

EP_1206_Best_of_SLEEP

I'm looking at the ROI on sleep. What's the return on investment? So yeah, I could get two more hours of light sleep. Is it going to make me live 20 percent longer? Is it going to make me smarter tomorrow? Is it going to make me a better parent? What's it actually going to do for me versus where I could put that other two hours of time?

You're listening to The Human Upgrade with Dave Asprey.

There is a global sleep loss epidemic underway. What we know is that within the space of probably less than a hundred years, which is obviously a blink of an evolutionary eyelid, we've lopped off somewhere between 15 to 20 percent of our sleep amount. So if you look at surveys back in the 1940s, the average American adult, at least, was sleeping 7.

9 hours a night. Now that number is closer to an average of six and a half hours a night, and that's the average, which means that there's a large part of the distribution that's actually well below that average. And so if you were to think about saying, you know, in the past 20 years, you know, By way of a restricting device around your neck, you've reduced your blood oxygen saturation by 20%.

You're down to 80%. You know, that would be astonishing, but that's exactly what has happened with sleep. And we see that same profile in most developed nations. You know, my home country, the United Kingdom is not much better. 6 hours and 49 minutes. Japan is worst. It's 6 hours and 22 minutes now. So that is, that's a decimation of sleep that's happened throughout the industrial world within, you know, less than a hundred years.

Well, we're going to have to get right into an area where we might disagree and not really sure yet. How do you know that that isn't enough sleep. I mean, there is that big study of 1.2 million people showing that people who sleep eight hours a night die more of all causes than people who sleep six and a half hours a night.

So what we find is that the less and less that you sleep, the higher and higher your mortality risk. And the higher your risk for most of the diseases that are killing us in the developed world. There is actually though a very interesting curve to that mortality risk and you're right That once you get actually above nine hours of sleep your mortality risk then increases significantly So it's not a u shaped function.

It's more like it's more like a j shaped function kind of a j turned backwards as it were. So in other words Mortality risk on the vertical and less and less sleep as you go to the left, the higher and higher your likelihood of dying is. But once you get past about eight and a half to nine hours, there is a huck up in the mortality risk.

And at first it seems like perhaps that's telling us if you sleep too much, you're going to die. at a younger age. However, I think the media has been misinformed. If you actually look at those cities, what seems to be happening is that that huck is caused by people who were very sick and what we know. So these are people with usually infectious diseases or cancer.

And what was happening there is that. Sleep is the best sort of health insurance policy and it's the best immune and, um, healing process that we know of. And when you are sick, I think everyone knows, you just want to curl up, get into bed and sleep it off, essentially. And sleep, we know, actually responds to infections, a very well replicated finding.

What was happening here, we now believe, is that those people were so sick, and their bodies and brains were calling up more sleep to help the fight against the disease, but the disease was just too much for sleep. So it artificially looks like, you know, sleeping more is bad for you, but that does not seem to be the case.

All right. I love that answer. To put it in one sentence, basically sick people need more sleep. That's right. Sick people sleep more and they need more sleep. I do want to actually almost come over to your side and this may be strange from coming from a sleep scientist. Let's just go a little bit further with a thought experiment though.

Could there be a thing as too much sleep? I actually think yes, there could be. And the reason I believe that is because it's no different for any of the other three critical ingredients of life, food, water, and oxygen. So can you overeat? Yes, you can. Can you actually get too much oxygen? Yes, it's called hyperoxemia, and it will cause free radical damage to brain cells.

Can you overhydrate? It happened in the 1990s with the ecstasy craze, where governments were saying, when you go to dance clubs, please drink water. People drank too much, their blood pressure went up, and they had cardiovascular events. So. In all of these things, there is a sweet spot, and getting too little and too much seems to be a problem.

Are most people in danger of getting too much sleep? Au contraire would be my, my response. Okay, full agreement with you there. I knew we were going to find some common ground here. But there's a kind of the opposite side of the coin here. If sick people need more sleep, wouldn't it follow that exceptionally healthy people need less sleep?

If sleep was only there to actually, for example, support your immune system, you could imagine that would be the case, but it's not. There is no single major system within the body, reproductive system, cardiovascular, thermoregulatory, metabolic, or upstairs in the brain in terms of a neural process. There is no single system of the body or the brain that isn't optimally enhanced by sleep when you get it or detrimentally, detrimentally impaired when you don't get enough.

So sleep actually services every one of the biological operations that we know of in the brain and the body. And so therefore, Just because you're sort of, let's say your immune health is good doesn't mean that your cardiovascular system doesn't also need sufficient sleep or your reproductive system doesn't need sleep or your brain and your neural processes, particularly in fighting things like Alzheimer's disease doesn't need sleep.

So that's why just because you're healthy, you don't necessarily need less sleep. In fact, it's a very quick and easy way to get unhealthy. Okay, I totally buy that. Now, if someone were to sleep six hours, say, in an airport, versus six hours in a cave, what's the difference between those two nights? It's more than likely that there will be a difference in what we call sleep quality.

So, What you've done there elegantly is lock in quantity, which is where we're saying, look, clocked time is the same between those two conditions. When you're sleeping in a noisy environment or in unfamiliar environment, your sleep isn't the same with life quality. Yeah. And what do we mean by quality?

Part of it is About how continuous your sleep is, is your sleep broken up by brief awakenings throughout the night that usually results in poor outcomes the following day that we can measure in brain and body. The other aspect of that is, let's say that you're not waking up anymore, but the depth of that sleep is not going to be as deep, so you're not going to get as much deep sleep, and you're also probably not going to get as much REM sleep.

And I think REM sleep has been the neglected sort of step sister in the sleep conversation. A lot of people say, I'm just going to focus on my deep sleep numbers. That's probably not the best way to do it for two reasons. Firstly, REM

sleep is actually more important, we believe, for your mortality. And the reason is this, back in the 1980s, there were some studies that will probably never be replicated because of ethical issues, where they sleep deprived rats until they died.

And they had three main groups. One group was totally sleep deprived, and those rats basically died as quickly from total sleep deprivation as they would from food deprivation. So sleep is just as important as food. What was interesting is the other two groups, one of those groups was selectively deprived of non REM sleep.

Well, that's especially that deep sleep. And the other was deprived of exclusively REM sleep, rapid eye movement, sleep, or dream sleep. And what they found was that the rats died almost as quickly from selective REM sleep deprivation as they did from total deprivation. Whereas non REM deprivation, which is that deep non REM sleep we were speaking about.

The rats still died, but they just took about 60 percent longer to die. So in other words, if you want to kind of rank order the brutal priority of sleep and its stages on the basis of those studies, at least it seems to be sleep in general, then REM sleep, and then non REM sleep. What percentage of your night, if you could sculpt the perfect night of sleep for you, What percentage of the night would you want to be light sleep versus REM sleep versus deep sleep?

So, typically what we see in, in the healthiest people, and I guess that that's the best barometer, you would probably want to be seeing somewhere between 25 to 30 percent of deep sleep. Um, for REM sleep somewhere between, um, 20 to 25 percent and I'm giving ranges here. So the numbers may not all add up, but it's an estimate.

And then you want about 45 to 50 percent of lighter non REM sleep, which is what we call stage two non REM sleep. And I should note that that other type of non REM sleep is actually critical. It's the most prolific stage of sleep that all of us experienced like non REM sleep. You could well imagine thinking, well, that's just the stage that you have to go through to get down into deep non REM, or to go through to get up into REM sleep.

So it's kind of just junk sleep. It's quite the opposite. We're now finding that that type of sleep is packed full of things that we call sleep spindles. Which of these short bursts of electrical activity that happened for about a second or a second and a half. And for example, those sleep spindles are essential for learning and memory functions.

So, you know, it doesn't surprise me when I take a step back and. We were to ask, well, which stage of sleep is more important? And the answer is, they're all important. Because sleep is the most idiotic of all evolutionary behaviors, for lots of reasons. And if Mother Nature could have excised any one of them because it was functionless, I well imagine she would have done that, you know, Thousands, if not millions of years ago, but the fact that all of these sleep stages have fought their way heroically through every step along the evolutionary path must mean that all of them have a unique and important contribution to make.

And that's exactly what we're discovering. There's also the argument that Mother Nature didn't really evolve us to live in the world where we got all the food we need, and tigers aren't really gonna kill us, so some of those sleep things that evolved over all this time for the world we lived in, um, Might not be as relevant for where we are today.

Do you think there's a possibility that in a world with just a different level and type of stress and a different amount of environmental control, nutrient availability, that sleep itself will change maybe evolutionarily or maybe even consciously? I think sleep will evolve, certainly what we know if you look back across the millennia, we obviously emerged from apes and there was something fundamental about the transition from tree to ground that happened, that when we as hominids essentially came out of the trees and onto the ground, the amount of REM sleep that we had shot up dramatically.

And in fact, we are unique in the entire animal kingdom, or at least the mammalian kingdom. We have twice the amount of rapid eye movement sleep than any other species that we've measured. And so I make that point because it tells us that there was, there were critical inflection moments during evolution where sleep changed for reasons that we still don't yet understand.

Um, there's some theories as to why. Will it change again? I don't know. Undoubtedly so. You know, what is the timeframe of that? I don't think we know. What we do know right now is that from populations that we take in this present moment, in the current evolutionary state of our electrified society, when you take someone below seven hours of sleep, we can measure objective impairments in their brain and their body.

If you had to stack rank this sleep, let's say you're only going to get six hours of sleep because you're going to catch a flight tomorrow or because you have screaming children or all the reasons that people cite for not getting the, you

know, amazing, perfect eight hours of sleep, even though they're all important, what's, what's the point?

Is it REM, then deep, then stage two non REM? Is that the order of prioritization? The inherent danger with that question is you have to ask, what are you trying to optimize for? Because each one of those different stages supports unique and different functions. So, let's say that you want to sort of optimize your glucose regulation.

Okay. Well, there, the argument would be you should focus on deep slow wave sleep. Because that's been demonstrated causally to regulate blood sugar, um, equilibrium. If you're trying to optimize for your learning and memory, then you may want to focus on lighter stage two, non REM sleep as well as deep sleep because they have a combinatorial benefit.

If you want to focus on your, for example, your emotional health and your mental state. Then you may want to optimize for rapid eye movement sleep. So it really depends on exactly what your target is. And unfortunately as human beings, you know, you don't want to shortchange on any one of those and you will pay the price no matter what.

I suppose the the thing is you'll pay the price, but the average listener, and there's hundreds of thousands of people listening right now if they even track their sleep. And I've done a bunch of episodes on sleep tracking, and I was just looking at my numbers for last night. I got an hour and 25 minutes of REM, an hour and 32 minutes of deep sleep, uh, in around seven hours and 20 minutes.

Uh, so not a great night's sleep for me, um, just because the numbers are low and the amount of sleep I slept is high. Normally I'm six and a half, but I should be getting about two hours of each. And I'm, I'm listening to you about this, this non REM thing, but I'm also, I'm going to be pragmatic. I'm looking at the ROI on sleep.

Like, what's the return on investment? So yeah, I could get two more hours of light sleep. Is it going to make me live 20 percent longer? Is it going to make me smarter tomorrow? Is it going to make me a better parent? What's it actually going to do for me versus where I could put that other two hours of time?

So actually all three of those examples sleep will support that you described even the parental one We know that and your relationship in fact sleep is predictive of marital difficulties marital arguments and the quality of marriage, too so You can go from inside of the cell and we could speak about the DNA all

the way up to high complex socio emotional functions, like interpersonal relationships, and you can see that damage.

So I think it really comes down to the question of, you know, what do you want out of life? Would you like to, You know, invite disease and sickness early into your life when you could be living a longer life or are you happy to actually pay that cost towards the end of life and during your life increase your risk of significant morbidity.

For example, like a heart attack that you survive, but now you are compromised in terms of your heart function. If you were to try and ask me stack diet, exercise, And sleep because they're the other sort of two things that people try to optimize, you know, where does sleep sit in that? And we can play that game at a number of different levels, but let me just go to one extreme.

Let's say I take you, Dave, and I deprive you of food for 24 hours. I deprive you of exercise for 24 hours. Or I deprive you of sleep for one night, and then I assay your body and your brain across all of the different dimensions that are important to health and wellness. Sleep wins. Yeah, and sleep just decimates those other two.

I mean, it's not even close. Now, I'm not trying to belittle diet and exercise. They are fundamental, and it's all interacting, of course. None of these sit in isolation. If you want a sort of a realization of what you're doing by under sleeping, I think that that's one good metric to keep in mind. Okay, that is a beautiful example and I'm glad you brought that up because that really paints it in a, in a great context.

And just for full disclosure, I started out, you know, 20 years ago, pretty much hating sleep because it got in the way of all the cool stuff I wanted to do, right? And now I'm very conscious about using sleep as a tool and I do things, you know, an hour or two before I go to bed that increase the quality of my sleep and I generally wake up feeling really good and my numbers make me happy.

To the point where I, I don't know that I would want to invest more of my life in sleep, but I also am doing stuff that is related to the Russians. And I want to ask you if you've ever looked at this, and if you haven't, we can just kind of move on. Back in the 60s and 70s, in the unique way that Russian scientists thought back then, And they said, well, it's very expensive to send astronauts to space.

And they spend a third of their time asleep. So let's just invent a technology so astronauts can sleep a lot less. And therefore we can spend less rocket fuel and

build smaller rockets and send less astronauts to space. Right? Brilliant thinking. So they invented cerebral electrical stimulation. They ran a very small current back and forth between the ears at the same frequency as deep sleep or REM sleep to put the brain in that state and probably do some weird electrical stuff and found that they could function.

Adequately, probably not perfectly, on two or three hours of sleep, and have you experimented with or seen the results of any kind of technology that purports to increase the effectiveness or efficiency of sleep? There are a number of them. Um, and by the way, those studies, they don't really assess the true whole organism.

You know, they're usually assessing, you know, cognitive functions. So I think it's, it's to be mindful of, but. You have, you have tumors, but your brain works. That's right. Yeah. You know, they're not going to measure that. Your systolic blood pressure just went from 120 to, you know, 165 within the space of eight hours, but don't worry, you're fine.

So. There are several things that people could do to try to augment their sleep and get better sleep in the mold that you're talking about. One is actually temperature. So it's mostly effective for deep sleep right now. But what we know is that your body needs to drop its core temperature by about two, two and a half degrees Fahrenheit to initiate sleep and then to stay asleep.

And it's the reason you will always find it easier to fall asleep in a room that's too cold than too hot. Um, because too cold is taking you in that right temperature direction for good sleep. And there were some studies done and we've played around with this too, where you kind of essentially strap someone in what looks like a wetsuit that has all of these veins running all over it, these capillaries.

And then you as the experimenter control the water flow in those capillaries and you can warm the water up. Or you can cool it down and you can do that to any part of the body discreetly. And what they were able to do is that by essentially warming the surface of the hands and the feet, they were able to charm the blood out of the core of the body.

And therefore your core body temperature plummeted as a result. And that increased deep sleep in young adults, but it even more dramatically increased deep sleep in older adults. And those with insomnia. So temperature seems to be one of the ways that we can manipulate at least deep quality of sleep. If people are struggling with sleep, there's another technique called Cognitive Behavioral

Therapy for Insomnia, or CBTI, and that has really proven markedly efficacious.

It's now no longer the question is, does CBT help improve the quantity and quality of your sleep? The questions now in the research feel like we're doing, is that sleep improvement actually improving other downstream sort of consequences. And there are now some great studies showing that it markedly improves your mental health, decreases your paranoia, decreases anxiety, decreases rates of depression.

So there are a couple of methods that you can sort of, you know, some clinical therapeutic others, environmental that you can play around with too. Light is another one of those things. That we could speak about if, if you wanted to, but yeah, Satchin Panda came on and talked a lot about light and biology.

And one of my portfolio companies actually makes glasses that block all frequencies of light that affect the SCN. And I think listeners could benefit from hearing you talk for just a brief period about how important light is for sleep. But I would just say, go deep in the podcast with Satchin Panda or check out the true dark website for a bunch of research on that stuff.

So just talk about light and what you've seen light does. That's good or bad for sleep and it just reiterate that for people who still turn their bright bathroom lights on at night So yeah, that section is fantastic. We know each other very well But we we are a dark deprived society in this modern era and it's not just about the devices Although I'll speak just very briefly about those that are harmful in It's also just that we bathe ourselves in electrical light throughout the evening.

And the reason you need darkness at night is to release a hormone called melatonin. And melatonin helps the timing of your sleep and the healthy timing of your sleep. Technology is perhaps. Fast becoming one of the greatest sort of assaulting things in terms of our sleep. One study looked at the impact of one hour of iPad reading before bed versus just one hour of reading a normal book in dim light.

And what they found is that the one hour of iPad reading actually. Blunted the amount of melatonin that was released by 50%, 50. Furthermore, it delayed the peak of that melatonin, which normally should peak, you know, a few hours before bed and then rise nicely in the first couple of hours. It delayed that peak by three hours.

So myself here in California right now, I would be much closer to Hawaii time. If I read an hour on an iPad before bed in terms of my melatonin, um, two other things that they found with that study. One is that it also decreased the amount of rapid eye movement sleep that people were having. And then finally.

Even when they stopped reading the iPad in the days afterwards, there was a blast radius impact of that reading that the effect of on that sleep disruption didn't go away until two or three days later. So it's almost like sort of washing yourself out with a drug that, you know, just that wow didn't, you didn't shake it off for a couple of days.

So light is, It's something that I don't think we think enough about and if you want a quick, I don't really like to call them hacks, but you know, when you, you know, blue light blocking glasses, um, there was one study that demonstrated some efficacy there for melatonin. The other way that you can do it is just turn down half of the lights in your house before you go to bed.

You would be surprised at how soporific that, that feels. And it really does make you sleepy. And then, you know, eye masks and sort of block out curtains throughout the night, if, if that's your thing. It, it's ridiculous how much just dimmer switches can change your life. And you, you go to my house, there's dimmer switches on everything.

We don't use white LED light bulbs. We use, you know, halogen bulbs because they dim better and they have a more natural spectrum that's less blue. And at night we have red nightlights or even red full on a few lamps and all of my exterior lighting is red. So the difference in the quality of my sleeping, if I look at screens or whatever, I wear the glasses and the glasses from my company are, they're red and they block violet and green and blue and other things for the melatonin effect.

But I, like, I double my deep sleep on my sleep ring if I do that versus walk around the way I used to. Uh, so I, I found that, that between temperature, which I recommend, and, and light, as well as just not eating too close to bedtime, and then a couple supplements, the supplements for me help the REM, but for my deep sleep, it was all about the, Just turning down the lights, but your studies show that it's actually affecting REM sleep, not deep sleep.

What is the hack that raises REM sleep the most other than lights? There's actually very few hacks for REM sleep, it turns out. One of them may actually be that we're just exploring right now and we don't have enough data, is reverse engineering the deep sleep hack. Which is, if you look at the circadian profile

throughout the night, and circadian just means your sort of 24 hour biological rhythm, your core body temperature starts to go down before bed, it hits its rock bottom, core temperature around three or four in the morning, stays there for about another hour, and then it will start to rise back up.

In the late morning. Why is that important for REM? Well, your deep sleep and your REM sleep are not evenly distributed throughout the night. You have most of your deep sleep in the first half of the night, and you have most of your REM sleep in the second half of the night, especially in fact, in the last quarter of the night, which parenthetically, by the way, should give people pause because.

Yeah. If you were to say, look, I normally get eight hours of sleep and I only got six hours last night. So I lost 25 percent of my normal sleep. I lost two hours from eight hours, 25%. That's true, but it's not quite true because yes, you lost 25 percent of your total sleep, but you may have lost 80 to 90 percent of your REM sleep.

So, there is a nasty twist in that tale of how sleep is distributed, and if you're shortchanging your brain by waking up early because you think you want to get a jumpstart on the day or get to the gym, you should be mindful of that science. And by the way, I may be sounding like I'm trying to tell people how to live.

I'm not. I'm not here to tell anyone how to live. All I want to do is empower you with the science of sleep and then everyone can make their own informed choice. I'm not trying to suggest how to live here. You're not coming across as that, but if you do this, then this will happen. That's sort of precious knowledge.

And that's the stuff that I am working to tease out on every episode of the show. So I don't think that that our audience is going to be offended at all by this. I hope not. I'm intrigued though. Because, you know, the idea that, that, you know, wake up at 530 every morning to become a better human being, you're saying that that could kill your dreams.

And probably yourself a little bit quicker. Or rather a lot quicker. Hell, Elrod's going to be so mad at you. All I'm speaking of are the scientific truths.

I am a back sleeper. Even though the studies that talk about putting the head up higher are interesting, I think that's accounted for when you raise the height of your bed. So if, if we're talking about the full stack and I want you to poke holes in my stack, Peter, um, so I take up all the supplements, you know, the, the things I've talked about, uh, supplement wise, we won't worry about that.

There's plenty of blog posts on my side about that, but I, I ideally would be using my neck nest. It just hasn't arrived yet, but this is what I did until I left it in the hotel. So you put it under your neck, you're getting some traction. I sleep on my back. Right? I've got a weighted blanket, one of the blue weighted blankets.

I've got the sleep crown. I've got a bite guard in so you don't grind your teeth. It keeps your jaw aligned. I've got my mouth taped close. Uh, and sometimes I'll use the little nasal expander rings, which I don't always do, but so I do that and I'm laying on my back and I've got my arms that kind of opened up.

So my shoulders are open a little bit and I sleep like this. So well, I've been stupidly well compared to any time I ever have in my entire life, right? But I look probably like some kind of sarcophagus thing. I don't really know what am I doing right or wrong there? Oh, my bed is elevated six inches at the head.

I think I mentioned that, but well, so as far as I would see, weight is good because weight feels like protection. I think what a lot of, one of the key things that I find with my, my patients, clients is. I would ask the question, how do you regulate your body core temperature? Because core temperature is significantly important when it look, when you come to deep sleep and quality of sleep, and it sounds like you're doing a great job.

The, the recommendations that are currently out there. I believe are wrong, and I look at them as being wrong, coming from an allostatic place. So, if the, you know, so the body wants to, the body only really cares about the core. It doesn't care about your arms and your legs. It can, your arms and your legs can drop down to whatever temperature it wants to be, but your core needs to stay at 98 degrees.

Actually, in order to get a deep sleep, it drops two degrees. So I believe that people should use covers just to cover their torso and have their arms and their legs exposed as radiators. I do not recommend, like some people, putting socks on and you're keeping your hands warm because that's the extremity.

Your body temperature regulates out your hands and your feet and that all comes to something that's called allostatic load. So the reason why people get sick is because, or they get worn down, is because of energy drains. And so one of the hierarchies is body core temperature. So your body will drain all resources in order to keep the body core temperature warm.

It'll suppress immune system. It'll suppress reproductive system. It goes into a sympathetic state. So when your body core temperature is not protected, like your sleep is, it throws people into dysfunction and you can actually wake up and use more energy because your body's trying to fight to stay warm.

And so what we do is we cool out the hands and the feet. So there's some pretty good research. I mean, I've, I think I was the first guy to talk about the chilly sleep system many years ago before they came out with a new one, which I love it. Okay. So you love that. So I actually have one of those. I don't use it every night, but I do.

I have an eight sleep mattress that has some built in cooling as well. And I use that sometimes, but I actually have like a sleep lab up here. Like literally I have a separate bedroom with weird stuff in it to test what works for sleeping because like I'm a nerd and I'm a professional biohacker. So I do find that cooling the mattress really helps, but that's going to lower my core temperature.

That's kind of flies in the face of what you're saying. No. So you need to lower your core temperature, right? But your body heat. So it's a, this is a really interesting dance that we've been playing with. I like the chili pad because I, your, your core temperature follows a circadian rhythm. So you can set your chili pad to raise in lower throughout the night to be able to match that circadian rhythm.

Okay. You're not just cooling. No, you, you want to cool in warm, right? So and then it all depends on, because listen, I love exercise. I exercised so much the other night. I almost threw up. But I got horrible sleep that night because when you exercise, you're, you're, you're, you're stimulating your metabolism chilled out my, with my, my chili pad.

So that helps me get better sleep. But I don't, but, but we have to understand that temperature regulation is super important. So if you're looking at a winter night where you're keeping your room really, really, really cold. And you have the ability for your body to temperature regulate out your hands and your arms.

You don't need cooling because your, your body will is controlling that temperature. So you have to, you have to take room temperature, how much food you ate, how much you exercise. So it's a, it's a dance and that's everything that we teach in the, in the sleep quest. Very, very cool. That, that makes a lot of sense.

And of course you can open a window and cool things down. And that's actually something I did last night as well. Cause we have tons of frogs outside right now. So I'm like, I'll listen to the frogs and I go to sleep. So it was really cold when I woke up. So maybe, maybe that helped me get 101 on my heart variability, but it's, it's intriguing.

These are all things people can play with. And when people get a neck nest, I know that you're, you're giving them your whole course and all, and all the different sleeping stuff, which is totally worth paying attention to. So I, I appreciate your, your level of sleep nerdiness, because, uh, we, we definitely both think about the same kinds of weird things you can do.

And. There's a noticeable difference from having that traction and I, I absolutely noticed after it took about three months of using the neck nest after you first gave it to me at that event where I noticed I was like, my chest was out more in my, my head was further back and you don't want kyphosis when your head comes forward.

One thing we haven't talked about. Is lymphatic drainage kind of walk me through what happens with lymphatic drainage and neck angle or back angle and things like that. So there's lymphatic drainage and there's glymphatic drainage. One of the things is when we talk about what, or when people talk about sleeping position, glymphatic drainage is this, your brain and your neural tissue.

Needs to detoxify and it does so at night and there's this flow of cerebral spinal fluid that occurs There's an influx and then there's an outflux of flow. So when you go horizontal, every, your joints don't get blood supply, so they swell. So there's a swelling that occurs at night. And it's thought that that swelling occur, that that swelling occurs more effortlessly when you're sleeping on your side.

And that's based on a research study. And I, and, and people challenge me on that all the time because I talk about back sleeping. Okay. And then people talk about, no, but the research says that lymphatic drainage happens more efficiently on your side. And I know that lymphatic drainage is critically important.

The cervical alignment and the, the, the, the cervical spine alignment is critically important in the lymphatic drainage. So I had to go find this research article and I'm going to put up a picture for you, Dave. Tell me if these two spines, do you think might react differently? Differently. So the spine on the left is the one that the research study was done on.

That would be our, our right because of the camera. It looks like a politician as far as I can tell. That's no, that's a rat. That's a rat. And the spine on the other side is a human spine. So when you look at the cervical spine here, it's curved. When you look at the cervical spine in the rat, it's reversed.

So, so in the study, that everybody's placing, like, all of this information on, Oh no, sight sleeping's better. It's based on a rat. And in the study, it says special statement. This is based on a rodent. We're extrapolating that side posture sleeping is better in humans also. And then I looked at every, everybody started quoting it.

Saying side sleeping, side sleeping, side sleeping. And it just doesn't make sense to me because I'm like, Glyphatic drainage happens most efficiently, it swells at night, and when you walk, and you get mobile, that's when the flow happens. And it's critically important that your cervical curve, you maintain a healthy cervical curve to decrease dural pressure and allow that alignment of that cervical curve to be able to, uh, allow for that drainage to come out of the brain and down through the CSF.

So, that is my, uh, that, so when we talk about lymphatic drainage and lymph drainage. When you're looking at just drainage as the issue, that's one thing, but when you're looking at, that's the research, looking at the wrong data, looking at the wrong variables. The most important variable about sleeping is reversing the damage effect of the modern day lifestyle being on a computer all day Be texting all day.

Our spines are getting destroyed Our sleep scores are getting destroyed because we're tossing and turning all night long You can fix your spine while you sleep get great get 30 percent better sleep scores by just changing your position And you can virtually eliminate neck and back pain by doing it while you sleep You It's just, it's, it's, it's, it's crazy to me that we are a side sleeping culture and I am trying to do my part to create the happiest, healthiest, most well rested people on earth by teaching them how to sleep in a different position.

Very well said. And it's one of those things, it's something that doesn't take any more time than what you already do. You just get more benefits. And those are the most powerful. Most powerful biohacks that you can possibly have you ready for a couple audience questions. Absolutely. I love it. Let's do it All right.

Let's bring Holly up It's just wondering with the neck nest Always fought with pillows to get it to put under the neck so I could balance the weight So I loved

you describing the counterweight aspect of it But is there any data or research you've done with what the neck nest might do for relieving TMJ symptoms?

Without a doubt. So I had a, uh, maxi lingologist, I don't know that maxiologist, the people that work on the, the, the mouth and, uh, in the TMJ on a podcast that we'll, we will be releasing. It's a sleep podcast. And the entire episode was about the TMJ because which she did, which I thought was brilliant. Is she related?

It's the only person that has ever thrown out Wolf's, I mean, Davis's Wolf's Law back at me. She's like, you know, due to Wolf's Law, the bone, the, the, the bone, the, the tissue aligns based on the stresses that it's under. So when you sleep on your side, breaking down the maxillary and you're causing temporal medibular dysfunction because of side sleeping.

So when you, when you sleep on, and we have a lot of people, we have thousands of people now in a neck nest. And, and we do a weekly call and what I like is that we've gotten so much, so many more testimonials not just on, on improved sleep, but they're saying, you know, my wrinkles on my face aren't happening as much.

And my TMJ is doing better. My headaches are gone. And that is all because of sleeping it with proper alignment. So yes, to answer your question, it will help by taking, by, by removing dural pressure at the base of the occiput, those muscles come over and attach to the TMJ on the backside. So it does, I'm working with dentists now.

It does release the tension in the TMJ. Very cool. That's a, that's a solid answer.

I would just say fixing TMJ is one of the most important things you can do to live a long time. And this very, very old episode of Bulletproof Radio with Dwight Jennings, I talked about that. Um, I spent a couple of years with, you know, bite alignment adjustments and all that stuff to get rid of lifelong TMJ.

It actually changes the shape of your jaw. And interestingly, James Nestor, when he came on, talked about doing something similar, you know, just realigning the jaw. So I'm not talking about breaking the jaw surgery. I'm talking about just over the course of a year or two designing the jaw. So it affects your nervous system in the right way.

And since the jaw and the vagal nerve are so intimately connected via the trigeminal nerve, it's no wonder if your jaw is tweaked, you're going to have

stress on the vagal nerve, which controls stress even in the gut throughout the body. And if you have a misalignment of your spine, it's going to affect your vagal nerve, which affects your gut, affects pain receptors throughout the body and all.

So in an ideal world, you get rid of the TMJ and you sleep in a good position or you get your adjustments. You do what it takes so that your spine works properly and you have way less pain and strangely better sleep, better digestion, less inflammatory response. Like, these are fundamental things to performing well.

You got to watch your food intake, right? And how much food you eat before you go to bed. That's significantly important. You got to, because the byproduct of food is heat. And remember, you got to protect your body core temperature. So the body will detox at night. It raises your temperature. Body metabolizes, metabolize.

Food at night raises your body's core temperature. Exercise at night raises your body core temperature. So, you know, some, some hints or things to do to be able to improve your sleep. Cut your food out at least four hours before you go to bed. Now, if you, if you want to eat something light, so your blood sugar level doesn't drop so good, you can do that.

But just watch your food intake. That's cool. So, I would just say, five hours before bed don't eat, if you really want to be maximal for that. At least three hours. There's so much good data about that, and FastlessWay, I went pretty deep on that. And so, yeah, eating right before bed, it doesn't, I'm going to say, it probably doesn't matter if you have a neck nest, if you eat right before bed, you're probably not going to get a good night's sleep.

You'll probably be better with a neck nest, but it's still not going to be good. And that midnight snack is so incredibly, incredibly harmful. I'm to the point now in my mid 40s, if I don't get at least an hour and a half of deep and an hour and a half of REM, I kind of consider that a sleep fail. And there are nights when I get two hours of one or the other and quite often two of each, even though I'm sleeping six or six and a half hours.

Uh, and this was not happening for me even two years ago. So, you know, a lot of different things have worked to make it happen, but I, I don't call it sleep age because I don't have your algorithmic purity, but I, I do realize I'm sleeping like a 20 year old, which kind of makes me feel good. If you're getting an hour and a half of deep sleep in REM at night, that is very good.

Like almost 20 year old. Especially in less than eight hours. Like it's unbelievable. But I do all of the stuff in my books and. I think the stem cells, the whole body stem cell makeover, I just did an episode with Marcella about that. I think that getting stem cells in my brain really did give me a younger brain because my sleep quality shifted.

Yeah, you were saying that, um, I was listening to that podcast, actually, that you think you actually shifted your circadian rhythm a little bit too. Yeah, that's really inconvenient. I, I woke up this morning at 6. 30. It's, it's still kind of dark at 6. 30. It's horrible. I mean, like, I stay up late and I write my books.

And I, I'm losing my, my writing time between 11 and, and 2 is the sweet spot for really creativity for me. And now I'm like, I guess I could go to bed at 1030, which is, it's been an impossibility for probably 40 years of my life to do that. And now it's like, yeah, I could go to sleep and then actually sleep really well.

And yeah, if I go to sleep by 1130, I do get at least an extra 20 minutes of deep sleep from doing that. And it's pissing me off. Interesting. Yeah. Yeah. I mean, I think what you're hitting on here is, is a topic that I find fascinating. You know, based on your circadian rhythm, there's probably a better time in the day to do different activities.

Oh yeah. Um, and that's something we're working towards in our, in some of our algorithm work is like, and this fluctuates if, you know, you've talked about it in some of your books with the different types of animals for different types of sleepers. Yeah. That that's, uh, that's Michael Bruce. Actually, those aren't my books.

That's the power of when I quoted him earlier. Oh yeah. Right. Yeah. But that work, it's totally real. Like there's a good time of day for sex. It was a good time of day for board meetings. And it, it's a big problem if, you know, your wife's time of day for sex is early morning and your time of day for sex is 10 at night, you're like, well, maybe we have to meet in the middle somewhere and it's time for, you know, that, that lunch meeting.

But, well, that's an interesting thing is what if you could say the best time that's convenient for the relationship? Well, he, he does that in his book. He explains it. It was mind blowing stuff because like, Oh, And if you want to ask for a raise, maybe you shouldn't do it when your boss is completely like a curmudgeon because they had to come into work at 8am and they're not a morning person.

Like, maybe let's do a little bit later. Right? Like if you're a salesperson, Oh, this matters so much. Uh, I I'm super stoked on it, but tell me, tell me what you've learned. Like, what do you, what are you learning in the lab about this? Cause Michael did it as a clinician. You're doing it as a university researcher.

You're going to get different results. Yeah. So let me just tell you kind of the way that I think about this with, you know, time of day and what sleep is actually doing. Okay. So the theory I subscribe to, and a lot of people in the research do as well, for one of the main reasons, there's many reasons, but one of the main reasons why we sleep is something called the synaptic homeostasis hypothesis.

And so Giulio Tononi kind of coined this theory, and it's basically that over the course of the day, the activation of your neurons gradually increases. And I think that part of why you have more creativity towards the nighttime. It's because you have an overall higher, higher neural activation. You're just kind of, your, your neurons are kind of firing at a higher level.

Basically, you can think of it like that. And the main function of sleep, according to this theory, is that during deep sleep, you down regulate all those relevant connections that you made during the day. Such that the relevant things to your survival rise to the top. So, you know, it used to be like, you know, don't go to that part of the forest because the lions are over there.

Now it's like, you know, what did so and so say about me at the office or something like that? And then that happens in deep sleep. You downregulate. And then in REM, you replay all the relevant things to your survival and then integrate that into your personality and your long term memory, basically. That is pretty epic to understand.

And what do I do with that? Even just sleep age. So someone figures I have an old sleep age, I have a young sleep age, or they look at the whole data set you just had there. What do you do with it? So this is the main thing that has also, you know, been at the front of our minds is like, All these devices, like, you know, Fitbit's like, Oh, you got so and so deep sleep.

What do you do with that information? Like, there's nothing that's that actionable about that. And so we're not just trying to track, but we're actually trying to enhance. And I think that's really where the field ought to go. So by more accurately measuring sleep based on your sleep stage. There's ways of actually enhancing your, for example, deep sleep in real time while you're sleeping through sound or temperature stimulation.

And that's something that I've been using your app to do, which is kind of cool. Yes, so there's two components of sound that we can think about here. A really low hanging fruit way to improve your sleep quality. It's to block out noise pollution. So this is something that, you know, and it's actually a socioeconomic issue too, where there's some recent research on this that's really kind of depressing a little bit.

But basically, you know, urban environments that are louder and sometimes poorer, the people in those environments often get worse sleep. And part of the reason for that is you, and this was something that was very surprising to me when I was doing this research, sounds wake up your brain all the time without conscious awareness of it.

So when people come into our laboratory environment, you know, we hook them up to the best wearables, we connect, connect them to polysomnography and we work with, you know, this fabulous professor at Penn State, his name's Orfeo Buxton, to conduct these trials. And then, you know, we have the EEG data giving us truth.

While we're looking at that data, we have, um, a post doc, Margo, uh, Shade, who actually, her specialty is the understanding of how sleep impacts pain perception, and that's another whole thing we can talk about. But she'll look at the brainwaves and then systematically administer sounds to people. And she'll literally play hundreds of these sounds to people throughout the night.

Louder than how I'm speaking to you right now. And people have absolutely no idea that the sounds were played yet. It's disrupting their sleep basically. So step one is mitigate that impact with. What we call is an acoustic cushion. So we basically measure the sound in the room and then adaptively ramp up the sound in order to mitigate the impact of noise pollution.

So that's step one. For me in hotels, I've really noticed a difference from just doing that with sonic sleep, uh, because. At home, the only noise pollution I had last night, I live on a small organic farm. A woodpecker lands on our chimney, and they like to peck on the chimney because it resonates, so they make a lot of noise to attract a mate.

And that's why I woke up at 6. 30 this morning. I'm like, I just wish that woodpecker would find a mate and stop doing that. But, you know, okay, that's not normal in hotels. It's elevators, it's people in the hallway, and it's just all the machinery in hotels. That I, I find I get worse sleep just because of that.

And when I turn on the acoustic cushion stuff just on the phone next to my bed in airplane mode, I do sleep better. And there might be another process that comes to mind for why that also might be. is, you know, there's a really interesting effect in the sleep literature called the, uh, first night effect.

And basically whenever some, someone goes, so I can use sleep environment almost always, they naturally have a little worse, you know, worse sleep quality. It's because your fight or flight response system is naturally a little bit elevated when you're in like a new environment. And kind of what we're, part of what we're doing with sound is that we're building this association.

But, by the way, it's ironic we have a siren in the background while we're talking, talking about noise pollution. Anyway, keep going. So I'm, I'm, I'm kind of such a, I'm, I'm a little bit more, I'll, I'll self inflict on my biohacking, I think, a little bit more than you. And I actually recently just moved to a very noisy apartment in New York City.

To try to demonstrate that I could actually resolve this problem. Without 20 million, you're not living in New York City in a quiet apartment. Sorry, like, it's just noisy everywhere. Yes. So, you know, I've actually tried to hack this in my own, my own environment. Is it working? So I, I have a kind of crazy setup.

So I've like surround sound speakers connected around like my window, and then also by my bed. And so kind of the whole house has this like sound cushion to it. Are you sleeping by yourself, I'm assuming? Yeah. Yeah. My sleep hacking takes a hit when I sleep with Lana, okay? Yeah, so I, I, I, I'm, uh, recently, uh, single, so I, I can really dive into some of this stuff.

It's, it's actually a gift because you sleep way better when you have that flexibility. And the bed partner is a really other inter, like, so I do sleep consultations with people too. And that was another thing that I was surprised by is pets and the bedroom partner are oftentimes major contributors to poor sleep quality.

I have an article called Split Blankets, Not Beds. All about trying to mitigate that relationship. Oh man, I love it. I'll link to that on Twitter or something. Lana and I switched about four years ago to split blankets. Yeah. And that makes a big difference. And plus, I like way firmer than she does. And sleep surface, I'm sure, is a variable.

So I oftentimes do like the paleo style sleeping wipes. I've got a one inch hard cell mattress. Otherwise, I'm on a really nice bed. But if we're sharing the bed

and we don't have separate blankets, she'll wake me up every single night. And then, you know, you look at this, you're married for like a long time, decades and decades, and you just get 10 percent less quality sleep for decades.

You know, you might get Alzheimer's from that. That seems kind of crappy because it's not that expensive to buy two blankets. Exactly. And you know, this is actually kind of an American thing almost to have one blanket. Like if you go to other cultures, I think in Netherlands, for example, it's much more socially acceptable to, uh, you know, not only have separate blankets, but sometimes even separate beds.

Something like 43 percent of Americans in a recent big survey said they would love to sleep separately, but they kind of felt guilty about it. And the state that wanted that the most was Texas. I don't know why, but it was a cool fact of the day, like 200 episodes ago. Yeah, that's, I mean, the, the global statistics, or like the statewide statistics on sleep are kind of interesting.

Like, for example, Colorado, I think is the best, is the state that sleeps the best. So we kind of diverted again, but with this, with the sounds, um, this is the really kind of sexy thing in the literature that brought me back to this topic. So I was actually making sleep algorithms for like your iPhone back in 2010.

You know, the standard, you know, sleep with the phone in bed with you kind of thing to measure your sleep. I made that with a, um, a neuroscientist from Canada, Mark Therian. And, um, we've actually validated that that task is just as sensitive to circadian rhythms. And. Your sleep need then something called the psychomotor vigilance task, which is your PhD thesis, right?

Yeah, that's what I got That's what I focused on for my PhD and we actually made artificial intelligence models that simulated performance on those tasks With stuff with like micro lapses in the basal ganglia and stuff like this So basically, if you don't get enough sleep, you are not good at paying attention and noticing stuff.

Yeah. You proved it beyond belief. You also, because we talked a lot about your acoustic cushion stuff, but you got almost a million bucks from the National Institutes of Health a couple years ago, and from the NSF to improve sleep detection and increase deep sleep. I want to know, given that we talked about sound, light, and temperature variables, and these are big things from Headstrong, my book, but these are what control your mitochondria as well.

Was that part of that grant? Did you, did you spend that million dollars figuring out what light, sound, and temp do? Or was that other stuff? Yeah. So this is, you know, basically what happened was at a certain point with the sleep detection, I realized that you couldn't accurately detect sleep with just motion alone.

And I actually gave up on trying to do this for like two years. And then when the Apple watch came out, I knew that that was the time. And so that's when we applied for all these grants and it was based also on this really sort of sexy finding in the literature that you can actually prime different brain states with sound.

So first and foremost, what our lab is focused on is how to use sound to prime deep sleep. So also when I was in grad school, this kind of famous professor with like 30, 000 citations to his work. It was one of my grad advisors, his name's Roger Parasurman, and he was a pioneer in something I think you're very interested in, Dave, which is transcranial direct current stimulation.

Oh, yeah. Basically, there's things like, you know, headsets that you can wear, like Halo Neuroscience that does some of these things. Do you mean like this headset? Oh, there you go. Yeah, so we were actually zapping people's brains with low levels of electricity in grad school. And they would let us do it to undergrads, because it really doesn't have a high, uh, It sounds a little, you know, sci fi and out there, but Basically, the Air Force is really interested in some of this research to try to make super soldiers.

I think that's where a lot of the grant funding came from. And there was a lot of evidence to show that you can improve, you know, mental performance with this. At the end of the day, the brain's connections are just a set of electrical circuits, right? And what they found is that they could get this similar effect with not just electricity, but also through acoustic stimulation, because the auditory cortex basically processes that information, converts it into electricity, and you could actually prime these brain states without zapping people, but actually with sound.

And so that's the main purpose of our NIH grants is if people get less deep sleep, can we actually use sound played at just the right time, and this is the hard part, the right volume, in order to get the brain to entrain to it without pushing the person into an arousal. And so we understand the science behind that basically better than everyone else, I, I think.

And we're the first lab to show that we can actually get this deep sleep stimulation effect. On something as, you know, easy to wear as an Apple watch or an aura ring. So like there's other devices out there that already do this on a headset form factor, like you mentioned the Phillips and there's another one dream, but where we can actually, we're the first ones to show that we can do it with just measuring heart rate and motion on, you know, Fitbit or Apple watch aura.

Which, you know, we think is pretty innovative and we show we can increase slow wave sleep and also next day cognitive performance In a paper that we just submitted to the Journal of Sleep. Okay, this is groundbreaking stuff Okay, going back 10 years You know, I'm sleeping with this incredibly sexy headset on.

And now you're basically saying with the microphone on a common phone, you can get this. So there's a microphone that gets it to some degree. And then if you have an Apple watch or a ring. Get out of the heart rate from the ring. You really need the heart rate to nail the effect. There's some benefits still with just the phone by your bedside.

And this whole like sleep with your phone thing is something I left way in the past. I do not, I'm not a proponent of that at all. Of sleeping with it. Like a lot of people sleep with their phone in bed with them. Um, if it's on airplane mode and it's near your bed to collect sound, that seems okay or no?

No. Yeah, that's fine. Okay. That's what I do. I think that this, this is something that I've personally, um, come to terms with recently is my phone addiction. And I think that this is one of the main reasons why we're, our generation is, you know, having some sleep issues, especially with sleep quality. Um, it's a major thing.

Arianna Huffington, she is, she's all about like, leave it outside your room or you'll die, and is a very big sleep proponent. And I'm, I'm always torn the data for me that says you did a good job, but my phone is exceptionally dim. I have a color filter turned on and I don't look at the phone. So for me, it's working.

And then I get progressive wake up alarms, which are also really nice where, you know, it wakes you up slowly at the top of a sleep cycle. That seems pretty worth it. But you're right. If you're addicted to your phone, get the addictive stuff away. So, so this is why it's so interesting to me. It's like. It's very, like, I don't like giving generic feedback sometimes, because I think it's very individualistic.

Like, frankly, most people sleep with their phone by their bedside. So first and foremost, we try to measure your sleep using that phone by bedside form factor and give you meaningful feedback. And also, this is a big thing that I think Almost always helps people wake up very gradually. That's the right way.

My life. It changed everything. Yes. And so we try to do that because we, since we understand how sound impacts your arousability and this also like sleep spindles, and there's some cool science on a lot of this stuff when you want to, if you want to get deep into some of that, I'd be happy to do so, but so we actually start a sound to wake you up gradually.

Yeah. It's almost imperceptible, and then it ramps up over a ten minute period in Sonic. I use it. It's, I feel so much better all day. Oh, you do? Yeah. And the difference, like try having a four year old run in screaming, and like your whole day is wrecked. I mean, seriously. Uh, that's, that's a big thing for how I perform the way I do is how I wake up.

So yeah, that's beautiful. And I love that it's built in. And part of this is also is to, there's a thing in sleep science called the cortisol awakening response. Are you, are you familiar with this? I explain it for listeners, I am, yeah. So, basically, you actually want a spike in cortisol when you wake up in the morning, like, it's healthy.

Yeah, it's important. It's very healthy, and I think one of the reasons why older people often sleep worse is their circadian rhythm kind of flattens out. And also, if you have stress throughout the day, like chronic stress, You actually respond by this, this cortisol awakening response decreasing. But by the way, if I'm jet lagged, I'll take five milligrams of bioidentical cortisol the second I wake up.

to induce that response when, uh, uh, when I need it. And I'm telling you, if you don't want to get sick when you travel, here I am with a super, you know, scratchy voice. Cause I just, you had a lot of dry air, but it's completely changed things. It's an old school, like 1950s hack for jet lag, but you, you need that.

And you also need an acid spike in the morning. So this wake up and drink, you know, some sort of alkaline water it's BS, but lemon juice or lime juice is great because it actually provides acid And eventually, it's metabolized to be alkaline later in the day. But you do get the acid spike in the morning.

So, get some cortisol, get some acid. Those things are supposed to be bad, not when you wake up. But you don't want to slam it on, which is what happens when the two year old or the, you know, fire engine honking or something

wakes you up. A startle thing is you dump all the cortisol. And if you get a normal cortisol ramp that starts right before you wake up, And I think with your app, that 10 minute slow wake up allows cortisol to come on slowly.

See you next time on the human upgrade podcast.