



Alternatieve werkplekken

Effect op werkprestatie en klachten
aan het bewegingsapparaat

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In ons dagelijks leven zitten we...



Zitten op kantoor...

- Steeds meer kantoorwerkzaamheden
- Risico op klachten aan bewegingsapparaat
- Gezondheidsrisico's op lange termijn



Sitting - bad for your health?

Tijdschrift voor Human Factors

Sitting - bad for your health?

Workstation alternatives to reduce sitting time at work

Too much sitting seems bad for your health and puts you at risk for early death. Since a large part of the working population spends the majority of their workday sitting, the workplace has great potential to address the public health problem of too much sitting. Workstation alternatives that allow desk work to be done while standing, walking, biking or stepping reduce the total time spent sitting without substantially affecting work performance. Moreover, these alternatives are acceptable to users. However, it is too early to abandon the traditional desk and chair from the office and recommend the widespread use of alternative workstations. More high quality evidence is needed with regard to the long term effects and generalizability of results to different working populations. Ergonomists could play an important role in developing recommendations for set-up and use of alternative workstations, as well as in improving their feasibility.

Maaïke Huysmans, Hidde van der Ploeg, Karin Proper, Erwin Speklé en Allard van der Beek

Too much sitting (at work) and the effects on health
Traditionally, ergonomics primarily focused on protecting workers from metabolic overload, fatigue or biomechanical strain by reducing physical exposures at the workplace (Straker & Mathiassen, 2009). Reducing the exposure was appropriate for jobs that were biomechanically and physiologically too demanding. However, the technological revolution in combination with efforts to improve workers' health and safety have made that, over the last 50 years, drastic changes have occurred in working life. Occupations have moved away from work with high levels of physical activity towards occupations with low physical activity that are more mentally demanding and predominantly require sitting (Church et al., 2011; Straker & Mathiassen, 2009). Working adults spend about one half to two thirds of their working day sitting, mostly in jobs comprising extensive computer use in an office setting (Brown et al., 2003; Jans et al., 2007; Tigbe et al., 2011; Toomingas et al., 2012). Since the eighties of the last century, there is a rising awareness in ergonomics that sedentary jobs with minimal physical workloads may also put the worker at risk for musculoskeletal symptoms, giving rise to initiatives that increase exposure variation in jobs, e.g. by introducing active breaks or job rotation (Straker & Mathiassen, 2009). Not until recently, public health research has suggested that too much sitting in itself may also be detrimental to health, independent of physical inactivity.

A large epidemiological study (N = 222,497) found that prolonged sitting time is a risk factor for all-cause mortality, independent of physical activity, and is responsible for 7% of premature deaths (van der Ploeg et al., 2012). Evidence about the health effects of

sitting is not consistent (e.g. Proper et al., 2011; van Uffelen et al., 2010), but several reviews have suggested that sedentary behaviour is a major lifestyle risk factor for the development of obesity, cardiovascular disease, diabetes, depression and cancer (Proper et al., 2011; Thorp et al., 2011; van Uffelen et al., 2010; Wilmoth et al., 2012; Zhai et al., 2014). Sedentary behaviour is distinctly different from physical inactivity and is defined as activities that are done sitting or reclining and cost <1.5 times the basal metabolic rate (Sedentary Behaviour, 2012). Thus, people can have a physically active and sedentary lifestyle at the same time (i.e. they meet the physical activity guidelines* (World Health Organization, 2010) but sit for most of the remainder of the day). As interruptions of prolonged sitting are associated with metabolic health benefits (Dunstan et al., 2012; Healy et al., 2008), promising strategies to improve workers' health aim at reducing or interrupting (e.g. light intensive activities, such as standing and walking) by the total amount of time spent sitting (Chau et al., 2010; Dunstan et al., 2012; Ekblom-Bak et al., 2010; Straker & Mathiassen, 2009). Reducing sitting time might also be helpful in preventing other prevalent disorders among office workers, specifically fatigue and pain in the neck, shoulders and arms (Richter et al., 2009).

Given the many hours that office workers are sitting at their job, the workplace is an important arena for interventions aiming at reducing the total sitting time. One way to address the problem is to introduce (active) breaks from seated work, such as standing up, making short walks of just a few minutes, or doing (stretching) exercises. However, the advice to frequently break up your work to stretch your legs may not appeal to all employers or employees, because they may dread that it affects productivity, even though several studies have shown that this is not the case (Dababneh et al., 2001; Galinsky et al., 2000; Van den Heuvel et al., 2003). From the employer's perspective it may be interesting to explore solutions to reduce and break up prolonged sitting at work without interfering with workers' productivity. Since most office tasks, i.e. computer work, non-computer desk work (reading, writing), calling, attending meetings or presentations, are usually done while seated, it is worthwhile to investigate whether these tasks could also be done while standing or moving.

1 The World Health Organization states that, to be physically active, adults should perform at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or perform at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week (or an equivalent combination of the two in bouts of at least 10 minutes duration).



Figure 1. Sit-stand workstation of which the whole desk can be moved up and down (source: Ergotron).

In the present paper our aims were to: (1) give an overview of workstations that allow deskwork and thereby replacing the traditional desk and office chair set-up, (2) summarize effects of these alternative workstations on the total time spent sitting and on health, and (3) give insight in the feasibility aspects of introducing these alternative workstations in the workplace. In order to meet these aims, we used the information provided by four recent systematic reviews and by the individual studies that were included in these reviews (Karakolis & Callaghan, 2014; MacEwen et al., 2014; Neuhaus et al., 2014; Tudor-Locke et al., 2014).

Alternative workstations to reduce total time or prolonged sitting at work
Alternative workstations enable office workers to perform their computer work and other desk-based tasks while standing, walking, stepping or pedalling. Different types of alternative workstations are currently commercially available and already implemented at a small scale in companies and distributed as individual or shared workstations.

Sit-stand or standing workstations
Sit-stand workstations vary with respect to the surface that can be heightened, either the whole surface (figure 1) or a small height-adjustable device holding the monitor, keyboard and mouse (figure 2) can be moved up and down. Standing desks can either be fixed or height-adjustable (manually or electrically), which allows working in either sitting or standing position.

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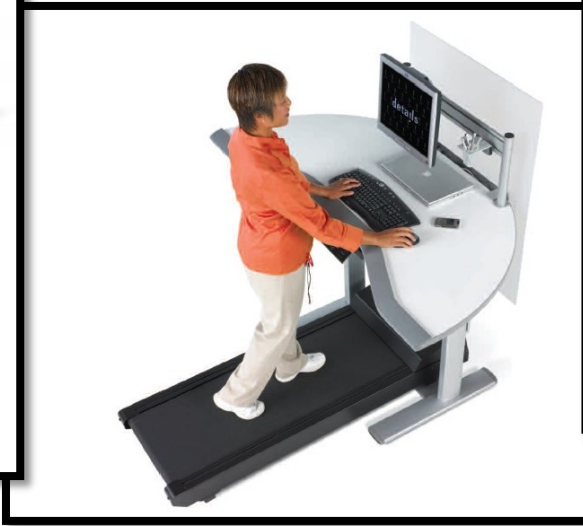


Tijdschrift voor Human Factors - afdeling 40 - nr. 1 - maart 2015 17

- Maaïke A. Huysmans, Hidde P. van der Ploeg, Karin I. Proper Erwin M. Speklé, Allard J. van der Beek

Alternatieve werkplekken

- Zit-stabureaus
- Loopband bureaus
- Bureaufietsen



Zittijd en haalbaarheid interventies

- Alternatieve werkplekken verminderen de zittijd
 - (review / meta-analysis Neuhaus et al 2014)
- Werknemers appreciëren het gebruik van alternatieve werkplekken
 - Alle 4 de reviews



Werkprestatie en klachten

- Werkprestatie lijkt niet te worden beïnvloed door gebruik van zit-stabureaus
 - Alle de 4 reviews
- Stappen of trappen lijkt een licht negatief effect te hebben op werkprestatie
 - Tudor-Locke et al. 2014, Neuhaus et al. 2014
- Zit-stabureaus: vermindering in klachten aan Bewegingsapparaat
 - (Huseman et al. 2009, Pronk et al. 2012, Thorp et al. 2014)

Up-date Werkprestatie en klachten

- Nieuwe reviews
- alternatieve werkplekken:
 - Chu et al. 2015
 - Shrestha et al 2015
 - Commissaris et al 2016
- Zit-stabureaus
 - Tew et al. 2015



Literatuur update

- Populatie: kantoormedewerkers
- Interventie: alternatieve werkplekken
- Vergeleken met zitten
- Gemeten: werkprestatie en klachten



Werkprestatie

- Passieve werkplekken (n = 16)

Labstudies zit-sta (n = 5)	Objectief gemeten (software)	= = = = = +
Labstudies staan (n = 8)	Objectief gemeten (software)	= = = = = = = =
Veldstudies zit-sta (n = 6)	-Zelf-rapportage -objectief	= = + + = +

Werkprestatie

- Actieve werkplekken (n = 15)

	Loopband werkplek (n = 11)	Fiets werkplek (n = 4)
Labstudies (n = 9) software	= = - - - - -	= - - - -
Labstudies (n = 2) zelfrapportage	- -	- -
Veldstudies (n = 3) zelfrapportage	= = + = + (rapportage leidinggevende)	=

Klachten aan het bewegingsapparaat

- Passieve werkplekken (n = 13)

	klachten (n = 4)	Discomfort (n = 9)
Labstudies zit-sta (n = 5)		= - - + + +
Labstudies staan (n = 4)		= - - - - -
Veldstudies zit-sta (n = 7)	= = = +	+ + +

Klachten aan het bewegingsapparaat

- 1 studie bekend: Groenesteijn e.a. 2016
 - Oxidesk, veldstudie, 22 medewerkers
 - Discomfort: =



Samenvatting alternatieve werkplekken

	(Werk) prestatie	Klachten / discomfort
Zit-sta bureau	Lab: = Veld: = +	Discomfort lab: - + Discomfort veld : + Klachten veld: =
Loopband werkplek	Lab: typesnelheid - Lab: muisprecisie: - Veld: =	
Fietsbureau	Lab: muisprecisie: - veld: =	Discomfort veld: =

Samenvatting alternatieve werkplekken

	(Werk) prestatie	Klachten / discomfort
Zit-sta bureau	Lab: = Veld: = +	Discomfort lab: - + Discomfort veld : + Klachten veld: =
Loopband werkplek	Lab: typesnelheid - Lab: muisprecisie: - Veld: =	
Fietsbureau	Lab: muisprecisie: - veld: =	Discomfort veld: =

Conclusies en aanbevelingen

- Het meten van werkprestatie
 - Lab vs. veld
 - Real-work condities
- Meten van klachten
 - Passieve vs. actieve werkplekken
 - Preventie en reductie?



Aanbevelingen voor de praktijk

- Zitten willen we niet afschaffen, wel doorbreken
- De oplossing ligt in een betere balans tussen zitten, staan en bewegen.
- Hoe kan gebruiker worden uitgedaagd?
- Hoe kan de omgeving daartoe uitdagen?

Voorbeeld om ziten te verminderen

- RAAF [Rietveld Architecture-Art-Affordances]



Bedankt voor de aandacht!

- Vragen?

