Take a Stand: The Dangers of Prolonged Sitting

STORY AT-A-GLANCE

- There are about 10,000 publications showing that prolonged sitting is harmful to your health and promotes chronic diseases, including obesity and Type 2 diabetes. Within 90 seconds of rising from sitting to standing, the muscular and cellular systems that process blood sugar, triglycerides and cholesterol — which are mediated by insulin — are activated. All of these molecular effects are activated simply by carrying your bodyweight upon your legs
- Even if you get 150 minutes of moderate to vigorous exercise each week, there's still a dose-response association of sitting with waist circumference, systolic blood pressure and glucose levels — a phenomenon referred to as "active couch potato syndrome"
- At bare minimum, avoid sitting for more than 50 minutes out of every hour. Ideally, limit sitting to three hours or less
- According to biological anthropologists, the fossil record suggests that when early man traded their nomadic hunter-gatherer lifestyles for a more settled one, it resulted in a less dense bone structure
- Recent research shows moderate exercise — loosely defined as exerting yourself to the point where you're slightly winded but can carry on a conversation — improves all-cause survival two times better than vigorous exercise, and that more is better. It cannot be overdone

Evidence shows that prolonged sitting is devastating your health. In his book, "Get Up!: Why Your Chair Is Killing You and What You Can Do About It," Dr. James Levine, co-

director of the Mayo Clinic and the Arizona State University Obesity Initiative, notes there are about 10,000 publications showing that sitting is harmful to your health.

Prolonged sitting actively promotes dozens of chronic diseases, including obesity and Type 2 diabetes, even if you're very fit and exercise regularly. It's also an independent risk factor for premature death, even if you lead an otherwise healthy lifestyle. In fact, chronic sitting has a mortality rate similar to smoking.[1]

Studies looking at life in agriculture environments show that people in agrarian villages sit for about three hours a day. Meanwhile, the average American office worker can sit for 13 to 15 hours a day, and research shows that vigorous exercise cannot counteract the adverse effects of this prolonged sitting.

Abandoning Nomadic Lifestyle Made Man's Bones Less Dense

Interestingly, evidence of the biological effects associated with lack of movement go further back than you might think — straight into the human fossil records, as reported by NPR in 2014 (audio above).

According to biological anthropologists at the Smithsonian National Museum of Natural History, the fossil record suggests that when early man traded their nomadic hunter-gatherer lifestyles for a more settled one, it resulted in a less dense bone structure. As reported by NPR:[2]

> *"The lightweight bones don't appear until about 12,000 years ago. That's right when humans were becoming less physically active because they were leaving their nomadic hunter-gatherer life behind and settling down to pursue agriculture.*
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> *A report on the work appeared ... in the Proceedings of the National Academy of Sciences,[3] along with a study from a different research group that came to much the same conclusion.*

Those researchers looked at the bones of people in more recent history who lived in farming villages nearly 1,000 years ago and compared them with the bones of people who had lived nearby, earlier, as foragers.

'We see a similar shift, and we attribute it to lack of mobility and more sedentary populations,' says Timothy Ryan, an associate professor of anthropology at Penn State University. 'Definitely physical activity and mobility is a critical component in building strong bones.'"

Prolonged Sitting Takes a Toll Even if You Exercise

The health effects go far beyond reductions in bone density, however. I for one am absolutely convinced that excessive sitting is a foundational contributor to most chronic health problems and premature death, and research supports this notion. For example, as noted in a 2010 paper in Exercise and Sport Sciences Reviews:[4]

"Even when adults meet physical activity guidelines, sitting for prolonged periods can compromise metabolic health. Television (TV) time and objective measurement studies show deleterious associations, and breaking up sedentary time is beneficial. Sitting time, TV time, and time sitting in automobiles increase premature mortality risk ...

Physiologically, it has been suggested that the loss of local contractile stimulation induced through sitting leads to both the suppression of skeletal muscle lipoprotein lipase (LPL) activity (which is necessary for triglyceride uptake and high-density lipoprotein (HDL) cholesterol production) and reduced glucose uptake ...

[T]he perspective that we propose is that too much sitting is distinct from too little exercise ... [I]nitial findings on the metabolic correlates of prolonged TV viewing time have since been confirmed by recent objective measurement studies, which also show that breaking up sedentary time can be beneficial ...

> *Importantly, adults can meet public health guidelines on physical activity, but if they sit for prolonged periods, their metabolic health is compromised ... [T]here is ... the potential for high sedentary time and physical activity to coexist ...*
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> *An example would be an office worker who jogs or bikes to and from work, but who then sits all day at a desk and spends several hours watching TV in the evening.*"

In short, while sitting is clearly a sedentary behavior, standing is not. The authors cite several studies[5] showing that prolonged sitting promotes the very ailments that modern society struggles with, while standing protects against them.

For example, the more time you spend watching TV, the greater your risk of abnormal glucose metabolism and metabolic syndrome. Even if you get at least 150 minutes of moderate to vigorous exercise each week, there's a dose-response association of TV time with waist circumference, systolic blood pressure and glucose levels — a phenomenon referred to as "active couch potato syndrome."

Exercise Cannot Undo the Damage of Prolonged Sitting

The take-home message here is that even daily exercise cannot undo the harm done by sitting for hours on end. The key is to stand up and keep your body in mild motion as much as possible throughout each day. Only then will regular exercise work synergistically to improve your health.

Case in point: A study[6] published in 2015 found that, compared to those who exercised often and engaged in few sedentary behaviors, those who rarely exercised and spent many hours sitting had an almost eightfold increased risk of dying prematurely.

So, it's the combination of bouts of exercise and chronic bodily motion (such as shifting posture while standing) that brings about the greatest health benefits.

Another systematic review[7] that looked at 47 studies of sedentary behavior confirmed that the time a person spends sitting each day indeed produces detrimental effects that

outweigh the benefits reaped from exercise.

Sitting was found to increase your risk of death from virtually all health problems, from Type 2 diabetes and cardiovascular disease to cancer and all-cause mortality. For example, sitting for more than eight hours a day was associated with a 91% increased risk of Type 2 diabetes and 22% higher risk of death from any cause.

Other research[8] has found that those who sit the most have a 112% increased relative risk of diabetes and a 147% increased relative risk of cardiovascular events compared to those who sit the least. All-cause mortality is also increased by 50% in this study. To counteract the ill effects of prolonged sitting, researchers suggest you:[9]

- Keep track of how much you're sitting each day and make an effort to reduce it, little by little, each week
- Use a standing desk at work
- When watching TV, stand up and/or walk around during commercial breaks

Excessive Sitting Is Riskiest for Women

Another study published in the Mayo Clinic Proceedings,[10] which examined the relationships between standing time, obesity and metabolic syndrome — alongside and independent of exercise — found that, in men, increased standing was significantly associated with a lower likelihood of elevated body fat percentage, but not metabolic syndrome.

In women, however, standing half of the day was not only related with lower obesity risk, but also a 41% reduced risk of metabolic syndrome. Women who stood at least three-quarters of the time reduced their odds of metabolic syndrome by 53%. Other studies have also found that sitting, for some reason, is riskier for women.[11]

Why Sitting Causes so Much Harm

As indicated in the paper cited above, the reason why prolonged sitting impairs health and promotes disease has to do with the molecular cascades that occur upon standing.

> **“Muscular and cellular systems that process blood sugar, triglycerides and cholesterol are activated simply by carrying your bodyweight upon your legs.”**

As further explained in the book, “Get Up!” within 90 seconds of rising from sitting to standing, the muscular and cellular systems that process blood sugar, triglycerides, and cholesterol — which are mediated by insulin — are activated.

All of these molecular effects are activated simply by carrying your bodyweight upon your legs. These cellular mechanisms are also responsible for pushing fuels into your cells and, if done regularly, will radically decrease your risk of diabetes and obesity.

In short, at the molecular level, the human body was designed to be active and on the move all day long. Stop moving for extended periods of time, and it’s like telling your body it’s time to shut down and prepare for death.

While we clearly need to rest from time to time, that rest is supposed to break up activity, not the other way around. Sitting is not supposed to be a way of life. Sitting in a chair is a very unnatural posture that is bad not only for your back but also your metabolism.

Fortunately, the remedy is simple: Avoid sitting and get more movement into your life. If you have an office job, consider getting a stand-up desk. As a general starting guideline, Levine recommends standing for at least 10 minutes each hour. If you’ve been sitting down for a full hour, you’ve sat too long. I believe 10 minutes is the absolute minimum and, ideally, you’d want to limit sitting to three hours or less.

Excessive Sitting Leads to Exhausted Workers

Feeling exhausted by your office job? This too may have something to do with excessive sitting. As reported in a 2017 study in the Journal of Lifestyle Medicine, which queried

447 office workers:[12]

> *"The respondents spent an average of 6.29 hours of an 8-hour working shift in a sitting position. The results showed that 48.8% of the participants did not feel comfortable with their workstations and 73.6% felt exhausted during the workday.*
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> *Additionally, 6.3% suffered from hypertension, and 11.2% of them reported hyperlipidemia. The results of the NMQ [Nordic Musculoskeletal Questionnaire] showed that neck (53.5%), lower back (53.2%) and shoulder (51.6%) symptoms were the most prevalent problem among office workers ...*
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> *Our results indicated that long sitting times were associated with exhaustion during the working day, decreased job satisfaction, hypertension, and musculoskeletal disorder symptoms in the shoulders, lower back, thighs, and knees of office workers."*

Moderate Physical Activity Cannot Be Overdone

In November 2023 I **interviewed Dr. James O'Keefe**, a cardiologist with the Mid-America Heart Institute at St. Louis Hospital in Kansas City, about exercise dosing. He completed his cardiology training at Mayo Clinic.

He and three other coauthors published a meta-analysis in the March-April 2023 issue of Missouri Medicine,[13] the journal of the Missouri State Medical Association, which has profound implications. I view this study as a landmark that radically changed my views on exercise. Three key take-homes came out of this research:

1. **Too much vigorous exercise backfires —** If you're sedentary and begin to exercise, you get a dose-dependent decrease in mortality, diabetes, depression, high blood pressure, coronary disease, osteoporosis, sarcopenia, falls and more. However, beyond 75 minutes per week, you start losing those benefits. Beyond four hours a week, you not only gain nothing in terms of health benefits, you also radically raise your risk of heart problems.

2. **You cannot overdo moderate exercise —** In the case of moderate exercise, however — loosely defined as exercising to the point where you're slightly winded but can carry on a conversation — it's very clear that more IS better and cannot be overdone.

   Perhaps even more surprising, moderate exercise also improves all-cause survival better than vigorous exercise — about two times better. Examples of moderate physical activity include gardening, housework, yoga and walking, just to name a few.

3. **Overdoing strength training is worse than doing nothing at all —** The benefits of strength training maxes out at 40 to 60 minutes a week. Beyond that, you're losing benefit, and once you get to 130 to 140 minutes of strength training per week, you actually end up with WORSE long-term survival than people who don't strength train!

   So, 20 minutes twice a week on non-consecutive days, or 40 minutes once a week is the sweet spot. You also don't want your exercise regimen to center around strength training. It should be an add-on, as you get far greater benefits simply from walking, or any other moderate exercise.

What all of this means in practical terms is that there's no need to engage in high-intensity strenuous exercise beyond 75 minutes per week, or strength training beyond 40 minutes a week. Doing so can be highly counterproductive.

Instead, focus on mild to moderate physical activities, things that keep your body in motion without placing much strain or stress on it. Walking is perhaps the best activity you can do. It's about 2,000 steps per mile, and every 1,000 steps you get on average per day reduces your mortality by 10% to 15%.

And, again, while benefits begin to plateau around 12,000 steps, they do not decrease and become counterproductive, as what happens when you're doing too much high-intensity exercise.

For a Healthier Life, Give Up Your Chair

The evidence is overwhelming at this point that prolonged sitting will reduce your lifespan by promoting chronic disease. At bare minimum, avoid sitting for more than 50 minutes out of every hour. Ideally, you'd want to limit sitting as much as possible. As mentioned earlier, people who live in agrarian communities sit an average of just three hours a day, which would be an admirable goal.

I also recommend challenging yourself to walk as much as possible each day. If you have to choose between going to the gym to work out and simply walking more, walking may be the better choice. That said, if you want to really reap maximum benefits, add in 75 minutes of high-intensity exercise and 40 minutes of strength training per week as well.

Sources and References

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