The Detrimental Effects of Sedentary Behavior
Are We Sitting Too Much?

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Executive Summary

For the past 12 months, the evidence related to the physical detriments of prolonged sedentary behavior has increased dramatically. The body of research and national media focus are heightening interest and conversation throughout the business community. Understanding the potential health implications, negative impact on productivity and possible harmful impact on all-cause mortality demonstrate the need for education and awareness within domestic and global corporations.

Businesses that have implemented comprehensive health risk management strategies are demonstrating the ability to bend the healthcare cost curve. “The ROI on comprehensive, well-run employee wellness programs can be as high as 6 to 1.” Moving forward, comprehensive programs will need to evaluate not only current physical activity offerings, but actual daily time spent in prolonged periods of sedentary behavior.

Indeed, sitting too much, despite physical activity undertaken at other times throughout the week, is detrimental. As detailed later in this paper, too much sitting or low activity rates in general have a direct relationship with mortality, Type 2 diabetes, cardiovascular disease, and more. And as a culture, the answer to the question is “yes”—we are sitting too much.
Definition of Sedentary Behavior

Sedentary behavior comes from the Latin sedere, “to sit” and involves low levels of energy expenditure. In common, practical usage, this includes watching television, computer and game console use, sitting during commuting, working and leisure time activities. For many individuals, this adds up to a rate of 55 to 60 percent of their waking hours.²

The research points to a crucial differentiator from previous thinking, in that too much sitting is not the same as too little exercise. Researchers in Australia demonstrate that breaking up sedentary time can be beneficial, and strive for new governmental recommendations that reduce sitting time.³ In the U.S., studies point directly to the negative implications of increased sedentary time and deleterious cardiovascular and metabolic effects.⁴ These consequences are independent of physical activity (PA), thus meeting the recommended daily requirements for PA does not exclude one from the negative impact of sitting for prolonged periods of time.

Understanding the division of energy expenditure highlights the importance and continued promotion of regular PA, as well as increased bouts of light-intensity activity. There is a unit of measurement, MET or metabolic equivalent of task, that is basically a unit of energy consumption.

For example, sleeping is a unit of .9 MET, while running just under a six-minute mile is 18 MET. The Centers for Disease Control and Prevention (CDC) utilize moderate intensity as only up to 6.0 MET, while some sources allow up to 8.0 MET.

Thus, the idea being light-intensity activities are important and should not be left out of the exercise equation. This aligns with the idea that balanced meals throughout the day provide optimal energy; similarly light-intensity activities need to be incorporated for total health.
What is Causing the Problem?

Since the middle of the last century, there has been a dramatic reduction in physical activity in areas of transportation, communication, workplace and home entertainment options. This lack of activity, along with an increased consumption of high-density caloric foods, such as processed meats, sugary drinks and salt-laden foods, along with other lifestyle behaviors like insufficient sleep and the 24/7 global workweek have created unhealthy populations worldwide. Currently, in the U.S., obesity levels stand at 34 percent of the population, and this upward trend is growing around the globe, including Europe and Asia.

It is common for individuals to spend one-half of their waking hours in a sitting or sedentary position. Finding new methods to combat increased sedentary lifestyles is necessary. Research demonstrates that the introduction of light-intensity exercise throughout the workday can be a positive boost to metabolic health and all-cause mortality.

Inactivity has a Unique Physiology

There really is a detailed science behind why sitting too much is harming us. Observational epidemiological studies suggest that daily sitting time or low nonexercise activity levels have a direct relationship with mortality, cardiovascular disease, Type 2 diabetes, metabolic syndrome and obesity.¹ This research highlights distinct molecular, physiological and clinical effects that are visible in the body and separate from responses caused by structured exercise.

Physiologically, prolonged sitting leads to a loss of contractile stimulation or suppression of skeletal muscle lipoprotein lipase (LPL) activity and reduced glucose uptake. LPL is necessary for triglyceride uptake and high-density lipoprotein (HDL) production. Another way to say this is, certain metabolic processes shut down with prolonged sitting. However, simple intermittent bouts of low-level, light-intensity activity, such as standing, were enough to elicit LPL activity, thus positively influencing the metabolic process.

These intermittent, low-intensity activities involve the use of the postural muscles (think standing) or use of bigger upper thigh muscles, as in the use of a fitness ball in place of a chair. The research points to small, incremental changes in the large-group muscles such as quadriceps and gluteal muscles (front thigh and seat muscles) in addition to the large erector spinae muscles (large postural muscles of the back). This differs from past thinking that only “exercise” was the antidote to too much sitting. By contrast, the message is that just ever slightly increasing your daily output (total energy expenditure) by intermittent standing and changing of position can have potential, beneficial health outcomes.
Active Couch Potatoes

In a study of 11,000 adults in Australia, individuals who would normally be classified as “physically active” or meeting the requirements of 150 minutes a week of PA, were still negatively impacted by the amount of time they spent watching television. Waist circumference, systolic blood pressure and glucose in both men and women, and HDL cholesterol in women only, were the markers detrimentally affected. The strongest correlations were in those adults with four hours or more of television time. Thus, the need exists to encourage daily intermittent bouts of light activity, even if one is meeting governmental recommendations for activity levels.

This characteristic that too much sitting operates independently from too little exercise is counterintuitive, and breaks away from past physical activity recommendations. Currently, the American College of Sports Medicine and the American Heart Association continue to advocate for:

- 30 minutes of moderate-intensity physical activity, five days per week (minimum bouts of 10 minutes).
- Relatively more intense, vigorous exercise, for less time, 20 minutes, three days a week.

The American Cancer Society examined leisure time spent sitting and physical activity in relation to mortality. It found the risk for women with ≥ six hours/day sitting during the time period studied had a 40 percent greater risk to die than those with ≤ three hours a day sitting. For men, the increased risk was somewhat less, but still, men with ≥ six hours spent sitting had a 20 percent greater risk for mortality than those with three or less hours. Associations were strongest for cardiovascular disease mortality. The study involved 53,450 men and 69,776 women during a 14-year follow-up study adjusting for smoking, body mass index and other factors. In a nutshell: reduced time sitting has a beneficial impact on mortality.
Potential Implications on Employee Health

There are four main problems businesses need to keep in mind with the continued increase in sedentary lifestyles among an aging workforce:

- **Metabolic health is compromised.**
- **Increased risk of mortality.**
- **Increased risk of weight gain.**
- **Exercise does not counter the effects of prolonged sitting.**

Companies that institute Health Risk Assessments (HRA) along with biometric screenings have opportunities to monitor and provide guidance to employees on the importance of metabolic health. While it is understood HRAs are self-reported questionnaires, they do provide a reasonable snapshot of the overall employee population with regard to weight, height and body mass index. In addition, companies that perform biometric screenings through a trusted third-party source have the opportunity for non-self-reported biometric information such as cholesterol and glucose levels to be included and monitored. This data can help identify those people at risk for the four main problems noted above.
Comprehensive health risk management strategies should encourage employers to develop less sedentary opportunities for their employees throughout the workday. Many programs currently advocate for proper exercise and better nutrition standards; however, as exercise does not counter the effects of prolonged sitting, additional solutions need to be incorporated. Please see the sidebar to the left.

Inform, Empower, Initiate!

The first step is to inform employees of the benefits surrounding light-intensity activity throughout the workday. They should be made to understand that it is not another task to be added to the long list of requirements as an employee, but a new way of utilizing time and energy. Thus, even for nonexercisers, a minimum effort of less prolonged bouts of sitting can be beneficial to their health. Allowing individuals the freedom to utilize creativity in finding new ways to have more motion will empower them to take action. Employers and senior executives must initiate changes; for instance—a leader that stands in a meeting will provide the role model and impetus for others to follow.

Conclusion

There are opportunities and limitations to new research, and this will be a field of development in the next decade. The types and frequency of breaks have not been established, nor the duration. In addition, certain countries, such as Australia, are investigating the need for governmental regulations. For companies that truly value the health of their employees, continually updating and invigorating established health promotion programs must begin. Part of those programs should be to incorporate less sedentary opportunities for all employees.

One Final Word

Time down means time up, just like the old cheer: “Stand up, sit down, fight, fight, fight!”

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5Ibid, Owen 2010.