Sit-to-Stand: How to Exercise with a Sedentary Job

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Some statistics on sitting . . .

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- The time a person spends sitting each day produces detrimental effects that ***outweigh the benefits reaped from exercise.***
- Sitting for more than 8 hours a day is associated with a 90% increased risk of type 2 diabetes.
- Those who sit the most have a 147% increased risk of cardiovascular events compared to those who sit the least; all-cause mortality is increased by 50%.

Some statistics on sitting . . .

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- Sitting increases cancer rates:
  - lung cancer: 54%
  - uterine cancer: 66%
  - colon cancer: 30%.

- Research shows that maintaining a regular fitness regimen ***cannot*** counteract the accumulated ill effects of sitting 8 to 12 hours a day in between bouts of exercise.

Some statistics on sitting . . .

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- 1 in 4 white US adults spend about 70% of their waking hours sitting, 30% in light activities, and little or no time in exercise.

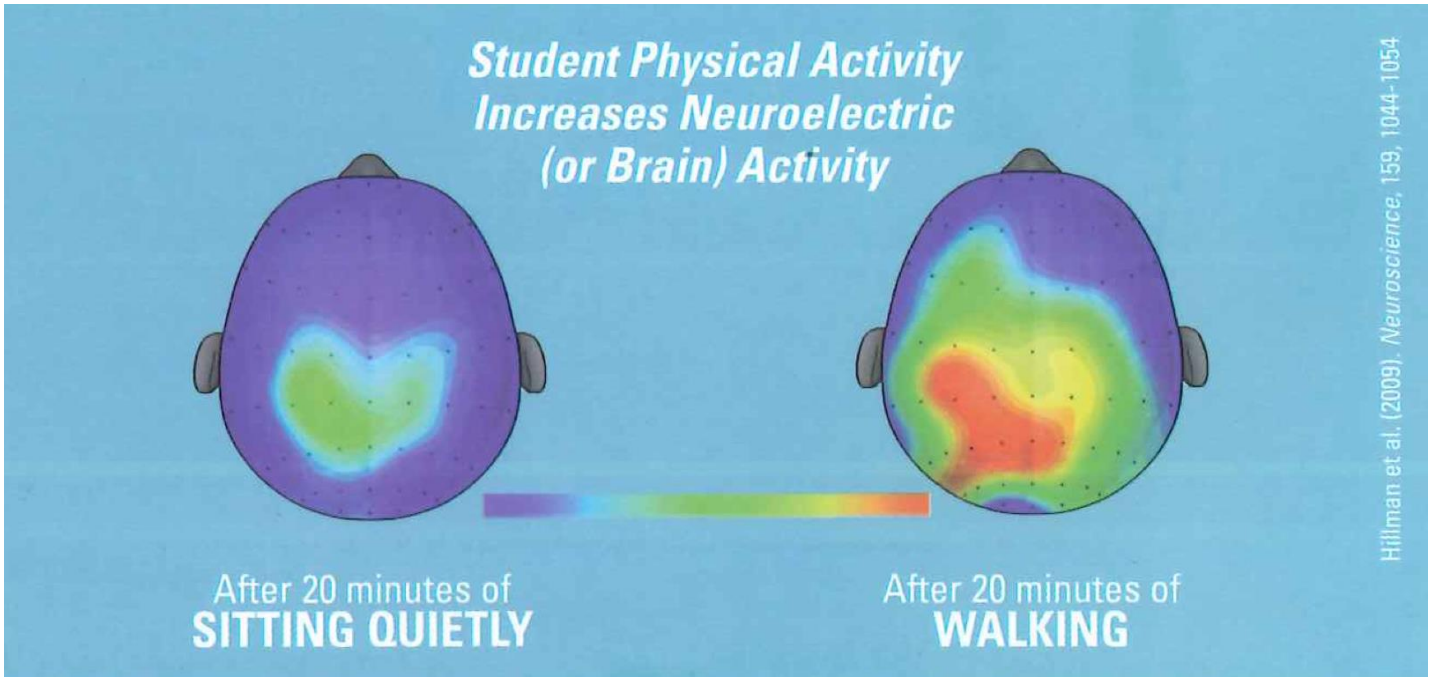
- Ways to break up prolonged sitting with short bouts of light activity:
  - walking down the hall to speak with coworkers instead of emailing
  - extending walking distance during trips to the break room or bathroom
  - standing or pacing when on the phone

Some statistics on sitting . . .

https://www.washingtonpost.com/news/wonk/wp/2015/06/02/medical-researchers-have-figured-out-how-much-time-is-okay-to-spend-sitting-each-day/?utm_term=.5522ae7175df
http://health.usnews.com/health-news/articles/2012/05/02/are-you-sitting-yourself-to-death

- The average office worker sits for about 10 hours daily
  - Computer use
  - Making calls
  - Eating lunch
  - TV
  - Computer or tablet use at home
- Experts now say you should start standing up at work for at least 2 hours a day -- and work your way toward 4.
- Average American sits for about 8 hours a day.

Brain Activity Changes With Sitting . . .



Effects of sitting on physiology https://www.washingtonpost.com/news/wonk/wp/2015/06/02/medical-researchers-have-figured-out-how-much-time-is-okay-to-spend-sitting-each-day/?utm_term=.5522ae7175df

- After 30 minutes of sitting:
  - Metabolism slows down 90%
  - Enzymes that move the bad fat from your arteries to your muscles, where it can get burned off, slow down.
  - Muscles in your lower body are turned off.

- After two hours, good cholesterol drops 20%.

Effects of sitting on physiology

- Skeletal muscle lipoprotein lipase (LPL) production is suppressed.
  - LPL = enzyme necessary for breaking down blood fats (triglycerides) in the body.
  - LPL suppression leads to elevated blood fat levels.
- The breaking down and use of glucose (blood sugar) is reduced, which elevates blood glucose levels.

Effects of movement on physiology

- Increases muscle and joint mobility
- Improves circulation
- Relieves stress and tension
- Improves mood and energy

Effects of movement on physiology

fitness.mercola.com/**sit**es/fitness/archive/.../effects-prolonged-**sitting**.aspx

- Within 90 seconds of standing up, 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 own bodyweight. These cellular mechanisms are also responsible for pushing fuel into your cells and, if done regularly, will radically decrease your risk of diabetes and obesity. ***In short, at the molecular level, your body was designed to be active and on the move all day long.***

Effects of movement on physiology

- Standing
  - During standing, postural muscles are continually contracting in order to keep the body upright and prevent loss of balance.
  - Frequent contractions in these large muscle groups are largely absent while sedentary.

Effects of movement on physiology

- Walking
  - At a rate of 15 minutes per mile (about 4 mph), a 185-pound person burns 67 calories walking for 10 minutes and a 125-pound person burns 45 calories. (http://www.livestrong.com/article/414178-how-many-calories-will-i-burn-walking-briskly-for-30-minutes-a-day-7-days-a-week/)
  - Increases HR, breathing rate, blood glucose use, circulation, oxygen consumption.

Cumulative effect of short bouts of exercise throughout the day

- Three bouts of 10 minutes of exercise actually regulate blood glucose and cholesterol better than one bout of 30 minutes when the rest of the day is spent sitting.
- Cardiovascular benefits of three 10-minute bouts of aerobic exercise (including brisk walking) are equivalent to one 30-minute bout of the same exercise.

Standing while working

- A study of nearly 17,000 Canadian adults found that those who reported the most time standing had a 33% lower risk of dying from any cause over 12 years compared to those who stood the least.

Standing while working

- Calorie burn difference between sitting and standing is negligible (about 174 calories more standing vs. sitting), however it encourages moving around more.

- Additionally, activating the physiological processes that occur during standing are important for cell, tissue, organ, and system metabolism.

Standing while working

- Non-exercise activity is crucial throughout the day—keeps the body in a fat-burning metabolic mode.
- Improves cholesterol, blood sugar, and blood pressure.
- Improves cognitive performance.

Compliance

Cooley D, Pedersen S. A Pilot of increasing nonpurposeful movement breaks at work as a means of reducing prolonged sitting. *Journal of Environmental and Public Health* .2013; 2013: 8 pages.

- Participants in the first 13 weeks received a passive prompt every 45 minutes on their computer screen reminding them to stand and engage in non-purposeful activity throughout their workday.
- After 13 weeks, the prompt was disabled. Participants were then free to voluntarily engage the software.
- Results demonstrated that when employees were exposed to a passive prompt, as opposed to an active prompt, they were ***5x*** *more likely* to fully adhere to completing a movement break every hour of the workday.

Recommendations

- Sit for no more than 20 minutes at a time.
- Stand in one position for no more than 8 minutes.
- Take a 2-minute moving break at least twice an hour to stretch or walk around.
- Set a timer/prompt on your phone or computer to help with adherence to these guidelines.

Recommendations

- Walk down the hall to speak with a coworker instead of calling or emailing.
- Have walking meetings instead of sitting at a desk or table.
- Utilize a stand up work station, if possible.
- Utilize a treadmill or bicycle work station, if possible.

Recommendations

- Go for walks during breaks.
- Take the stairs instead of the elevator in your building.
- Park farther away from your building.
- Short bouts of exercise throughout the day.

Exercises to do at your desk

- Stretching--calves

Exercises to do at your desk

- Stretching--quads

Exercises to do at your desk

- Stretching--hamstrings

Exercises to do at your desk

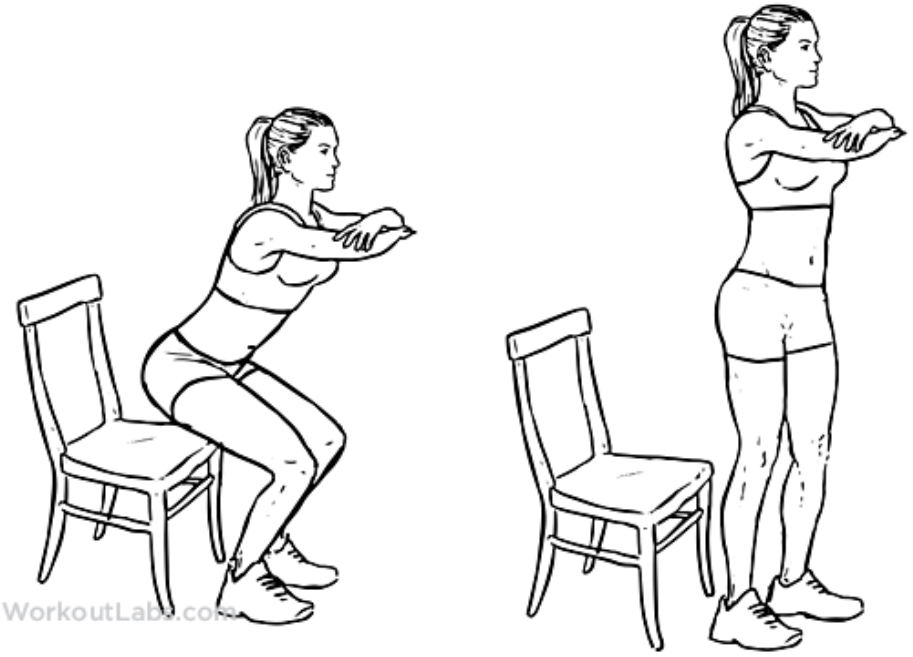
- Stretching—neck muscles

Exercises to do at your desk

- Stretching—
  pectoral muscles

Exercises to do at your desk

- Squats

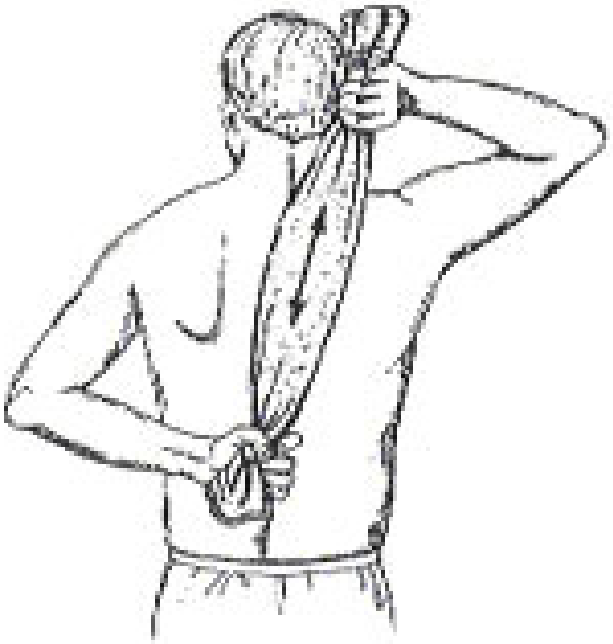


Exercises to do at your desk

- Heel raises
  - Double leg
  - Single leg

Exercises to do at your desk

- Shoulder mobility



Exercises to do at your desk

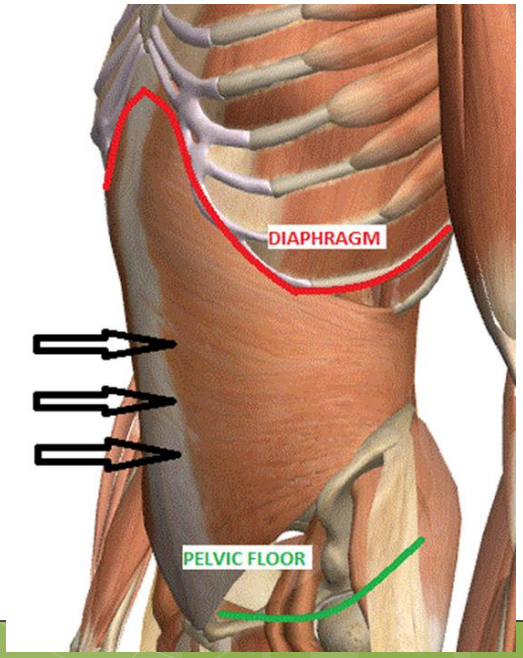
- Shoulder mobility

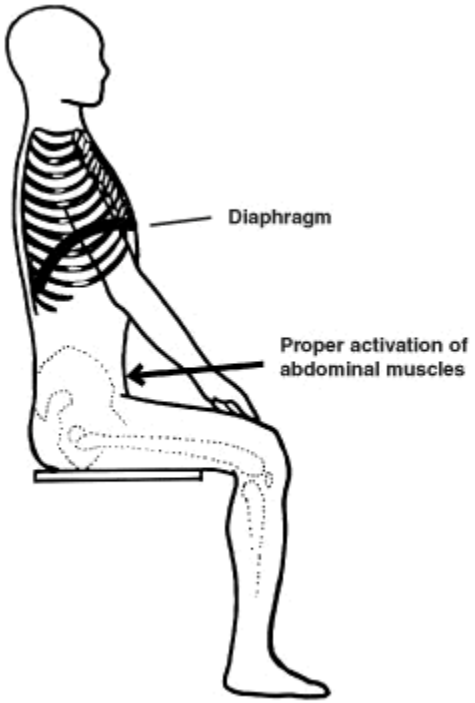
Exercises to do at your desk

- Posture

Exercises to do at your desk

- Transversus Abdominis activation





Exercises to do at your desk

- Deep breathing

Exercises to do during your lunch break

- Walking
  - 20-30 minutes out of a 60-minute lunch break
  - 10 minutes out of a 30-minute lunch break
- Stair climbing
  - Combine 10 minutes of stair climbing with 10 minutes of brisk walking

References

- Buckley JP, Mellor DD, Morris M, Joseph F. Standing-based office work shows encouraging signs of attenuating post-prandial glycaemic excursion. *Occup Environ Med.* 2014 Feb;71(2):109-11.
- Cooley D, Pedersen S. A pilot study of increasing nonpurposeful movement breaks at work as a means of reducing prolonged sitting. *J Environ Public Health.* 2013;2013:128376.
- Mullane SL, Buman MP, Zeigler ZS, Crespo NC, Gaesser GA. Acute effects on cognitive performance following bouts of standing and light-intensity physical activity in a simulated workplace environment. J Sci Med Sport. 2016; S1440-2440(16)30215-8.
- Kotz D. Sitting at work is bad, but is standing actually better? *Boston Globe*. 2014.
- Hitchcock H. Why do you stretch after sleeping? *LIVESTRONG.COM*. 2013.
- Miyashita M, Burns SF, Stensel DJ. An update on accumulating exercise and postprandial lipaemia: translating theory into practice. *J Prev Med Public Health* 2013;46:S3-S11.
- Koster A, Caserotti P, Patel KV, Matthews CE, Berrigan D, Van Domelen DR, Brychta RJ, Chen KY, Harris TB. Association of sedentary time with mortality independent of moderate to vigorous physical activity. *PLoS ONE*. 2012; 7(6); e37696.
- Healy G, Lawler S, Thorp A, Neuhaus M, Robson E, Owen N. Reducing prolonged sitting in the workplace (An evidence review: full report). Melbourne, Australia: Victorian Health Promotion Foundation; 2012. h ttps.
- Eguchi M[1], Ohta M, Yamato H. The effects of single long and accumulated short bouts of exercise on cardiovascular risk s in male Japanese workers: a randomized controlled study. *Ind Health.* 2013;51(6):563-71.
- Hamilton MT, Healy GN, Dunstan DW, Zderic TW, Owen N.Too Little Exercise and Too Much Sitting: Inactivity Physiology and the Need for New Recommendations on Sedentary Behavior. Curr Cardiovasc Risk Rep. 2008;2(4):292-298.