

Get Up! Why Your Chair Is Killing You and What You Can Do About It: A Special Interview with Dr. James Levine

By Dr. Joseph Mercola

DM: Dr. Joseph Mercola

JL: Dr. James Levine

DM: Is it possible to be incredibly fit yet still be at high risk of premature death and disability because of inactivity? Hi, this is Dr. Mercola, helping you take control of your health. Today we are joined by Dr. James Levine, who has written the book *Get Up!: Why Your Chair Is Killing You and What You Can Do About It*. He's also co-director of the Mayo Clinic and Arizona State University Obesity Initiative and the inventor of the treadmill desk. I am very delighted and honored to have you with us here today, Dr. Levine.

JL: It's such a pleasure. Thank you for inviting me.

DM: Well, your book is quite an interesting read. It reminded me of the similar paths that I went through in my journey in helping people understand new paradigms of health. It's doesn't necessarily have to be health. It's like any new, novel concept has this resistance from the existing paradigm to change, accept, and embrace it. It's a phenomenal story. Why don't you start by sharing that? Because I was really excited to see that there were other people that were going through the same type of criticism.

JL: I don't know if this is equally true of you. I was originally sort of fascinated by this concept when I was actually a kid. I was a 19-year-old kid. I can't explain why, but I was just intrigued as to why things moved and why animals live in a certain way.

In particular, I got focused in on snails. After investigating snails in my bedroom every single night for about two years and falling asleep subsequently in class (I don't recommend this for your viewers), I was called in by the head of the school to ask, "What on Earth is going on here?" I brought with me, as I went to the principal, these several hundred tracings of snail movements. I was very lucky not to be expelled from the school. He totally got it. He understood that there was somebody here, who for some bizarre reason – and we all have our callings in life – has a calling.

Fast forward, if you like, 20 to 30 years later, I stood up in front of a very prestigious scientific organization and explained that because we've become so used to being seated that for generations now, we've failed to realize that this is a major health concern. I proposed data that were at that point in time, irrefutable. The people who were prone to gain weight and developed obesity were those individuals who predisposed to be seated for two and a quarter hours extra a day than those people who are going to the gym and who happen to be lean.

As this happened, a very well-known professor stood up, ironically, in the middle of the audience and shouted, literally shouted, "This is just nonsense! How can a scientist with all of this data suggest even that sitting, which all of us do all of the time (and everyone laughed, of course), is so harmful?" Subsequently to that, I literally had emails sent to senior faculty at the Mayo Clinic, suggesting that I was

actually psychiatrically ill. And I'm not joking, I'm being serious. As I look back on this, it's sort of, you know, if you like, now 10,000 publications have shown that indeed this is all true.

But I will tell you – and I don't know if you will relate to this, too. But when your world is that of the intellect, of the mind, and of science, when your senior colleagues have you sent to a psychiatrist because they think you're insane, that really does make you pause. That makes you wonder first of all, is this all worth it? Is this mandate of wanting to bring health to hundreds of thousands of millions of people, is it worth the personal toll? Is it worth going to the point where you're so questioned that you sort of wonder whether you can actually exist in the circle of normal world at all? It pushed me back. It pushed me back a lot. But then at the end of the day, you know what it is.

Your kids... One of my... I've got two daughters. My youngest daughter actually came to the lab and said, "Dad, this stuff is so cool. My teacher keeps telling me to stop fidgeting, right? I mean, you guys, you know. What you're doing in the lab could be right." That was kind of the moment where I realized that you got to put the rubbish aside and you got to put the silliness of people's egotistical need to suppress other people away. You got to say, "What is right for the patient? What is right for the next generation? What is right for the kids of my kids?" Once I actually woke up to that, the rest is history.

I just said, "We got to get on and do this. We got to get America, we got to get the world up." We can actually help people with their weight, their diabetes, and their blood pressure. We can actually help millions of people with a very simple mission.

DM: Yes, indeed. Congratulations for that perseverance. Has there been a change or a shift in the attitude of your colleagues at the Mayo Clinic and actually in your professional discipline? Have they modified their views towards you? Or do they still want to send you to a psychiatrist?

JL: I think an interesting observation is that it was the outside world who thought all of this was ridiculous and all of this was just sort of an insane use of resources and so on. Interestingly, my senior advisers at Mayo Clinic, they were the ones who said, "Jim, forget what other people say. If your data substantiate a need to do something in society, your obligation is to put the patient first and you need to go forward." The wall at the Mayo Clinic has supported me every single step of the way.

It is really those external forces that have been those who have had to now relinquish that egotistical position and say, "Look, there is something important going on. There is something you can all contribute to. As a scientific and a health community, we need to get people up and reverse this sedentariness." Yes, the naysayers have all vanished. The naysayers have evaporated. I'm not one of these people who need to stab the knife back. I mean, that's just not who I am. But I have to tell you – and again I think this speaks volumes to the credit of some of my external colleagues – now several of them are actually collaborators.

We don't need to turn around and say, "Oh, I was right." That's not the issue. What is important here is that sedentariness is affecting the health of millions of Americans and millions of people in high- and middle-income countries around the world. This, unlike other things, is something we can do something about. This is something we must act upon. We can stand up and we can do something. That is what's important.

DM: Yeah, I couldn't agree more. But what initially shocked me when I first heard about this was I've been active my whole life pretty much. I embraced exercise at a very early age and I've never stopped. That's what I found particularly and profoundly just non-intuitive, that someone who could be really physically fit yet sitting down most of the day could be highly counterproductive. It's just not a rational intuitive conclusion. I'm wondering how you reconciled that, what your epiphany was, and how you understood that this was an issue.

JL: This is a very important point. My first comment to you is congratulations. The fact that you're a physician... There are many unhealthy physicians. There are many unhealthy health [practitioners]. Congratulations to you. You, throughout your entire adult life, have done this and you should at least keep going.

There are two important responses to your question, however. The first is a simple one. The first is that my core cause is not actually the person in the Lycra spandex, somebody as [inaudible 08:57] as yourself, or the person with a thousand-dollar bicycle with gym memberships. Those individuals are not my core cause honestly.

My core cause is the patient who sits in front of me, who has been battling with obesity, who has been battling with being overweight and type 2 diabetes, and who doesn't go to the gym for various reasons: a) they may not be able to afford it; b) they may not actually have access; c) they may have three jobs and do not have the time. And fourth on this, as you will be well aware as common is that many people who have excess weight feel looked upon badly and have bad feelings about themselves when they enter the hallowed territory of the gymnasium. The 75 percent of Americans – more in fact – who do not exercise regularly are in fact my core cause. [That's] answer one.

I was actually quite upset, As I'm sure you'll come to realize in a short time, I take all of this quite personally. I take the work the team does passionately. I was genuinely upset when the data started coming out first from the USA, then from the United Kingdom, and now from other places like Australia as well that suggest that those people who amazingly and impressively in modern society do get to the gym, let's say, in the evening or whatever it may be, are not protected from the ill effects of excess sitting or excess sedentariness.

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Now, it upsets me because often in our prognosis, we're encouraging people to be more active. They graduate to the gym. I laughed to this. If people love going to the gym, fantastic! [It's] a great place to meet people, a great place for people to socialize, a great place to take your kids, a great place for kids to take their parents. It's a great place for everybody. I was, you know.

Isn't that awful that people in the evening they make that effort yet it still isn't enough? There are a couple of important points. First of all, if you go to the gym, that does do you good. In fact, that is a phenomenal dose-response relationship. The more you do, the more benefit you get. That does not, however, relinquish you from the responsibility of being active throughout the day or of realizing the opportunities to be active throughout the day.

What is interesting is that the molecular mechanisms that come into play when somebody sits for hours on end, if you think about it, are actually not reversed by allowing all of that sedentariness to occur and then having a bout of activity in the evening or even in the morning. It's the hours of inactivity that are associated with the molecular mechanisms at the cellular level that are associated with causality for diabetes, hypertension, and even potentially cancer and other deleterious effects.

DM: Have you elaborated on some of those mechanisms? I've also interviewed Dr. Joan Vernikos, who I suspect you know as a colleague, who work with National Aeronautics and Space Administration (NASA) scientists, and who actually was the NASA scientist responsible for monitoring the astronauts' health. [She] basically recognized the harmful impacts of microgravity on the astronauts and the similarities between that and sitting. She concluded, as you did, that simply standing up is the solution. If you can expand on that process and what occurs when you stand up. It doesn't really need to be much more than that. It's just this continuous position, in a sitting position that is so deleterious.

JL: Right. The way I would frame it would be as follows: what is the simple connector, what is the single bridge that connects getting up with the reversal with all these awful [diseases]? And now there are 24 different chronic diseases and conditions associated with excess sitting. How do we understand the bridge between something so simple and such a massive expanse of ill health consequence?

The story is actually just as simple as the concept for a bridge. The story is interestingly just as simple as well. When somebody has sat for a long period of time and then they get up, what is the fundamental physiological process that occurs? Well, having been to medical school, I can attest to the following: if you ever had to support a friend who sort of blacked out from excess alcohol at a party or something, or you've actually helped carry a friend who is horribly drunk, you will know how heavy that person is.

I mean, the weight of the human body is enormously heavy. When you get somebody off their bottom and onto their legs, they are actually weight-bearing. They are carrying their entire bodyweight. Now, the musculature that supports that is actually substantial in size. It is the thigh, the buttocks, the abdomen, the back, even the shoulder and the arms because, of course, you carry your shoulder and arms differently to being slouched over on a desk, right? Now, that's obvious if you like.

Associated with that interestingly is the metabolic data that show, of course, that the calorie burned similarly starts to increase the moment you get off your bottom, in fact within 60 to 90 seconds. Again you should see it on the machines that we use, the calorie meters that we use. Now, at a molecular level, it's actually very, very interesting because within 90 seconds, within a minute and a half of getting off your bottom, the muscular and cellular systems that process blood sugar, triglycerides, and cholesterol system, which are in particular mediated by insulin, are activated.

As soon as you get up, a series of molecular mechanisms at the cell level is all just one thing. It's a whole cascade of activities that impact the cellular functioning of the muscles. The blood sugar handling is beneficially impacted. Therefore, the disease prevention for diabetes comes into play. And it's within 90 seconds. The whole series of molecular effects are activated simply by weight-bearing, by carrying one's bodyweight upon one's legs.

Now, those cellular mechanisms are not just fundamental for handling your blood sugar, cholesterol, and ultimately blood pressure, those cellular mechanisms are also responsible for actually pushing fuels into the cells. It makes perfect sense. If you've been resting after a hard morning's work and then you get back on your legs in order to go back into the fields, of course, your whole body system is to be pushing what you've just had for lunch into your muscle, into your body so that you can function well in agricultural practice, which, what, up until 200 years ago, what the human body was ultimately functioned to do.

The nature of the human body was to be active and moving all of the day. Now, what the body was never designed to do was to be crammed, pushed into a chair where all of these cellular mechanisms get switched off. Obviously we're supposed to rest from time to time. But that rest is supposed to break up the activity. It's not supposed to be the [inaudible 17:25] of living. Crunching the body into this very unnatural posture not only is sort of bad for your back, your wrists, your arms, and your metabolism, but it actually switches off the fundamental fueling systems that integrate what's going on in the bloodstream with what goes on in the muscles and in the tissues.

As a consequence of that, that is why the blood sugar levels are inappropriately high in people who sit. The blood pressure is inappropriately high, the cholesterol handling is inappropriately high, and those toxins, those growth factors that will potentially lead to cancer, particularly breast cancer, are elevated in those people who sit too much. The solution: get up.

DM: Okay. Well, thank you for that explanation. So, there's this cascade of adverse health consequences as a result of sitting down for too long. I'm wondering in your research or your review of the literature if

you've looked at evaluating the minimum effective dose (MED) to stop the sequence. How long do you get up? What do you have to do? And how frequently does it have to be done to counteract the negative effects of a job position that many viewers really have no alternative but to sit and to be in because of their work responsibilities for eight hours or more a day? Or in driving or flying on a plane?

JL: In answering your question, I think what's important before we address what the minimum dosing is let's get a quick reality check. When the studies have been done in people living in natural agriculture environments – and numerous studies are now being done – people in those types of villages where they are naturally moving all day are sitting three hours a day. The average American office workers may be sitting 13 to 15 hours a day. The point I'm making is that differential. The span of opportunity therefore is literally multiple hours, hours upon hours of, if you like, wrongful sitting. It's big.

Now, when you start thinking about what could be the minimum dose that can actually help people, at the back of your mind, please bear in mind that we're not dealing with one of these sort of little issues where, "I need to adjust this just a little bit." No, no, no. We're dealing with some serious stuff here.

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Now, the data that came principally out of Australia and then was recapitulated using continuous glucose monitoring in various labs, also include or demonstrate that if you can break up every hour of sitting with about 10 minutes of activity that will prevent the continuous escalation of glucose that follows the three meals that we have throughout the day. The bottomline would be is that if you've been sitting for an hour, you've been sitting for too long. We should all be up 10 minutes out of every hour. That reflects, I hope, well on your question, because I think your question is profound because we're talking about the minimum effect.

DM: Yes. Maybe 10 minutes an hour. But you have to somewhat practical. It's like every 15 minutes you're up doing something. But it's something as simple as standing up and sitting back down, which will interrupt it. But really you only took a moment, you know, a few seconds. Is it standing up and down? Or should you... During that 10- or 15-minute interval that you decide to interrupt your sitting, what is the minimum movement requirement that's necessary to break up that cascade of adverse health consequences?

JL: That's a fantastic question. You can imagine, when we went into real American offices and said, "We need to be getting people up every hour," we got a dose deficit of... We need to reverse sitting by several hours a day even if you think about the obesity literature at least two and a quarter hours a day more activity throughout the day. You can imagine the corporate leaderships were not only (I wouldn't say) intrigued but were exceedingly speculative and were exceedingly concerned more importantly that their employees are getting up, getting down, getting up getting down, moving around, or whatever it may be. That would impact the quality, quantity, and productivity of work that people were doing.

However, the most important observation of all of those office studies that have been conducted and now public shows the following things: yes, bodyweight improved. Yes, health has improved. But that's not the critical thing. What is critical is that if you actually do by inference of your question get people up during their workday, actually productivity, hardcore productivity – whether that's the number of loads processed in one company, the financial services doubling in profit from another company – those numbers improved. The actual profits improved.

Now, coming directly to your point, the key to this... And again, you might say well it's a very simple idea in a way. But getting people up, getting people down, getting people up... I mean, it's going to be chaotic if all offices are having people up and down like yoyos, right? But that is why on one hand, the

issue and the solution are so simple, because actually the solution is to get people up. But the complexity – hence the book *Get Up!* – is how do you actually build a working solution for a US corporation?

Now, in order to do that what we found by actually doing it, actually seeing these data, getting the results, and actually working in the corporate space with the people primarily and rightly concerned with the company profitability, is we developed 12 layers of deployment.

A simple example: if you have a company, for example, much like my job that involves numerous or should I say innumerable meetings every single day, one of the recommendations for that company would be to have a system in place, whereby walk-and-talk meetings become commonplace. You might say, “Well, that’s a simple idea.” Because of course, if I can convert three of my meetings – and I may have eight in a day – into walk-and-talk meetings, that’s three hours of walking. That’s three hours, over 180 minutes of reversing sedentariness. Fantastic!

Again, unless you have the leadership agree, unless there’s a confidentiality code in that company, unless there is, if you like, a protocol in place for doing this, unless there is clearance from the rest of the company, unless there is a track in lieu of those kind of programs, even as simple as it sounds in concept, it will not work.

Yes, at one level the answer is actually quite simple. But what is more intriguing and what I would describe perhaps as a mixture of art and science is working out how that simple concept of getting people up intermittently throughout their workday is actually manufactured into the workplace of a given specific corporation. Sometimes it isn’t a whole corporation you work with but management units within a corporation. The trick is to build not tricks, not quick solutions, not quick fixes, but sustainable solutions that could be carried on. Our goal is usually two years at a time.

DM: Terrific. It’s a matter of a... I’m still unclear as to what the actual dose. For someone who doesn’t work in a company, say, who stays at home like a sit-home mom or someone who has an occupation such as a cab driver or a limo driver, and they’re forced to sit down all day, is there something they can do in their chair? Or when you’re riding on a plane? Like just contracting your quads for 10 seconds or doing isometrics, is that going to be sufficient to do that? What types of things can one do to address these sort of inevitable restraints that we have on our activity?

JL: These are very good questions. I think I can give you very specific examples. It comes back to the same philosophy. Again, you can take the metric of 10 minutes of every hour as a starting point.

DM: Okay.

JL: That’s 40 minutes every 4-hour block, if you like, or an hour every session. That’s one walk-and-talk meeting before lunch in one example. That’s one walk-and-talk meeting after lunch and perhaps a couple of walks at the beginning and end of the day.

Now, I have specifically in fact worked with truck drivers and in fact created an entire protocol for one of the truck driving organization specifically around your question. Now, you obviously cannot, and it doesn’t fit in with the job description, to even suggest to a professional truck driver that they stop their truck intermittently to do walks. Second of all, it is completely and appropriately forbidden to have any type of activity program recommended to any driver. The primary goal of driving is to focus on driving safety and attention on the road.

Taking the truck driver issue specifically... And again, I have, in this case, one specific person in mind, a client of mine who I worked with. We developed a program that he actually wrote down on a piece of paper with check marks and then photocopied it. It sort of became his mantra. He sort of got quite into this. He actually got somebody else to do it with him.

What he used to do, the way his truck route worked is he used to load up. The loading process at the back of the dock was about an hour and a half. Now, interestingly, he used to “sit and have a cigarette” while that occurred. First of all, he quit smoking. Second of all, he deliberately made the hour and a half, by plotting it out on Google map, a sort of predesigned walking program, into a walk before he started trucking.

I don't know how aware your listeners or your viewers are, but he actually has to take obligatory breaks. What we would do, of course, one has to eat and, of course, there are sleeping breaks at the end of the sort of shift or period of time. He would take all of his breaks and divide them in two. Half was supposed to be gossiping, eating, and chatting and the other half was again this idea of deliberate walking. And then before he took to his bed, because there was actually a bed inside the truck as well, he again built an hour and a half – it was his choice – into the program as well.

Now, on top of that, he did it again. Again, as I said in the book, *Get Up: Why Your Chair Is Killing You and What You Can Do About It*, we described it. We actually have to go through a process of working out these solutions. He built a self-monitoring system – in this case, the charts. He had a buddy, which actually was another truck driver, he did it with. Now, on top of this, he sort of started to self-educate. He took on some really straightforward nutritional things as well. He converted regular soda pop to diet soda pop and then from diet soda pop to water. That was a revolution in his life as well.

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Another example, a separate example, I worked specifically with taxi drivers. There, we actually used the one that... We were actually building devices that can detect car movement, which affects a lot of these devices like Fitbit. We were building devices that would sort of subtract that out. Again, we build specific programs associated with taxi driver shifts. What we did there was.... Again, I don't know how familiar one is with that sort of business. The taxi drivers we're working with are individuals who hold taxi driver licenses and are 12 hours on and 12 hours off. One taxi driver will pick up where the other one leaves off and so on. We actually got these individuals to pair against each other in order to sort of be taxi driver coaches specifically for that type of work.

The point I'm making is that again, on one hand, yes, the problem is simple. But the problem itself is not that simple as these examples illustrate. We do not have (most of us) control over what we do for our jobs. Many of us think we have control over what we do in our evenings or in our off time, but that actually isn't true either. If we have kids around or we have other work obligations, right? We think we have spare time, but often we don't. On one hand, we are tremendously constrained by a series of forces that are external to us.

The solution to that therefore, although the solution is conceptually simple, is to design with a similar intricacy, solutions that individualize a response to the constraints imposed upon us. This idea of creating these individual solutions, of course, that's why you need a whole work about this to explain how to do those steps of getting people up in a way that is specific for them, that is targeted towards their needs, and that ultimately gives them the greatest benefit.

DM: Yeah. That's why I'm seeking an answer to this program, because in order to design that, you have to understand the requirements. In my discussions with Dr. Vernikos on her work and her research, her suggestion was that you needed within a working day, about 32 times to 40 times to interrupt that sitting. You couldn't stand up for 40 times at once.

JL: Right.

DM: It had to be 40 separate intervals interspersed throughout the day. I was trying to understand, in that time those 40 interruptions, if that's something you agree with, how long should that interruption be, what

other types of movements that would be beneficial, range of motion and posture-wise to optimize this interruption interval.

JL: First, let's think about where those data come from. Those data come from the experiments, whereby free-living people are covered in sensors that detect their body postures continuously over their day. When you look at those body posture sensors, you can actually tell when somebody gets up, when somebody sits down, and when somebody converts from sitting to lying, because you can see the change in these body postures. It depends. It's quite variable. But what's surprisingly invariable is that 30 to 50 transitions per day is what the average person makes.

Now, therefore the suggestion of sort of using an additional collection of those transitions is actually quite a nice idea because you're actually making those transitions each day, but many of those transitions are to come and sit down. As opposed to using a transition to come and sit down, one could mindfully use it to come and get up.

DM: Right.

JL: That is appropriate. That is on target. What is the most important concept of all, however, is to understand that yes, it would be fabulous if we all had control over our time 24/7, but the reality is we don't. The solutions unless one is going to have this sort of patriarchal solution, whereby some person imposes as far as the obligation to be up and to be down, to be up and to be down, all the time. We absolutely have to respect the fact that unless you're going... And again, it's great from the ivory tower to suggest utopian ideas. But unless there are practical solutions, we're not going to help anybody, right?

Whether it is in schools or whether it is in offices, what is critical to appreciate is that setting goals of getting up and getting down, getting up and getting down are simply impractical for 90 percent of American workers. What one has to do is understand that infrastructure and build solutions that enable people to be up two to three hours extra per day than they are already.

DM: Okay.

JL: Now, what the data suggest repeatedly at this point in time (and we're not cracking a new territory here) is that average, usual American workers (there's no average American worker with [inaudible 36:21] we know that) actually can with the correct coaching be up off their bottoms two, three, four, to five extra hours per day. But it takes intelligence, a skillset, a desire, and a collective reinforcement to enable that to actually happen. But yes, it can be done.

DM: Okay. One of the criteria is that ideally should be done at least 10 minutes an hour. You shouldn't be sitting more than 50 minutes an hour. Is that one of your base criteria? Obviously, it's customized to the individual's work circumstances.

JL: That's exactly the point.

DM: Right.

JL: We are agreeing 100 percent. But my argument would be it's the practicality that has to come first.

DM: First, okay.

JL: Because at the end of the day, when you work with real people in real offices... And as you know, we've done this now scores of time. What really is going through the mind of my colleagues who are out working in real offices isn't, "What do I need to do right now for my health?" What is actually going through the mind of people with real jobs is, "What is my obligation right now to my email account, to

my boss, to the report I'm supposed to do, to the number of papers or tasks, or whatever it may be that I have to process?" That is actually at the front of people's minds.

Trying to get into that space has consistently failed. What one actually has to do is build systems around the primary objective, which is to keep one's job, to keep doing it brilliantly and effectively, and to appreciate that the backend opportunity is in fact not only greater health and vitality and brightness, but in fact greater productivity and ultimately therefore if you like a better job.

But the trick to the solution isn't to assign a priority, a hard and fast rule that, "I have a desk job. I'm going to be up every 10 minutes of every hour." But in fact, to look at my schedule and say, "Oh, my goodness, I've got three meetings today with my boss, my manager, or somebody who reports to me. I got to convert this to walk-and-talk meetings." All of a sudden the solutions fall much better into place.

DM: Okay. Looking into being a practical recommendation, there is now the stand-up desk and the treadmill desk, which I think you invented if I'm not mistaken. These are other ways that you can integrate that. Dr. Vernikos wasn't... She's the only expert that I've interviewed. I've read her book, which is one source. But this is your career. I mean, you know the literature. I don't know. I'm just asking this as a question.

But it was her belief that it's the change in position from standing to sitting that is crucial. She thought standing up continuously was almost as bad as sitting down continuously. That's kind of what I was seeking to get. What are the physiological requirements to break these negative, adverse, metabolic consequences that you described earlier?

JL: Correct.

DM: Maybe you could address that with the practical focus on how to integrate that with the standing and treadmill desk.

JL: I should say it with the greatest pleasure. When you now think about somebody who has successfully managed to negotiate their company or their organization to get a desk that enables them to stand, there are a couple of issues at the back of one's mind that one needs to contemplate.

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The first thing is that really what we're trying to do here... Again, if you think back to this fundamental idea of how the human body is sort of designed to function. It makes obvious and theological sense that we're not meant to function like this. Even when we're standing up, no one stands up absolutely still. This isn't a good thing, right? I can't do anything standing absolutely stock still like this, right? I can barely talk to you.

What is obvious... And again even as the two of us are talking, we can see that when people are standing up, it is inevitable that they move. It is that movement that is where the value proposition comes. The walk-and-talk meeting if you like is a massively valuable entity as opposed to standing stock still by the door thinking, "[inaudible 41:13] I'm good."

However, what is very, very interesting when you again move from the ivory tower of concept to the practical office of America is the following: when we first addressed the question of standing desks, I lonely as always figured, "Well, standing stock still does nobody any good. This isn't going to help people." But what actually happens in real offices is not that at all. When somebody gets a standing desk, they generally stand for several hours a day. But they don't stand still.

A couple of things happen. The first thing that happens is... First of all, it's just like I'm doing now actually. I promise it wasn't just actually to make the point, but this is actually what happens. People don't stand still. They generally are moving from leg to leg and generally changing their body posture quite a lot. You can see a whole lot of body movement, too. That is actually what happens. Okay. And in fact, that weight-bearing and adjustment of weight-bearing has a whole series of physiological benefits to the musculature, the balance in musculature, the visual cortex, the testicular system, and so on and so forth.

However, in addition to that, what happens is if I'm now in a regular office and everyone else in this cubicle land which is in a regular office, and now I need to have a word with the accountant on the far side of the office, instead of sending them an email, what I should do now that I'm standing is I can see them. And what I do is I walk to them.

Similarly if I'm due to have a meeting with a lady four cubicles down and she happens to be standing as well, what happens without any design, without any program, what naturally happens is that people if they're standing, inevitably walk to each other and then work whilst walking, lean over to each other, or physically interact in the upright posture. That is actually the trick of the standing-desk office.

Yes, standing still isn't actually terribly good for you. But the good news is you don't naturally do it anyway. But if people are often standing in an office space with many other workers, you inevitably create an atmosphere where people are up and moving. That is in fact the data. There's a paper that's just coming out actually exactly to this effect. The data demonstrate that that is exactly what happens.

DM: Okay.

JL: If you get people up, they inevitably move. The first trick, however, is to get people up and then they can move.

DM: Okay. So, you're a strong proponent of standing desks? That would be a safe assumption from what you just said.

JL: You got to be careful. No, no, no. Because again, I think one has to... Again, you're talking to somebody who's actually done it rather than... I'm not conjecturing here; I'm sharing some of the experiences.

DM: Sure.

JL: Yes, I'm a strong proponent if you like of standing desks for people who walk or people who want to try them. But that doesn't mean that everybody has to have one, and that doesn't obligate anyone to do anything. Because there are people – and we've found this by experience – that when you can bring a stand-up desk or a treadmill desk, they just don't want it because it takes them off focus. They actually like walk-and-talk meetings, or they're used to working in a certain way and don't want to try anything different. Or whatever the reason may be, it doesn't matter. But what is important to appreciate is that what works for one person may not work for another. You have to be... If you're smart...

In other words, if you want to get the most benefit for your organization, the trick is to get people... The way we often do this now is to get people an à la carte menu and say, "Look, here are the offerings for this company. Here are some shared treadmill stations. Here are some shared standing desks. Try them. Here are some other things we can do. Walk-and-talk meetings, they're completely appropriate for this company. We laid out a walking track. But also there are many things at conference room where you can have a standing or sitting meeting. And you can, of course, if that is what you wish have a desk."

Now, the trick of all of this is and what the ultimate dream of mine is that the default position in modern offices becomes the up and moving default as opposed to the current default, which is the sit and sedentary default. Now, as soon as you change that status quo, that's where people is to be up and moving. Those who choose to be the different ones who now go to walk around the office, in the future, the different people will be those people who oddly and strangely for no apparent reason choose to be seated throughout their day. What I'm looking to do is switch the default. The way you switch the default is by a mass support based on giving people the best options, the best choice, and the best programs.

DM: Do you think there's hope for that happening in the near future?

JL: No. I don't think there's hope. I'm 100 percent certain that the future will change. Now, how did I know this? I know this because the data have come inconsistently. I'm happy if somebody wants to email me the exceptions. But I have not seen a single publication, which is different from each of what I'm about to say.

The office, the companies that take home this kind of mandates to try and switch the default into the up and moving default of the modern American office. What is interesting is that the coolest companies are the ones who are switching the default into the up and moving. The coolest companies are ones that are offering treadmill desks, standing desks, walk-and-talk meetings, and nap tents – that's cool, too. They're offering these dynamic workplaces.

The benefits they are seeing are as follows: they are able to competitively hire the best recruits, they have higher degrees of retention, they have a happier workforce, and, oh, yes, a healthier workforce with better health numbers and lower healthcare costs. But in addition to that, they have staff who are more engaged and happy in the organization. And most importantly for understanding the role of the company, these companies are the ones who are showing the greatest profitability. Now, all of this is affirmed by data. There are even data that show improved creativity and inventiveness with people who are up and moving. After all, Einstein discovered $E=mc^2$ while cycling across Princeton on his bicycle.

Bearing all of that in mind and understanding the company's common goal, if you're now building a new company and you want to have a competitive edge, you are going to build your company... One of the ways of building a competitive edge is to create these dynamic, exciting, and moving workplaces for all the aforementioned reasons because you're going to ultimately succeed. And so that is how I know the landscape is changing. You will see it in action in the coolest, hottest companies in America. That's how I know that things are changing.

DM: Okay. Well, that's exciting. I'm assuming some of these are the really new tech firms like in Silicon Valley and other entrepreneurial ventures where this is becoming the standard. The others will lead by example. And the companies that don't – and there will be many that are resistant and that refuse to adopt these changes – will potentially die out over time.

JL: Correct. Although I don't think Kodak will use treadmill desks.

DM: Yeah. That's a good example. They probably have other issues, too. But there are certainly a number of challenges.

JL: I suspect they're talking about other things.

DM: Now, you work at the Mayo Clinic. Have you been able to convince your colleagues there? In your career or academic environment there, there's a lot of sitting going on. Have you been able to catalyze a change in that arena?

[----- 50:00 -----]

JL: What's very, very interesting is in a way Mayo has been very, very open particularly to us that have said, "Look, we are a knowledge organization. We're a learning organization." If you actually look at the publications in this place, you'll see many or several of them should I say have come from Mayo Clinic, from our colleagues and myself. Some of them, for example, with radiologists, some of them are transcriptionists, some are physicians. One major health population that's often completely overlooked is actually physicians. They have a lot of separate, hardcore health problems. You'll see a lot of that researched literature coming out of Mayo Clinic.

When I came down to Arizona, the part of Arizona State University I worked with installed treadmill desks almost universally. I was sort of quite shocked. I mean, I'm very lucky to work in amazing places. And yes, they read the literature and they respond because at the end of the day, the Mayo Clinic and Arizona State University are two of these super cool places where terrific people are going to come and work.

DM: Excellent. That's really great to hear. I'm just wondering, to fine-tune this or tweak this for those who aren't engaged to this standing-up process as opposed to sitting, if there are any posture recommendations. Because that's your discipline and area of study, you might recommend to supplement the standing up and any particular attention or exercise that one could do to really address the common, almost pervasive tendency of people who are sitting, which is they're crunched over and they get this thoracic kyphosis, or this hunched back, and just leads to loads of decreased range of motions, flexibility, and complications as they age. Are there any postural additions you would recommend to your program?

JL: Again, it's a very, very interesting question. I'm going to answer it broadly because it actually touches on where no one else has ever touched on. But it's actually very interesting. When I very first started doing all of this, one of the first people, after they sort of saw what we were doing, that took this on was one individual who's quite a senior person at a gene technology company in Boston. He emailed me to say he's going to build one of these treadmill desks himself. [It has] nothing to do with his weight (he was actually lean), nothing to do with his health (he claimed to be in good health), but because he has back pain.

In the email he sent me, asking me if I want to visit him. It was about a three-course-of-a-page explanation of his back pain, his back surgeries, and so and so forth. I went to visit him in Boston and subsequently got to know him a little bit. And of course, you know the end of the story, otherwise I wouldn't be telling you. His back pain was solved and so on and so forth. We find this a lot again with our partners. Getting people off their bottoms and getting them up and moving resolves a lot of issues you would never thought would normally be amenable to get people simply out of their chairs.

Now, one of the groups of individuals again when I started doing all of this who were always quite contrary, were the professionals working in ergonomics. Because here was a bloke coming along, a scientist coming along, and saying, "Look, I want to get people out of their chairs," and yet the ergonomics community had invested so much in doing the right lumbar support, [inaudible 53:40] support, and all these kinds of things, right?

Now, over time, again with the quite substantial, about 10,000 publications at this point, the ergonomics professionals have really come around to this. I can't claim that everyone has, but many hundreds for sure. I actually just recently did a webinar and more than a thousand ergonomic professionals appeared on the webinar because there is a realization that yes, there are specific lumbar supports and so on that are good for people once they're sitting. And honestly, I'm not an expert there. It's not what I'm good at. But there is also a realization that if you can, as you and I have been talking about, get people up in a way that doesn't interfere with the primary objective of their job. Get people up and moving throughout the day. A lot of these other things, even things like carpal tunnel syndrome improved significantly and dramatically.

All of a sudden, one of the groups of people I now spend much more time with is the ergonomics professionals because I think, together... Here's a pre-existing workforce, you can get these ideas and infiltrate it if you like to changing the default of American working from chair-based to leg-based.

DM: Okay. Now, you had mentioned briefly you worked with the company Fitbit. But there other activity trackers out there like step counters, sophisticated step counters.

JL: Right.

DM: Have you found any correlation there just to get people moving to have something like a minimum threshold like 10,000 steps a day or does it need to be spread out over a certain amount of hours? What's your recommendation on those fitness trackers?

JL: Right. In the book again... I'm sorry to plug the book but...

DM: No. It's a great book. It really is. Get Up!

JL: Anyway, but I do talk about tracking devices in the book *Get Up!* Now the reason... You might say, "How does he talk about devices?" They're quite simple. They measure how much activity, how many steps one does, and whatever it may be. Because what's interesting about tracking devices... And again, you can look at the whole data experience in Japan who deployed the pedometers. This was served many, many years ago almost population-wide. There has been big population-based approach. There are big corporate give outs of various technologies. There is an intelligence regarding technologies that many of us didn't much appreciate.

Now, if I am an avid athlete, totally into it, a health buff, Nike this, a camera to record absolutely every sweating moment of my exercise, then I'm also probably going to be an individual with three different tracking devices. And then I'm going to spend an hour a day studying my tracking. I'm going to get my gear powered and how much I've tracked and how I could change the 14th minute of every hour every fourth Wednesday if the sun is shining. Great.

How about average people? How about normal people? How about again my core cause who are these sort of... Eighty percent of people are into that kind of thing. What's very interesting if you look at the data, if you give a whole lot of people tracking devices, when they first get them, they'll use them like loads. They're like, "Fantastic!" Then what happens is there's an exponential fall off in generally about three weeks. They'll wear them to look cool. There's nothing wrong with that. Who doesn't want to look cool? But no one actually looks at them or looks at the data. We've actually retained devices that actually don't work at all.

There is an intelligence regarding tracking devices, too. The short answer is that all these various devices they're all pretty much the same unless you kind of get into the research phase. They're all about the same. They all monitor this. They all monitor activities. Some monitor steps. Some are better than others. Pedometers particularly in children, by the way, are very, very poor. You need to be very careful about using those as guides for kids, kid's advice, and encouraging children because, of course, children can be doing great stuff that is never recorded on their device. You got to be careful.

But really, the biggest utility of the tracking device is: a) to give yourself a baseline, b) to set yourself a goal. And then you find out with your body what it is to get your goal that says 20 percent high or 10,000 steps if that's what you want to do. But then once you're at your goal, you kind of know what you need to do to stay there. We actually recommend people to take off their device, put it in the drawer, put it away, and forget about it. Keep on doing. There perhaps at six months, we get them to use their electronic calendars to remind yourself to note two weeks of tracking to see how you're doing.

Using tracking devices intelligently for usual people... And I hate tracking myself. It's like a personal hate of mine. The best I can do is track a couple of weeks at a time and then I kind of give up. But I'm actually pretty normal in that regard.

DM: Okay. It's interesting.

JL: Because most people actually don't like to continuously track themselves and gather data. Yeah, tracking devices are super-duper for assessing a baseline and ascertaining if you've made your goal and if you're staying there down the road. But most people do not use them all the time. That is where it begins sort of a degree of thoughtfulness is critical if you're going to use these things most effectively.

DM: Thank you for your perspective on that. I appreciate it. But I'm wondering if your research suggests that there's some minimum threshold again that if it's spread over the day, would it be the 10,000 steps or 15,000, 5,000? Or does it not really matter as long as you're moving 10 minutes out of the hour?

JL: Again, breaking up inactivity time appears to be critical. And in fairness again to my knowledge, none of the current tracking devices are particularly good at that. There's actually an app called Get Up that shouts at you to get up if you've been sitting for too long. Of course, it's made with a degree of good, funny shouts. "Get up!" But the idea is that yes, that can be done. Now, with respect...

DM: But how does it know you're sitting down? Is it on your phone? You have to put your phone in your pants?

[----- 1:00:00 -----]

JL: Exactly. If you've made the mistake of leaving your phone on your desk for two hours, your desk is going to have to get up. But importantly, about setting goals, again, there's a whole science behind this that is almost invariably completely overlooked. Here are a couple of important points: one has to appreciate that most people living in America are either overweight or have obesity. Okay?

DM: Sure.

JL: For most of those individuals, most of the tracking devices are not actually very good at capturing the amount of activity that individual does. Now, that activity – and I'm being deadly serious – if one is carrying extra weight (I suspect you'll agree with me), that activity can even include simple things like step counting because when these things are validated, they're validated... And I'm walking three miles an hour kind of like this. However, normal people when they walk around throughout their day, they walk a bit like this. The tracking devices are not particularly good at capturing that non-exercise activity.

DM: Ah, interesting. Okay.

JL: Yeah. Again, one has to be super careful about how these devices are used. A very simple paradigm is to say, "Okay, my body type is what it is. I'm going to put the device on the same place of my body every day." I have to tell you putting things on your wrist isn't as good as putting them somewhere on your trunk, right? And I tell you putting them on the wrist is better than leaving them on the bedside stand.

Over a couple of weeks' period of time, I'm going to see what my number is whatever the tracking device I'm using. And then I'm going to say to myself, "The next week, I'm going to decrease my sitting time," because of all the things we've spoken about, whether that's getting out of the office, whether that's... I'm going to put it away. I'm going to use my tracking device for a couple of weeks to see my baseline and then I'm going to set myself a goal. The goal can be 20 percent above where I am now.

And then I'm going to take a series of steps like we've discussed on how to reverse my sitting that are not going to lose me my job, that are not going to lose me my family, and that are achievable. But I'm going to set that goal of 20 percent. I'm going to use my tracking device to see if I can actually get there and keep it there for a week or so. Now, that goal therefore is heavily individualized for my body type, for the kind of things I like to do, and is by definition responsive to the things I've taken on because otherwise I'm not going to see myself get to my goal. Now, that to me, is quite a smart way of using these devices to get to my goal.

You might say, "Surely, 10,000 steps is all I need to do." I mean, there are fabulous data for those people who do 10,000 steps. They live with better health, longer, and so on. Now, that is true and fantastic for those who are into it and who have the right body type. The devices are correctly tracking their activity. If, however, one is an individual with perhaps a larger habitus or perhaps a belly or body fat that makes these devices less accurate, it can get very discouraging. Because once that you do, the device isn't going to detect the 10,000 steps, you see.

Therefore, again, even with tracking devices there's a degree of sophistication one needs to use in order to get not only the most benefit from them in terms of monitoring how one's doing, but also it's important that one doesn't get falsely discouraged when one is actually doing things that are totally cool, getting up your bottom intermittently.

DM: Yeah, I couldn't agree more. These devices, these trackers are relatively simplistic. They won't differentiate based on your weight. They have no clue of the amount of exertion in muscle energy that you're expending based on your mass. I mean, someone who's carrying 40, 50, or 100 pounds of extra fat, that's just a workout, just moving that mass. Anyone who's done a pull-up with normal body weight knows how hard that is. And then putting the 45-pound weight belt on and trying to do a pull-up is a whole different story.

JL: Right.

DM: For someone carrying that extra mass around, that activity tracker is not going to identify that at all. There's no way you can determine it. The current technology does not do that.

JL: Right.

DM: I appreciate your insights on that. They do have one other interesting aspect. They have a relatively crude way of measuring your sleep, which is another important part. Obviously it's not part of our discussion but indirectly it is because you have to recover from your activity. If you're not sleeping enough, that's maybe not equally but seriously a handicap to acquiring good health. Many people sleep a lot less than they think they do. These devices can help you understand that.

JL: If I may, we actually have done very intricate studies on this.

DM: Okay, good. I didn't realize that. I'm sorry.

JL: You'll definitely be interested in a reflection on that if I may.

DM: Sure.

JL: Thank you for bringing that up. It's one of my major mantras. Again, I'm being absolutely serious. In school, students, and in corporate programs, we talk about good-quality sleep as a critical, critical element. Not only will one sort of have the natural desire to be active, but also diabetes prevention and whatever else it may be, let alone a sense of well-being, right? Who doesn't feel good after a good night's sleep? Who doesn't feel awful when they're tired, right? It's ubiquitous.

Now, here's something really interesting. If you take people (and again you bring them inside the ivory tower) and you conduct very, very careful experiments, where one experimentally sleep deprives people by a third of their normal sleep quota. Now, that is determined by actually measuring people's normal sleep and then subtracting a third. All done not on averages; all done person by person by person. You sleep deprive somebody by a third. What happens?

Here's what happens. It's fascinating. This is really, really cool. If I'm sleep-deprived by a third of my sleep, okay, what happens? Two things happen: the first thing that happens if I'm sleep-deprived by a third of my sleep is that the total amount of activity for my day doesn't change. It's incredibly consistent. Even though I'm sleep-deprived, even though I'm awake several more hours, my total amount of activity for the day is constant.

However, if I'm sleep-deprived, the amount of caloric intake increases. That makes sense. Anyone who gets sleep-deprived is like, "Oh, I'm not in the mood to go out for a walk. I'll have a snack." That is exactly what happens. People consume about 500 calories extra when they sleep deprive a third of their normal sleep quotient, and yet they don't move anymore. It is the perfect storm for obesity, diabetes, hypertension, and so on. Eating more, not moving more. It is incredible. The data are exquisite in this regard.

As we think about getting up during the day and the intelligent ways of doing this – fun activities to do at home, whether I should paint my basement and all these other things I need to think about doing – what I mustn't forget is to have a good night's sleep because ironically (and it is ironic when you think about it), one of the most important things for being active is to have good rest.

DM: Okay. I'm glad we're onboard with that. But my point was that these fitness trackers help us understand what that rest is because there are so many people who are confused about it. I mean, this is an area of your study so you can comment more intelligently on this. But it's been my understanding that that's about eight hours for most people. There are some rare individuals who need a lot less than that, but they are clearly the minority. Anything less than seven, I think, probably you're fooling yourself. I was in that group. I fooled myself for decades, many, many decades of getting less than seven hours and thinking that was healthy. It was crazy. It was really highly irrational and delusional. But I did it.

JL: You're delusional? Impossible.

DM: Yeah.

JL: Or am I being delusional? Anyway, one very interesting final observation about sleep, when you actually look at the sleep data from the scientific groups – and again, this speaks more to me actually – is that often if we're sleep-deprived during the week, we actually catch up during the weekend. The data suggest that that isn't just me. That's actually a phenomenon that a lot of people do. This idea of lying in on Saturday morning one wonders, one conjectures whether that is in fact physiological and also sort of part of this equation of getting good activity means getting good sleep. Those two things I think are intimately related.

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DM: Just a last comment on my observation or my appreciation of this is one of this... I think it was a Jawbone UP study that found that people who actually got enough sleep, it took them longer to fall asleep. When they were sleep-deprived, they fall asleep real quickly.

JL: All I can tell you is that having done sleep-deprivation studies and visited with our volunteers while they're desperately trying to stay awake, I think you are 100 percent correct. Or I'll be even more boring than I thought I was.

DM: Well, we've exceeded our time limit with you. But if there are any final important observations you'd like to make about what your work has been doing...

JL: I just have to say this has been the most superb, and you getting to talk about this, this is an idea of intelligence. This is just the most intelligent and brilliant interview. I'm really personally grateful that you've thought through this and have taken the time to ask these questions.

DM: Well, thank you for that compliment, but it's a passion of mine. My foundational passion is just to understand truth, so that we can imply it to large populations. I especially appreciate your perspective because it really is based on common sense and the wisdom that you have to be practical.

JL: Right.

DM: Many of these recommendations aren't, especially coming from academics.

JL: Correct.

DM: Which is unusual from your perspective, because that's where your perspective is. You've somehow overcome that obstacle and managed to provide practical recommendations, which have tremendous potential. I'm really grateful for your work. And coming from such an important academic perspective, it helps validate what we're seeking to encourage and inspire people to do.

JL: Thank you. No, it's really an honor. I've got nothing else to say but thank you. And thank you to your team, by the way, for persevering to get this connection.

DM: Okay. All right. Well, thanks again. Continue your work. Hopefully we'll talk again soon.

[END]