We sit to commute. Sit at our computers. Sit at meetings. Relax…by sitting at home. In North America, most adults sit for about 9.3 hours. And that’s bad news for our health.

When we sit for long periods, circulation is constricted. Metabolism slows. Muscles shut off; connective tissue tightens.

Our brain hungers for blood and nutrients that are barely slugging through our system.

Our body engine is set to “idle”, neutral, or even worse — switched off.

Sitting too much makes us unhealthier, unfitter, more metabolically broken — possibly even dumber.

*Ha, you think. I work out. I’m safe.*

Think again.

If you work out for an hour a day, but sit for the remainder, that one hour doesn’t do much to counter 9+ hours of butt-in-chair.

(Just like running an hour doesn’t give you a free pass to smoke.)
Bottom line: **There is nothing good about prolonged, chronic sitting.**

So what can you do?

Well, throughout the health and ergonomic world, experts have proposed:

- Sitting on an exercise ball rather than a chair.
- Working at a standing desk rather than sitting.
- Using a treadmill while working at a standing desk.
- Breaking up sitting with movement at regular intervals.

These all sound good.

But do any of them actually make a difference?

Let's take a look.

**The quest for a better chair**

The biggest problem with sitting down all day: It’s uncomfortable.


(In fact, the prolonged contact between femur and patella that can cause chronic knee pain is often called “moviegoer’s knee”.)

If we’re at a computer, we slouch. Lean in further towards the screen. Round our shoulders forward. Crane our necks. Squint. Tense our facial muscles.

And like the loyal suspension bridges they are, our backs try to compensate valiantly.

In as little as an hour of sitting, our backs can measurably stiffen.

(Men suffer slightly more than women, who are typically a bit more flexible.)

Not surprisingly, designers have tried to build a better chair. And over the last decade, researchers have compared the various options.
BALLS VS. CHAIRS

One common alternative to the standard office chair is the exercise ball.

The theory behind the exercise-ball-chair is that the unstable surface will keep the back muscles working.

This is assumed to be a Good Thing.

Turns out, not so much.

First of all, studies show that spinal compression and muscular activation is pretty much identical whether using a chair or using a ball as a seat.

Indeed, the greater contact area of the ball compared to a chair might encourage more soft tissue compression, which can mean more discomfort, soreness, and numbness.

Related work looking at muscle activation in the rest of the body found that subjects moved their trunks more on the ball than chair, yet they also
experienced more “spinal shrinkage” (discs being compressed) and more trapezius activation (upper back and neck stiffening).

These drawbacks may outweigh any potential benefits.

**DYNAMIC CHAIRS VS. STANDARD CHAIRS**

So the exercise ball may not be such a great idea. But balls aren’t the only kind of dynamic chairs on the market.

For instance, some office chairs allow the seat pan to move as the back tilts. How do these stack up?

In looking at three of these kinds of chairs compared with a typical static office chair, one study showed that the real issue doesn’t seem to be how the chair affects muscle activation, but rather, how different kinds of tasks affect activation.

In other words, the sliding seat pan doesn’t make a whole lot of difference.

**KNEELING CHAIRS**

OK, how about those funky-looking kneeling chairs?

There’s not a lot of research on this type of chair.

One paper considered what type of chair maintains a “proper” lumbar curve. Unfortunately, the study only looked at posture comparisons between standing and sitting using a chair or a kneeling chair.

No tasks were assessed; no muscle activation checked, no spinal shrinkage measured. So in the end, it doesn't really tell us much.

Another study looked at self-induced movements in kneeling vs. regular chairs. It showed that on the kneeling chair, the lower body is “turned off” when prepping for movements, which may actually reduce balance and function.
THE BOTTOM LINE FOR YOUR BOTTOM AND BACK: TASK AWARENESS

The best option: When you have to sit, sit on something that:

- reduces pressure on the body;
- reduces points of contact with soft tissue;
- reduces tension; and
- reduces the stress of tasks like typing or writing (or reading or filing or phoning).

But that’s not a perfect solution.

No matter we’re sitting in or on, within a short time the negative effects of sitting are going to bite us in the bum.

Balls and kneelers don’t seem to be better. In fact, in some ways they might be worse than well-designed chairs.

But even with well-designed chairs, our bodies have different needs with different tasks. We need to respond effectively to those tasks.

We’ll come back to that shortly.

From musculoskeletal to metabolic

So when it comes to muscle activation, spinal shape and spinal compression, all chairs are pretty much equal, with small tradeoffs between them.

But how does sitting affect metabolism?

Key point: “Uninterrupted sedentary time” is strongly associated with “cardio-metabolic and inflammatory risk biomarkers” — regardless of age, gender or ethnicity.
In other words, **sitting sucks. For everyone.**

And if **we sat less, we would be leaner, healthier people.**

**SITTING: AS BAD AS SMOKING?**

Indeed, a study that looked at 105 full-time office workers showed that those who sat longer were about three times as likely to have a waist circumference larger than 94cm (37 inches) for men or 80cm (31 inches) for women.

Waist circumference, as you probably know, is strongly associated with cardio-metabolic risk.

These same workers were also nine times more likely to have a BMI greater than 30, which in technical terms would make them obese.

Meanwhile, another study showed that each additional hour of sitting led to larger waist circumferences, as well as higher insulin and lower HDL cholesterol. Not good.

In fact, the evidence against prolonged sitting is so strong that one paper asks if chronic sitting, in itself, ought to be considered a “distinct coronary heart disease risk factor”.

That’s putting prolonged sitting in the same category as smoking.

Given these correlations, the comparison may not be surprising.
Stand up!

If sitting sucks regardless of the throne we choose, is standing any better?

One study suggests that computer users who spend as little as one hour a day on their feet at work have less back pain.

Interestingly, data entry speed went down when standing, but not by a lot.

By the way, these tests were performed with people who had not practiced standing desk work. With practice, they’d probably get better at it.

So, when it comes to aches and pains, standing may be a good alternative to sitting.

But will people actually use the option to stand if it’s available?

It appears they will.
A Swedish call center with over one hundred employees adopted sit-stand desks and found that people stood more and sat less.

A recently reported Australian study explored the same issue. With electronically or manually adjustable sit-stand desks available, sitting time at work went from 85% at start to 60% by the time the study ended.

Interestingly, participants were motivated to give the desks a try, either because of their own “dodgy backs” or because they’d heard they could burn more calories standing up.

Other studies have looked at the effects of sit-stand desks on metabolic markers of health and disease, and found that short bouts of light to moderate intensity walking lowered post-meal glucose and insulin levels in overweight and obese adults.

Granted, these studies considered movement vs. sitting rather than standing vs. sitting. But standing, it turns out, can be a pretty good substitute for and complement to movement.

Whether standing or walking, what’s most important is *reducing overall sitting time*.

By the way, those Australian office workers were right. Standing burns about 1.36 Kcals per minute more than sitting. That’s more than sixty calories an hour. Multiplied by eight (the hours in a typical work day) and you’re talking about 500 calories or more a day.

Big difference. If you’re looking to lose weight or simply stay lean, get out of your chair ASAP.

**WHAT ABOUT WALKING DESKS?**

If standing is good, and walking is good, what about combining them in a walking desk?
Great idea. Standing takes more energy than sitting. And walking takes more energy than standing.

It sounds like a slam-dunk. Walk all day at work, lose weight, reduce musculoskeletal pain, and improve metabolic function. Bingo!

But hang on. Is anyone actually able to get any work done with these walking desks?

After all, there's a reason that most of us sit on the job. Our work requires sustained attention to detail, analytical focus, creativity, innovation, or discovery.

Is any of that possible with a moving desk?

Sit down and think it over
In other words, before we all get carried away and sink our hard-earned dollars into standing or walking desks in an effort to save our backs or to boost our metabolism, we also need to consider another critical variable: cognitive performance.

Humans do tend to do finer work sitting down, and this has been true for thousands of years. It’s hard to imagine the creators of cuneiform tablets breezily jotting down their little notches in clay while at a brisk trot.

So if we’re doing some heavy-duty thinking, reading, or writing, is it better to sit?

It appears so.

In our own research, we looked at whether people perform better cognitively when seated or when standing. We wanted to understand whether the indisputable metabolic benefits of standing might also apply to the cognitive realm.

Alas, the answer appears to be no.

On the positive side, there was little statistical difference in cognitive performance between standing and sitting. In other words, if you feel better standing rather than sitting, it won’t hurt your brain power a whole lot if you decide to stand.

However, there was one important exception.

**Those who need to multi-task do better when they are seated.**

To that end, we’d now like to test a responsive sit-stand desk, one that could detect multitasking and gently descend to help people achieve a better position for this work. But this research remains in the future.
As for the walking desk, it seems those metabolic benefits come with a cognitive cost, and the cost goes up as the level of mental challenge increases.

In other words, the tougher the task, the more mistakes you'll make if you’re trying to perform it on a walking desk.

This result is not entirely surprising.

Work on walking and task performance consistently shows that participants slow down and finally halt – sitting down to work out problems as the challenge increases.

**NOT SO FAST: MOVEMENT AND COGNITIVE PERFORMANCE**

So, in the interests of working smart, should you just forget about the walking desk and go back to slumping over your screen? Not so fast.

Because even if walking desks can interfere with task performance on the job, movement itself is hugely beneficial to overall cognitive function.

Cognitive research shows that people who are regularly active perform better throughout their lives than their peers who don’t.

And it’s never too late to start a movement practice. More and more studies are demonstrating that even short spurts of exercise (say, 20 minutes long) improve cognitive performance immediately afterwards in people of all ages.

In other words, exercise first, then go be smart, rather than trying to walk and solve equations at the same time.

**I CAN SEE CLEARLY NOW – OR NOT?**

Movement is also critical for another part of our well-being: vision.

For most of us, vision is the primary way we experience the world.
Unfortunately, myopia (or nearsightedness) has been increasing globally. While there is some debate about the causes, lower visual acuity seems connected to more screen time.

Screen work focuses our eye muscles in a particular position for long periods, while preventing them from focusing at other distances, as they are designed to do.

In other words, myopia may be a kind of repetitive strain injury of the eyes.

When we don’t see well, we don’t perform well.

These cognitive and physical effects have been studied extensively in sports. We’re just starting to apply that research to the realm of knowledge work.

Just as movement throughout our day can aid in clearer thinking and reduce the strain on our musculoskeletal and metabolic systems, it might also reduce visual strain inherent in seated, static-posture computer work.

**IT’S NOT ABOUT THE CHAIR**

Fundamentally, research on physical well-being and cognitive performance all comes back to this:

**Movement is good for us — for everything about us. And lack of movement leads to disease.**

Sitting all day is just bad for us as human beings.

A ball chair, or a better chair, or a stand-up desk are all better than nothing. But let’s push this a step further. Let’s look for different ways of working that will let us perform at our best.

Let’s move more often throughout our days. Let the juices flow. And then, sit (briefly) when it suits us — perhaps for contemplation, or deep concentration.

Get creative
If you’re a seated worker reading this, don’t get discouraged. Get imaginative and strategic.

Think: How can I make this task more active?

Look for options and small, simple changes. You probably have more possibilities than you realize.

Sneak what Frank Forencish of Exuberant Animal calls a “movement snack.”

- **Go on errands.** Use the bathroom one floor up. Pop over to another building to get something or meet someone.

- **Brainstorm or plan standing up.** Use a whiteboard or a flipchart instead of a pen and paper. Or spread some sheets of paper out on the floor and squat down to organize them.

- **Sit when it’s best to sit. Move when it’s best to move.** Figure out how to make rote tasks more active, and how to make intensely cognitive tasks more focused.

- **Experiment to find out what works for you, and remember that combining movement with work improves with practice.** Don’t leap on your treadmill desk at 4 mph and try to knock out your PhD thesis. Try just standing up for a little while first.

- **Take regular movement breaks.** Set a timer. Every hour, stand up, stretch, walk around for a few minutes.

- Allude vaguely to a smoking habit or back injury, and get your coworkers accustomed to you popping out for some fresh air, or standing up in meetings (you can easily lean unobtrusively against a wall).

- **Have walking meetings.** Outside if possible. Your coworkers will probably appreciate the break too.
• **Walk and talk.** When you take a phone call, stand up or go for a stroll. Try a dictation app on your smartphone for jotting down notes. Many apps will even transcribe your speech. Basic accessibility features on most computers and smartphones will read your screen to you. Why not listen to your email while out for a brisk constitutional?

• **Ask for better.** Many workplaces offer options for healthier work… but employees don’t ask for them. Start asking. Employers understand cost cutting, and healthier employees definitely save money. A few hundred dollars on a treadmill desk could save thousands in physio costs later.

**Bottom line**

Improving ergonomics with better chairs or workstations is a great start, and an easy way to make a small, immediate, manageable change.

But simply adapting ourselves to how we think “work should get done” isn’t enough.

We need to go further, for our own health. For optimal human performance along with creativity, innovation, and quality of life, we need to adapt the environment to our actual needs.

Humans *need* to move. So let’s get going.
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