

Real science lies behind the fad for standing up at work

Winston Churchill knew it. Ernest Hemingway knew it. Leonardo da Vinci knew it. Every trendy office from Silicon Valley to Scandinavia now knows it too: there is virtue in working standing up. And not merely standing. The trendiest offices of all have treadmill desks, which encourage people to walk while working. It sounds like a fad. But it does have a basis in science.



Sloth is rampant in the rich world. A typical car-driving, television-watching cubicle slave would have to walk an extra 19km a day to match the physical-activity levels of the few remaining people who still live as hunter-gatherers. Though all organisms tend to conserve energy when possible, evidence is building up that doing it to the extent most Westerners do is bad for you — so bad that it can kill you.

That, by itself, may not surprise. Health ministries have been nagging people for decades to do more exercise. What is surprising is that prolonged periods of inactivity are bad regardless of how much time you also spend on officially approved high-impact stuff like jogging or pounding treadmills in the gym. What you need as well, the latest research suggests, is constant low-level activity. This can be so low-level that you might not think of it as activity at all. Even just standing up counts, for it invokes muscles that sitting does not.

Researchers in this field trace the history of the idea that standing up is good for you back to 1953, when a study published in the *Lancet* found that bus conductors, who spend their days standing, had a risk of heart attack half that of bus drivers, who spend their shifts on their backsides. But as the health benefits of exercise and vigorous physical activity began to become clear in the 1970s, says David Dunstan, a researcher at the Baker IDI Heart & Diabetes Institute in Melbourne, Australia, interest in the effects of low-intensity activity — like walking and standing — waned.

Arse longa, vita brevis

Over the past few years, however, interest has waxed again. A series of epidemiological studies, none big enough to be probative, but all pointing in the same direction, persuaded Emma Wilmot of the University of Leicester, in Britain, to carry

out a meta-analysis. This is a technique that combines diverse studies in a statistically meaningful way. Dr Wilmot combined 18 of them, covering almost 800,000 people, in 2012 and concluded that those individuals who are least active in their normal daily lives are twice as likely to develop diabetes as those who are most active. She also found that the immobile are twice as likely to die from a heart attack and two-and-a-half times as likely to suffer cardiovascular disease as the most ambulatory. Crucially, all this seemed independent of the amount of vigorous, gym-style exercise that volunteers did.

Correlation is not, of course, causation. But there is other evidence suggesting inactivity really is to blame for these problems. One exhibit is the finding that sitting down and attending to a task — anything from watching television to playing video games to reading — serves to increase the amount of calories people eat without increasing the quantity that they burn. Why that should be is unclear — as is whether low-level exercise like standing would deal with the snacking.

A different set of studies suggests that simple inactivity by itself — without any distractions like TV or reading — causes harm by altering the metabolism. One experiment, in which rats were immobilised for a day (not easy; the researchers had to suspend the animals' hind legs to keep them still) found big falls in the amount of fats called triglycerides taken up by their skeletal muscles. This meant the triglycerides were available to cause trouble elsewhere. The rats' levels of high-density lipoprotein (HDL) fell dramatically as well. HDL is a way of packaging cholesterol, and low levels of it promote heart disease. Other studies have shown the activity of lipoprotein lipase — an enzyme that regulates levels of triglycerides and HDL — drops sharply after just a few hours of inactivity, and that sloth is accompanied by changes in the activity levels of over 100 genes.

Papers which focus on people rather than laboratory animals have found similar effects. Happily, this research also suggests the changes can be reversed by small amounts of fairly relaxed activity. A study published last year by Dr Dunstan found that breaking up prolonged periods of sitting with two minutes of walking every 20 minutes made a big difference. After feeding his volunteers a sugary meal, he discovered that people who had been walking in this way had blood-glucose levels almost 30% lower than those of people who had remained seated.

For some scientists, this combination of epidemiology, animal experiments and human trials suggests that light-to-moderate exercise — standing up, walking around and the like — is something qualitatively different from an energetic, high-intensity workout. But not everyone is convinced. Many of the human studies are small-scale. (Dr Dunstan's paper, for example, involved just 19 participants.) And not every study that has gone looking for the ill effects of inactivity has found them.

Still, the potential size of the problem means not everyone is prepared to wait for definitive proof. Sellers of standing desks are, naturally, jumping on the latest research findings to advertise their wares. And it is surely only a matter of time before the first law suit from a sickly cubicle slave reaches court.

Clarification, August 12th: *This piece seems to have caused some confusion on the web, for which we apologise. The frequent, gentle activity recommended by some researchers to stave off the dangers of long periods of sloth is not intended as a replacement for regular, vigorous exercise, but as a complement to it. We have tweaked the paragraph that seemed likely to be the cause of the muddle.*

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