

CPH News and Views

A semi-monthly column on emerging topics related to healthy workplaces

Issue # 38: Will treadmill workstations be used by office workers?

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Sitting is the defining body posture for most office workers. A key piece of furniture in the office workplace is the chair. Furniture should be designed to offer the office worker the possibility of adjusting it to maintain the whole body in a relaxed, upright but not rigid position during the workday. Most ergonomic progress for office workers refers to the neutral position concept to [prevent musculoskeletal disorders](#) and so far this has been considered as comfortable neutral posture while sitting. However, passive sitting time for most of the workday has been associated with poor health status, such as cardiovascular and metabolic diseases and possibly even [elevated risk of cancer](#) [1]. Unfortunately, it seems that the deleterious effects of prolonged sitting time are not counterbalanced by increasing activity at other times [2]. In other words, people with physically active leisure time who sit for most of the day still have increased risk of diseases attributable to their extended sitting.

Thus, the challenge has become to transform the office environment into one where office workers might perform their work without being physically passive (sitting) but being as active as possible, while staying safe and productive. Among many ideas (sit-to-stand desks, cycling stations, exercise balls instead of chairs), the treadmill workstation has recently gained attention and popularity. The basic concept is to walk instead of sit while performing one's office duties. One key advantage is that slow walking (two miles per hour) increases energy expenditure by approximately 100 calories per hour [3]. At the end of 48 weeks (almost one year of work), this would total 144,000 calories or almost 41 pounds. In addition, the risk of sitting-related diseases would presumably be reduced.

Under ideal conditions this should work as stated. But we know that office environments are much more than a lab in which one piece of equipment (a chair and a desk) is replaced by another (a treadmill desk). In fact, it is not uncommon to hear that exercise equipment bought for leisure-time exercise was used only for a short period of time, after which it becomes an "expensive dust collector." We want to avoid the same thing happening in the work setting.

We therefore conducted a study of the factors that might influence the use of treadmill workstations by highly motivated office workers [4]. Five healthy and physically fit female volunteers committed to use a flexible treadmill workstation for six months and to provide information about their experiences. The workstation consisted of a large, electric height-adjustable desk, a walking treadmill and a chair. The most frequent layout was to place the treadmill beside the chair, allowing for two work areas on the desk surface: one in front of the treadmill and another in front of the chair. A couple of ergonomists explained how to keep neutral body positions while sitting, standing, or walking. There was only one instruction, "use it as much as you want and can," and one recommendation, "be aware of the need to adapt." Participants were asked to keep notes over the six months about what made it easier (facilitators) or more difficult (barriers) for them to use the treadmill.

Important facilitating features noted by participants were the ease of learning and using the electric desk and not having to crank it up or down to move between sitting and standing. Other incentives to walk were the enjoyment (after participants had adapted enough that they could stand and walk with less conscious attention); and identifying the work periods of having sufficient decision latitude (job control) to schedule one's own activities and control the work pace. An initial concern about potential generation of nanoparticles, due to the friction generated by the belt and other moving parts of the electric treadmill, was resolved by air measurements

before, during, and after using the treadmill which showed the absence of such airborne contaminants in participants' offices.

However, the barriers to treadmill use were powerful and by the end of the study they had become stronger than the incentives. The difficulty in setting up the desk surface to switch easily from standing/walking to sitting was an important one. The chair and the treadmill were next to each other, so changing position implied moving all materials on the desk surface back and forth. Having to move the monitor, keyboard, mouse, phone, papers, pens, and other items was time-consuming and discouraging. Peer pressure was experienced as ostensibly joking comments from co-workers, such as asking why the participant was sitting or just standing instead of walking. When they persisted after some weeks, these "funny" comments were experienced instead as disrespectful and annoying.

Foot and knee discomfort disappeared after some weeks of adaptation, with a mat on top of the treadmill belt. Several workers reported that they accidentally kicked the side of the treadmill base when moving around the office. Participants did not consider this as tripping and did not relate it to a potential fall. However, it is important to note that the risk of falling because of tripping on an uneven surface is usually almost non-existent in the office environment.

Some jobs did not allow participants to reduce their work pace and they could not use the treadmill because there was a linear relationship between speed and decreased productivity. Drawing and working with spreadsheets were the activities reported as most sensitive to disruption. Our participants reported that having low job control decreased the use of the treadmill. Of note, low-hierarchy workers are the ones with the lowest levels of job control and also with the highest rates of cardiovascular disease.

Therefore, it appears that currently available treadmill workstations have design problems that interfere with them becoming a feasible solution to office sedentarism. Further, they are more likely to be used by workers with high job control rather than workers with low job control, who need them the most. In summary, changes in workstation design and in the way that office work is organized should be considered to get the full possible benefit from these units.

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consensus among all Center personnel. We welcome your responses and discussion. Please send all questions and comments to CPHNEW@uml.edu.

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