at baseline and at 6 and 13 months.

The primary endpoint of a 30-min increase in physical activity was not met, but the authors were able to report that, between baseline and 13 months, the intervention group had a greater increase in weekday walking time and number of steps than the control group (18 min [95% CI 9 to 26] in the intervention groups *vs* 1 min [–7 to 9] in the control group). Notably, during the same period, the intervention group had a smaller increase in physical activity on weekends than the control group (5 min [–8 to 18] *vs* 8 min [–5 to 21]). No effect on daily time spent sitting was found (p=0·44). No significant intervention effects on anthropometric measurements, body composition, or any other health-related outcomes were found.

The finding that implementation of treadmill workstations increases daily walking time over a rather long follow-up time among healthy office workers compared with sit–stand desks is novel. The intervention effects on daily walking time and number of steps were largest in the beginning of the study, after which it slowly attenuated but remained significant after 13 months. This attenuation of behavioural effects of workplace health promoting interventions is more the rule than the exception, and more studies investigating sustainability of these interventions are needed.

The increased daily walking time of 22 min and 1646 steps ought to be sufficient to improve several health outcomes in an overweight and obese population. However, the absence of health effects might be explained by the quite high level of physical activity of the population at baseline, the fact that the intensity of the increased walking time might be too low to impose a substantial improvement in health,[8] and the smaller increases in weekend moderate and vigorous physical activity in the intervention group than in the control group. Thus, future interventions with active workstations for office workers should aim for a walking cadence of at least 100 steps per minute[8] and prevent compensatory reductions in moderate and vigorous physical activity during leisure time.

The main strengths of the study by Bergman and colleagues[7] are the randomised controlled intervention design, the long follow-up time, and the use of repeated measurements with thigh-attached accelerometers to provide information on sitting, standing, and walking over several work and non-work days. The main

limitations of the study are the absence of information on how much the intervention group used the treadmill workstations and the potential contamination between the intervention and control groups within the same companies (ie, the effect of controls seeing their colleagues in the intervention group walking at work).

I applaud Bergman and colleagues for performing such a challenging and costly randomised controlled workplace intervention in several organisations with repetitive measurements over a long follow-up time of 13 months. The intervention provides the important and useful knowledge that implementation of treadmill workstations can feasibly increase daily walking time among office workers over availability of sit–stand desks. However, the treadmill workstations did not seem to improve the health of office workers who are already quite active. One main benefit of the treadmill workstation over other workplace exercise interventions is that the office worker can increase walking at the same time as doing productive work. In this manner, the benefits of increased physical activity among sedentary workers can be achieved without production loss for the company. To strengthen sustainability and scale-up of workplace physical activity interventions, a close integration of the physical activity with the main work tasks without reducing productivity ought to be strived for.[9] Future randomised controlled trials investigating sustainable workplace interventions with the aim of increasing physical activity during productive work among sedentary workers are warranted.

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I declare no competing interests.

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