Announcer: Bulletproof Radio, a state of high performance.

Dave: This is an upgraded and reworked combined episode of Bulletproof Radio, full of details about technology and gear that help you vastly improve the quality of your sleep. This is the episode for you.

Dave: Sleep, we all want a piece of it. Either you're getting some or you're not. I've shared with you all the ways that I hacked my own sleep and how it changed my life and how I'm up to the point where I can get about two hours of deep sleep and two hours of REM sleep in six hours, which has been really transformative for how I feel, even how I look. On the show, I've brought in top sleep experts to share their research and offer up some really solid hacks you can use and since sleep is one of the things I get asked about the most, I just created a multimedia sleep series as part of better sleep month, although frankly every month should be better sleep month.

Dave: I've chosen the most compelling and useful interviews from Bulletproof Radio, the coolest articles from the blog, and a batch of different videos. Each week, I'm going to bring you the best Bulletproof tips and tools for sleep that I know how to gather so you can start sleeping better. Get hooked up with sleep on the blog at blog.bulletproof.com and check out dave.asprey on Instagram, where I post all the good stuff. Listen on, read on, and get your own piece of the night.

Dave: Today's guest is Harpreet Rai, the San Francisco based CEO of Oura Health, a company that developed the Oura Ring. You might have seen me on social media wearing a distinctive looking, shiny, black ring and I've never been a fan of wearing rings because they tend to get in the way unless they're doing something really valuable. I was CTO of one of the wristband sleep tracking companies called, Basis, that was acquired by Intel a while ago and I've been tracking my sleep very carefully for more than a decade because it's allowed me to write some of the very first blog posts about how to hack your sleep, how to take control of your sleep, how to get more out of the amount of time you spend with the lights out and your eyes closed and for me, the pain point has been wearing an ugly headband that my wife didn't really like or a chest strap or even a wristband that didn't get great data and there's been an evolution in the technology of that and when I saw the Oura Ring about five years ago, I got really excited because it's a ring that does all the tracking that I was hoping to do with these other devices and I've been using one for quite a while.

Dave: I wanted to bring Harpreet on to talk about what they're doing, to talk about what heart rate variability does to help you control your sleep, know how well rested and recovered you are, and he was nice enough to come and meet with me live at Alpha Laps, so we can get deep on sleep circadian rhythms and why Harpreet believes that sleep is the foundation of your body and your mind instead of coffee. Harpreet, welcome to the show.

Harpreet: Thank you, Dave. It's awesome to be here and honesty, just gratitude also as a listener. The information you put out there just helps people learn every day.

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Dave: Harpreet, you've been in investment banking, you've been an entrepreneur, and you decided to join and lead Oura, given a bunch of different things you could have done. What made you decide you wanted to focus on sleep?

Harpreet: I think sleep is honestly one of the greatest bio hacks or biggest performance enhancing thing that you can do. I think in today's society, it's harder to get sleep. I think we're constantly being pinged by our phones, pinged by social media, there's Netflix, there's all these things to sort of distract you from it, but I do think sleep is the foundation of our health and the foundation of our body and mind.

Dave: All right, that was a great PR canned answer but here's the deal man, sleep kind of sucks and sleep has pissed me off for years because it keeps taking away time from stuff that I want to do that seems like it's higher value and I've had to change my perspective on sleep from, screw that noise, I don't want to do it, and I'm not going to do it and you can get away with that when you're young, especially, and say, I'm just going to soldier through and you do have a performance decline when you can measure on various tests of executive function, short term memory, things like that but you can also learn the way Navy Seals do, to be resistant to lack of sleep, to perform well even if you're tired by taking certain functions from your conscious brain and sort of making them go into automatic mode, reducing load on the brain, taking Modafinil like I did for eight years, which, by the way, is a heck of a way to handle a poor night's sleep but I also realized, every time someone would say, you should get eight hours of sleep, I'm like, yeah, I tried that.

Dave: I didn't feel that much better and the ROI on the extra two hours of sleep ... I sleep six hours and give minutes, just never seemed like it was there. You're saying, yeah, sleep is the foundation, sleep is good. We all heard we should sleep eight hours a day. Our moms told us that when we were five but what's different? What's new about sleep that we didn't know before?

Harpreet: Sure, I think what's new about sleep is a ton. It's not just the length, as you mentioned but it's actually the quality of sleep. We can and some people, I would say two thirds of the population do get eight hours of sleep but the quality of the sleep is actually probably what's lacking and I think it's the quality of sleep that we're learning more and more about as a society, how much deep sleep do we need? How much REM sleep do we need? What do those two different things even do to our body and our mind and having information on sort of seeing the different choices you make during a day, what time you eat, when you have that last cup of decaffeinated Bulletproof coffee, can have an impact on your sleep and so I think learning how you decide to make these choices on when you exercise, when you eat, what supplements you take when, which supplements are the most effective, a lot of these things can be reflected in your sleep and the quality of your sleep.

Dave: I found that there are really highly individualized and a lot of my work in Headstrong and even the early blog posts on Bulletproof have been around, here's the biochemical explanation given what we know, which is a very small amount of what we will know about the human body and so given this, this auto work, let me test is for my sleep. Let me test it on a few friends for their sleep and then writing hacks about using raw honey

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before bed and the Bulletproof blog was the first one to do that and then a lot about lighting in the room, what actually happens if I black things out obsessively and turns out, I notice massive changes on my score in sleep than if I had a few LEDs on or the curtains cracked, I didn't sleep as well, even though I still slept the same amount and so I started sharing that knowledge but this was from the perspective of a biohacker. You've got a substantial amount of data. Can you disclose how much data you have in the Oura database on sleep?

Harpreet: We haven't disclosed that yet but it's-

Dave: Come on, just do it now.

Harpreet: Actually, I'm trying to think because the numbers are growing every day.

Dave: Yeah, you can ballpark it.

Harpreet: The company started five years ago and our gen one ring, some of the first shipments probably have made two and a half to three years ago and so the amount of nights that we have seem cumulatively on what we consider pretty highly accurate data, yeah, has been tremendous over the years.

Dave: It's got to be hundreds of thousands of hours or-

Harpreet: Oh yeah, millions.

Dave: -tens of millions of hours.

Harpreet: Yeah, we haven't disclosed how much and unfortunately, I'm not going to disclose it today but I will say-

Dave: But you could, you're just not going to because you lack respect for Bulletproof Radio.

Harpreet: No, it's not that.

Dave: I'm just teasing you.

Harpreet: No, I think we will actually be releasing a lot more of this data and actually sharing the data from different cohorts of people and frankly, even one of the things you brought up in the past, trying to show sort of tags of people and certain things that they're doing in their data. You will be seeing this self-manifest, seeing these thoughts manifest itself in something in the Oura community and that's going to be coming soon. I just don't want to spoil it for everyone.

Dave: I totally get it. So based on the data, who sleeps better, men or women?

Harpreet: Actually, mostly women.

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Dave: Women have an unfair advantage for sleep.

Harpreet: I don't exactly want to say that but yeah, the data would indicate yes.

Dave: Okay, why?

Harpreet: Look, I think a lot of probably ... A lot of it has to do with just the type A personalities we probably have in our database. We do have more men, so that probably skews the data but I also think men are probably drinking more, they're probably eating later. I think they tend to work sometimes way late into the night, which can disturb their sleep. Women do those too but we just don't see it at the same numbers. I would actually ask you, from all your experience in tracking sleep over the last 10 years, 10 plus years, why do you think men sleep poorer?

Dave: I don't know that my experience is that men sleep more poorly than women, you have more data than I do, but I find sleep problems are very different. You don't see nearly as many men who say, I wake up between three and five AM and I can't go back to sleep. That tends to be a problem with women, right? And that is usually a blood sugar regulation issue and it can actually change based on monthly cycles, right? And then women tend to be negatively impacted by long-term unending ketosis or intermittent fasting every single day, instead of doing alternating schedule, the way I recommend in most of my books and there, if you're blood sugar crashes in the middle of the night, the brain says, well I need some glucose here, especially if you have no key ketones present, you didn't get a little bit of brain octane before bed or you're not fat adapted, when you run out of energy, the brain says, okay, doing sleep is mission critical and if I have no energy, the organism is at risk.

Dave: I know a really fast way to make glucose. Let me secrete adrenaline and cortisol and when you do that, it has the great effect of turning muscle into glucose and there you go, brain is happy. I got glucose and you're sitting there going, why can't I go back to sleep? It's because you just got stress hormones to stabilize your blood sugar and for more women than men, that trick of one to two teaspoons of raw honey, not cooked honey, and by the way, if you put raw honey in your hot tea, it's not raw anymore but so just eat it on a spoon and do that right before bed and brush your teeth and all that and that tends to solve that problem or and for some portion of men and women, they can do collagen and brain octane and that combination can be very calming and this is because glycine, the amino acid in collagen, the primary amino acid unlike muscle protein, can be calming and relaxing, at least I think that's why it works and so it's kind of funny.

Dave: You can do that and that's a bio energetic problem and there's also, depending on kids, if you have mommy brain, guys don't normally get this and so if you have young children in the house, mother nature wires women to wake up at the slightest sound because it could be a tiger eating your baby and this is really useful if you live in a cave or on the savanna and it sucks if you have kids under two or maybe even five years old because it's just going to happen, so then quiet in your room is really important.

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Dave: Oh, but you're in a city, you probably won't get that. So then I recommend tracking your sleep so you know how many times you're waking up that you may not notice and there of course, the Oura Ring is fantastic and I also recommend things like sonic sleep, which is an app that measures the sound level in your room and then makes white noise based on the volume of level in your room and then when you're in deep sleep or REM sleep, it makes changes to the sound to cause you to get more REM sleep and more deep sleep and that's one of those ... A couple bucks for the app sort of thing and I use that when I'm traveling, especially-

Harpreet: Same here.

Dave: You do the same thing? So that's another area where like, okay, what's going on with men versus women? Is it a noise thing? Is your brain primed because of hormones? Do you have some other dysfunction or maybe it's just bright lights, which I think affects men more than women.

Harpreet: Yeah, actually that is one thing we have seen in our data, that men do tend to have actually, it seems like more sensitivity to light. What we do find though from actually the women in our database is they tend to go to sleep at a more consistent time, ironically, than men. I don't know if it's that they're more maybe in tune with their bodies or listening to it more and part of it just has to do with the demographic of our user. We probably have women that are slightly older and past their first child, so they're probably just in more of a schedule and part of the problem is, we probably have, like so many listeners on this audience on the male side, men who are pretty focused, type A personalities, will work hard late into the night and wake up in the morning and work out. Some of it can always be skewed just by the data we have based on our user base but there's tons of interesting, I think, correlations and tidbits that we'll be releasing in the future through the app.

Dave: In the early generation of the first Fitbit, the Basis wristband, where I was CTO, that was cross fitters and marathoners and heavy duty athletes coming in first as early adopters and I think for sleep tracking, we've all heard, oh yeah, you should get eight hours of sleep. It turns out the data doesn't support that from big studies but you should get quality sleep until you're rested and your heart rate changes and I think that's crossed over from crazy bio hacker early adopters into, wait a minute, if there's one thing I could do today in order to feel better, it would be sleep better instead of exercise more.

Harpreet: Yeah, look, I think the stats actually speak for themselves, right? 15% of the population works out on a weekly basis but 99.9% of the population is sleeping on a daily basis and that sleep that you get every night, whether you're going to work out or not work out the next day, is going to have a huge impact on how you feel, how you perform mentally, emotionally, and physically. I think one of the reasons we focused on sleep too is that sleep ends up being a leading indicator and sometimes activity can be a lagging indicator, right? If you get enough sleep and your heart rate variability is high and you're in that parasympathetic state, you're going to perform better in activity the next day, right? And there's numerous studies that actually show that. I think trying to get people in this mentality of, focusing on tomorrow today by focusing on sleep first, gets you ready in this mindset for what's going to happen tomorrow.

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Dave: I would support that in my own experience and it's really easy to say, Wednesday is when I scheduled my heavy workout for the week and if you've read the recommendations in the Bulletproof Diet and all, high intensity interval training once or twice a week. So you've got it scheduled, you're meeting your friends, you're going to go do something that makes you cry for 15 minutes and then you're done but if you got crap sleep the night before, you actually will be better off standing on the sidelines and cheering your friends on and taking it easy and that is not something that's convenient to schedule ahead of time and if you thought you were going to get a great night of sleep and something, even if you don't know what, just jacks that up, you might wake up and say, I'm a little tired but I'm just going to shake it off but if the data that I see on my phone when I wake up says, God, I didn't recover last night even though I wanted to and oh, I'm just going to go whack myself over the head with heavy exercise today, it doesn't give you the return on investment and the time and energy spent exercising. You're better off to get a massage.

Harpreet: Yeah. Look, I think matching sort of load and recovery is one of the hardest things or has been one of the hardest things for people to do. I think you're seeing this now in the pro athlete world and obviously you know a bunch of people there as well and they're starting to get smarter about, okay, football players had a tough game on Sunday. Does it really make sense for them to come back in, they were on the road, they had a game that went into overtime, they got beat up and have them hit dead lifts the next day? Probably not. Their nervous system is fried. They're probably in a sympathetic state. Their circadian rhythm is thrown off by the travel and so I think what you're starting to see is people realize that, wait, I want to break down that muscle, I want to work out hard, but the time to do that is actually when I'm most recovered. That's when I'm going to get the best ROI.

Dave: I was really impressed when Nick Foles came on the podcast and talked about being a Super Bowl MVP but his recovery stuff was at least as obsessive as what I do at Bulletproof Laps and even started the Bulletproof upgrade labs and spun it out as a new company because I think recovery is as important as exercise and no one recovers without sleep. You see pro athletes come in, even some of the WWE pro wrestlers like Nikki Bella, who's been on the show as well. Talk about a hard life. They fly to a different city every night, every other night, and have these incredibly grueling bouts and then they're on a plane doing it again, 250 days of the year. You want a crucible for human performance and recovery, it's at those extremes where you learn the most data and I'm helping Nikki with her recovery, so she can be a better professional recovery artist, so she can be better in the ring and it's fascinating because all of them, how do you sleep? And every single celebrity pro athlete, it's jet lag, it's time zones. I just need more sleep or I need better sleep.

Dave: If they get their data and I usually recommend to these types of people, you need to track this. It's not optional. Get a ring but when they get the data, what do they do with the data? What does anyone listening to the show who says, okay, I got a great night of sleep, what do I do with that or I got a crap night of sleep, what do I do with that? What's actionable from this?

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Harpreet: Sure, I think that's one of the biggest questions in wearables and frankly, I think focusing on sleep makes it a lot easier and understandable. What we're seeing is actually ... We talk about the pro athlete world, right? Their trainers are there helping them interpret the data but I think we've made it pretty easy in the Oura app to look at it and say, hey, did I get a good night sleep score? We give you a number based on all the different characteristics we see during your sleep, looking at your REM sleep, looking at your deep sleep, looking at the amount of time in bed, versus the amount of time you're awake, how efficient you were and we will actually tell you that, hey, your sleep score is really good today. Today is a good day to push yourself and actually get some activity in or vice versa.

Harpreet: Take today, I had to wake up pretty early to come out here to sunny Vancouver Island and unfortunately, because of that, I didn't get to bed early enough. I had a dinner meeting unfortunately and I only got six hours of sleep, actually more like five and for me, it's like, okay, my readiness score is low, my sleep score is low. Today is not a good day for me to exercise because I'm actually probably going to do more damage and the science actually supports that, when we're getting less than six hours of sleep, our risk for injury goes up by over 50%. We know that if I'm not getting enough deep sleep, I probably don't have a high level of free testosterone that day.

Harpreet: I think we're seeing people take our data, take our scores, and adjust honestly how they train and what they do and frankly, because of things like Upgrade Labs, we're starting to see people go and spend more time on recovery, spend time doing hyperbaric chambers, spend time doing float tanks, spend time doing IV therapy or even infrared light therapy and I think as more and more of these things come out that help people actually recover, we're just going to see that industry grow. I think if you look at sort of the sleep industry as a whole, it's now 40 billion dollars, all the things that people are spending money on to help improve their sleep and it makes sense, right? How you perform physically, how you perform cognitively, is all based on your sleep.

Dave: What about weight gain and sleep? Talk to me about your own experience there.

Harpreet: Oh man, so yeah. I graduated college, I did study electrical engineering, hardware engineer, but I decided to go into Wall Street. It was 2006, it was just getting to sort of the peak, right before the crash in '08 and I actually ended up going into investment banking and I probably averaged about four hours of sleep a night. I came into investment banking weighing 140 pounds. Guess how much I weighed after one year?

Dave: 200?

Harpreet: 185. I almost put on a pound a week, almost, and I was eating less. Yes, I wasn't working out but I was still eating pretty healthy, right? I'd have mainly keto diet, low carb, or at least paleo but just by the lack of sleep and we can talk about some of the hormonal stuff, I know ... Yeah, that'll be a ton of fun but I just saw it in myself. I was literally gaining almost a pound a week. I mean it's pretty infuriating to just all of the sudden be not really doing anything, not eating that poorly. Yes, I don't have the time to exercise because of my job at the time but just gaining that weight was extremely frustrating.

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Dave: What I found and what the data supports is, exercise really doesn't help you lose weight or if it does, it's very painful and you don't keep it off because of hormone changes. You're nowhere near 185 pounds now. That or you're carrying it pretty well. So you're not 140, where are you now?

Harpreet: I'm probably 150 right now.

Dave: Okay, so ... You look healthy.

Harpreet: I'm also 12 years older.

Dave: Yeah and you're way ripped, so it's all good. No, I'm just kidding but you look like you're in reasonable shape.

Harpreet: Thank you.

Dave: And what did you have to do? Clearly four hours isn't enough and I'll tell you my own four hour night story but how did you shift from four ... How much do you sleep? What was the effect on your weight when you did that?

Harpreet: Yeah, so after that one year of actually starting to ... In the age of 22, seeing my hair gray and lose some hair and most people probably can't tell, just because I wear a turban but I was starting to lose some hair, I gained a ton of weight, and honestly, my parents looked at me, they're like, are you sure you want to be doing this? And they were absolutely right. I did leave investment banking. I still went into a stressful job but at least started to get seven hours of sleep. Actually, right around the same time, I started adopting a keto diet.

Harpreet: Back in 2009, 2010, and frankly I wish I had known more because I would have done it more in cycles but started doing keto, started doing Bulletproof Coffee, ended up working out, not a ton, but at least three times a week, two to three times a week, and I just found that sleep became such a central part of my life that it determined how much I ... how I could work out the next day. It determined how I'd perform at my job the next day and so for me, just honestly learning and having that experience with sleep and just sort of seeing that weight come off with almost less effort than I would have thought, just because I was focused on sleep, was a huge eye opener.

Dave: The amount of sleep you get is well documented to control how much fat you put on. When I finally perfected the Bulletproof coffee recipe, I was just starting the company and I decided that I would do an experiment and I was really, frankly, still kind of angry about the fact that I had weighed 300 pounds and the fact that I had exercised every day, six days a week, for 18 months, hour and a half a day, went on a low calorie, low fat diet, and still was fat and just fat and tired all the time and when I realized I could lose weight eating a lot more food and feeling good, I said, I'm just going to do an experiment for the blog.

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Dave: My son had just been born, so this was a really good time to do a sleep restriction experiment and I said, I'm going to eat 4,500 calories a day, sometimes 5,000, sometimes 4,000, but an average of 4,500, way more, that's about twice what my body needs at my current ... at least my heavily detailed quantified based on that metabolic rate is 2,292 calories a day or kcals I burn, so I'm eating a lot and I said I'm going to double my calories but I'm going to eat the Bulletproof diet because I'm writing this book on it, I'm doing the blog on it, and I'm going to restrict my sleep to always less than five hours a night and the goal is four.

Harpreet: Wow.

Dave: And I said, well and I'll use this extra time, even though I'm a VP at a big company, I'll put it into the blog, I'll put into Bulletproof and just sharing all this knowledge that no one told me and I thought, okay, I'm going to gain three pounds and the data is going to say I should have added 10 pounds, therefore calories in, calories out, has some asterisk. I stacked the deck against me. I took digestive enzymes to make sure I would absorb all the fat and I was like, yeah, I'm going to gain a few pounds and I actually lost weight and was really surprised at this because it should not have happened but it did and I ended up continuing that for a long period of time and that said, my telomeres are probably shorter as a result of doing it but I did start what's becoming a successful company, while I was a VP and a new dad and it was a great use of time and I felt energetic the whole time.

Dave: There were times when I was tired and I'd just kind of power through it but it's doable and what I realized over the course of time, I wrote about, how do you squeeze every drop of sleep out of that four or five hours you're going to get and became militant about every little thing and since then, I've been tracking my sleep reliably for the past five years and I get six hours and five minutes a night of sleep. I think I have in the latest thing about 1,950 something day's worth of data and I was sort of thinking, all right, is this bad? But all my labs are getting better. I'm 11% body fat and my energy is really good. It's better than a lot of the people who I work with, or at least on par, and I'm getting older, right? What's going on there?

Harpreet: I frankly think it's everything you've done to optimize your whole day and everything you do before you go to bed, so I think part of it is you're wearing blue light blocking glasses, you're getting your body already primed to be the most effective when you go to sleep. You're doing thinks like a hyperbaric chamber, you're doing things like infrared therapy, both at night and perhaps even in the morning.

Dave: Oh yeah. I live at the first Bulletproof labs, right?

Harpreet: Exactly, alpha. I think what's great is, you have found and discovered and brought all these different tools to your audience on hacks that you've done to figure out how to optimize your sleep. Modern man has access to these tools. We didn't have access to most of this stuff, frankly even 30, 20 years ago, right? I think as more and more of these things get commercialized, access is available through things like Upgraded Labs, I think you're going to be able to ... People are going to be able to hack their sleep and get more and more efficient and I think that's going to work for a lot of people.

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Harpreet: Everyone does react differently. I know you're a big believer in [inaudible 00:27:05], as am I, and so for some people, six hours of sleep and doing all these things probably will help optimize the time and bed and for others, they might find that actually like Lebron James or a Tom Brady, where hey, given the high load that they have in their life, they actually need more. I think people ... The hard thing is, how do you know what's working? How do you know what part of your diet is working. How do you know if honey is actually working for you before bed and so you need access to that data to be able to see what's working and what's not and we designed Oura literally for this, for people to figure out, yeah, I'm in a pretty, I would say ambitious part of my career.

Harpreet: I'm trying to run a startup. We have most of our team overseas, so for sure, I think I am probably getting less sleep on average than I used to in the years prior to this. That being said, the amount of things that I've learned and the amount of packs that I've done as well, have helped me really get a good quality six hours when I get it.

Dave: One of the blog posts that actually made people really mad in the early days of Bulletproof is ... I might have chosen an inflammatory headline but it was something like, 1.2 million people prove that eight hours of sleep is too much, or something along those lines and I found a study where the data was collected in the 1980s and it was so much data, they couldn't crunch it on 1980s computing, so they put it in a drawer and someone found the data and crunched it on modern compute and it was the first study that allowed you to have granular data to see the difference in outcomes over even a half hour difference and they found that the people who lived the longest, slept six and a half hours a night and people who sleep eight hours a night, consistently die more than people who sleep seven hours a night and of course the conclusion that you could draw from that is, clearly sleep less to live longer.

Dave: Which would be the wrong conclusion but what I took away from that is that people who live the longest are the healthiest people and the healthiest people require less sleep because they require less recovery because they're not dealing with some chronic thing, they're just dealing with the stress of life and they probably have healthier, happier outlook on life. Their anxiety levels are lower and they're getting higher ROI on their sleep or they have a lower burden before they need the sleep. For me, lowering the burden was a big part of my practice there and when I hear someone who says, I just can't get by without nine hours of sleep, it's possible there's a genetic thing going on or something like that but the more likely thing is, you're sick and you don't know it or you don't know how to get quality sleep.

Harpreet: Yeah, look I have a personal experience with that. My girlfriend has Lyme disease and she was sleeping and I was sleeping longer ... We've been dating for almost five years and she would always sleep longer than me but yet wake up feeling like crap, right, and basically when we started to look at her data, she had no deep sleep and we went and got a full sleep test done, got it done at ... I believe it was Cornell, great medical school, and what we found is actually she has something called hypersomnia, where she would fall asleep really really quickly, not actually fall into the correct cycles of sleep and even though spending eight hours in bed plus every night, she woke up feeling tired and you were right, it was because she was fighting something off that she didn't know about at the time and so I would completely agree.

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Harpreet: I think it's a balance. Really what we're striving for at Oura is helping sort of balance this load and recovery and that load can be sort of self-induced. It can be working out really really hard, it can be working until 2 AM every night, trying to run a few companies, probably like you've done at different points in your career, or it could be actually that there's something not right. There could be a chronic disease that you're fighting. It could be some type of, in this case, mold related type infection. I think having access to that data will let people sort of know, is there something else going on with me? How do you really know if you're sleeping better? Oftentimes, it's really hard to tell.

Harpreet: You're actually unconscious when you're sleeping, so how do you know how you really feel? Most of us sort of guess based on how we feel the next day and I think the Pittsburgh sleep test, done at the University of Pittsburgh where that sort of qualitative assessment came in, has just been proven to be inaccurate. People don't really have good memory recall on how they slept.

Dave: Yeah, you're just not going to be great when you wake up in the morning. Although I did find after a year or so of tracking my sleep with real data, I did learn how to correlate how I felt with the quality of my sleep. I could wake up and say, based on how I'm feeling, here's what I think my sleep score on my Oura Ring would be and you can be reasonably accurate-

Harpreet: Pretty close.

Dave: -because you've learned. What could people who don't want to go out and buy an Oura Ring do to more accurately gauge the quality of their sleep when they wake up?

Harpreet: I mean there's different types of tests you can do. I think some people have been doing this that don't have an Oura Ring, will do a heart rate variability test in the morning. For your users or your listeners who don't know, you put on a chest strap, you lay in bed for 5 to 10 minutes, and you use some type of app to connect that chest strap to your phone and get an assessment of sort of where your HRV is. That could be something and sometimes chest straps are cheaper than an Oura Ring.

Dave: Some of them are 20 bucks.

Harpreet: Yes, yeah.

Dave: In fact, in the Bulletproof diet, which came out in 2014, its first print before it went into paperback, I had a heart rate variability based app because it can tell you the quality of your recovery and your sleep, it can also tell you what's going on after a meal if you eat something you're allergic to. There's all sorts of interesting data points there but very few people are going to sleep with a chest strap on. It's just not ... It's not something that will happen unless you're either an extreme high performer, professional athlete type, or if you're really sick and you're desperate and I've never been a professional athlete. I like to think I'm a professional bio hacker but I've definitely been really sick with Lyme disease, which comes as a result of toxic mold exposure and fibromyalgia and

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arthritis and high risk of heart disease, all these things, obesity, and having said, I'm not going to do this anymore. I'm done.

Dave: It was that motivation that made me be willing to sleep with a chest strap and all that, I just never liked it and to be able to just have a ring that I don't notice, that gives me better data than I was getting from that anyway, because I actually use it. Whereas the other thing I was going to bed, screw that noise, I won't do it tonight. I'm grateful to have that ability, I just think about all the people who aren't going to go to go do that. Is there something to pay attention to, maybe ... Here's a hack that I know definitely correlates with toxin exposure and very likely with sleep is grip strength in the morning.

Dave: When you wake up in the morning, if your grip is weak, you probably got bad sleep or you ate or breathed something the night before that messed with your system. You can get a digital grip strength gauge, which will do that. I have one but that's 100 bucks or something and now you're like, okay that's a pretty weak metric compared to a ring and at least in my case, it doesn't ... I pretty much maxed the thing out and it says I have a strong grip for an 18 year old, but I'm ... I don't know that I'm getting good data anymore but N equals 1, right?

Harpreet: Yeah, I think some of ... Actually some of our team, they do an orthostatic test in the morning. Checking sort of the heart rate change after you stand up, so that could be one and I've seen people estimate that just by sort of counting their pulse as well. There's things that you can do for that. I mean there are different sort of CBT type reaction time tests, also as apps.

Harpreet: That's another thing that people do in the morning to sort of just test cognitive function. That could be a quick hack, something that you try and frankly, I think a lot of it is, you can just ask yourself over time and this does get harder in today's society but, how are you feeling every morning and I think if you do that consistently and you take the time to do it, you really have to look inward. If you're not feeling great and you have low energy, then okay, maybe you should start looking into this. Maybe that Oura Ring might be worth it or maybe you start doing an orthostatic test first, see if that data jumps out as irregular and then maybe decide, hey, I should look into this further.

Dave: And for the data [inaudible 00:35:43] bio hackers amongst our listener base, which is a minority of people but there's lots of us out there, we'll totally do that because we're curious but I like the idea of, I put a ring on, I wake up in the morning, I get a sleep score that takes into account my heart rate variability, the amount of sleep, and all the other data available and says, you're about this rested. Your sleep was about this good. Use that and move forward. When I compare that to the daily, how am I doing metric, part of the research that went into my new book, Game Changers, that is on Amazon right now as a pre order ... By the way, did you guys notice the plug right there? Go to Amazon and pre order Game Changers, thank you.

Dave: Anyway, it is ... I did a daily satisfaction with life metric. It was, how much energy do I have? Do I like my relationships, my job? Is life good or not? And I tracked this every day for a year and tracked it and compared it to frequency of male orgasm and came up with data to test some old [inaudible 00:36:46] equations and it turns out there is all

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sorts of data you can get if you take what you know, whether it's how rested and recovered are you, from your ring or just your observation of, do I like things? As long as you track it over time, you can correlate it to all sorts of things, probably including what you had for dinner, including how much social interaction you have, and you start to realize, the things you do in your life affect the quality of your sleep and the things you do in your life affect the quality of whether you like your life or not.

Harpreet: Yeah, I mean there's scientific papers, numerous of them, sort of correlating mood and quality of sleep. For sure there's lots of hormones that are released during when you sleep and a lot of them do have to do with emotional balance and cognitive balance as well. That makes a ton of sense. We've seen it actually from our users, just when you asked me earlier, how are people using the Oura Ring?

Harpreet: Well people are starting to realize that actually if you eat a pint of ice cream before you go to bed, you end up having low heart rate variability, a high resting heart rate, most people won't get that great of deep sleep or REM sleep and as a result, you sort of feel like crap the next day and so I think you will start to realize that it's actually your lifestyle actions, what did you eat last night? When did you eat last night? Did you drink? That do have an impact on actually how you sleep and part of that can be also just cumulative stress. You could be in a stressful relationship, you could have a super stressful job where you're really not jiving with your boss and those things are going to have an impact on your sleep and then vice versa. It's an unfortunate negative snowball that if you're getting a poor night of sleep on top of all this other stress, then the next day is just going to be that much harder.

Dave: Beautiful and thanks for being on Bulletproof Radio.

Dave: All right, let's get going. Today's guest is a huge challenge for me because I am going to attempt to say a name in Finnish. Are you guys ready? His name is, here we go, I'm going to say this right. Petteri Lahtela. Petteri is the CEO and co-founder of Oura Health and he's a series entrepreneur with 25 years of experience. I'm really interested in having Petteri on to talk about monitoring yourself and the reason I think that you'll care about this is that when you can get a little bit more data, particularly around sleep quality, it totally tells you whether what you're doing works. Welcome to the show, Petteri.

Petteri: Thank you very much. Very nice introduction.

Dave: All right.

Petteri: It's an honor to be here with you.

Dave: Thank you and I appreciate that you're dialing in on this call from Finland and so for me, it's morning but for you, it's evening.

Petteri: Yeah, that's right. If we would follow our chronotypes, I think it should be opposite. You having in the evening and I in the morning.

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Dave: Are you one of those disgusting morning people?

Petteri: I'm a lion. Yes, I'm a lion. Yes.

Dave: And I just have to say, we've all heard that, the early bird catches the worm. That common aphorism but the second part of that never gets repeated and it's that the early bird works for the late bird, I'm just saying. No, I'm just kidding. There is no moral superiority from waking up early or waking up late, it's just about your chronotype and that's a cool thing. All right, so let's get back to this cool tracking stuff. You're getting heart rate variability reports from just wearing a ring and they show up on your phone. What does that tell you? What can you get from heart rate variability this way?

Petteri: Yeah, so first of all, something about heart rate variability, of course you know a lot about it, about for listeners that someone who is not so familiar with that, heart rate variation is something that ... It's so sensitive a parameter that basically everything in your life affects that, so it's really important to know the context, when you can measure it, and so that you are not infecting subjectively or with some stimulants that the actual reading. Our perspective is that the most valid time to measure your heart rate variation is during the night, so when you sleep.

Petteri: The ring calculates HRV for each five minute period. It measures every beat and the time between the heartbeats and it calculates over the five minutes periods, it calculates the heart rate variability and then it shows that average value there in the app. In the cloud UI, you see actually the whole curve over the night but through that and especially as a trend, so how your heart rate variation is varying over the time, that's really important information. In relation to your sleeping patterns, how they change over the time. It tells you the direction, how your auto nervous system is tackling with different stressors in your life, mental, physical, stressors, whatever. It's always a combination of those. You can get a good indication that where you are heading to.

Dave: You can use the Oura Ring to tell you when you should apply stress that makes you stronger because you have less of the stress that makes you weak, is that a good way of explaining it?

Petteri: Yeah, definitely. This is really important in relation to stress because many people have kind of negative annotation to stress and it definitely is not negative. We always need some stress to perform at our best, so Usain Bolt, when he's on the starting line of 100 meters, if you would measure his in high stress situation but the effect is that you get the best out of yourself that way. That's why basically we don't talk about stress, just many people have negative association to stress. We have turned the coin upside down and talk about readiness and so through the HRV as one of the parameters, you can see what is a good day to stretch your limits and really push forward and what are the days to take it easy.

Dave: That's why you would care about heart rate variability, because it's going to tell you how much unconscious stress is my body under and then you might decide, all right, I'm going to figure out what this is. Maybe you have a chronic low grade infection, which is

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a common source of stress. All right, nightly temperature is another thing that I've been fascinated with forever. Talk with me about why tracking your temperature changes at night would be important.

Petteri: Yeah, so temperature, as you said, is really interesting parameter, especially during the night, basically all the kind of [inaudible 00:44:28] we get during the night, they reflect what's happening in our life during the day. Our body is giving its response but in relation to temperature, it is inside our biology that actually human body reaches the lowest body temperature during the night. All of us humans, we are around a few hours window around 4:30 AM when we reach the lowest body temperature and with the ring, we actually get 0.07 degree centigrade resolution of your body temperature reading and the variation during the night. We can really accurately detect what's the lowest body temperature for each night and then we, as a train, we show you how it's variating between the nights.

Dave: When you're looking at a finger or a wrist, this is not near the core and you're supposed to suck on something, get a rectal temperature or maybe an armpit temperature for full accuracy and some people get cold hands, especially when they sleep. How are you able to track temperature from a finger?

Petteri: Yeah, actually as you know, when you go to sleep, the core temperature is pushed to the [inaudible 00:45:48]. That's what happens. It's biological thing that needs to happen when we go to sleep.

Dave: In fact, you can't go to sleep with cold feet and cold hands. Your body won't let you.

Petteri: Exactly.

Dave: Most people don't know that, so if your hands are really cold and warm, you have to warm them up. That's why blankets are helpful or a warm bath. There you go, so thanks for saying that.

Petteri: Yes. Yes, exactly. That's one of the things that has to happen so that you can get the sleep and there's quite high rise of temperature when you go to sleep, when you just lay down and you're prepared for sleep. If there's enough melatonin, the hormonal balance is for sleep. Then the skin temperature starts to reflect the body temperature and then they start to get closer to each other and then when you reach the lowest body temperature, then the skin temperature is the same as the body temperature. That happens during the night and so that's one thing and that's actually one of the basic things for detecting your chronotype. The Oura Ring is basically, it's the only product in the market that can detect your real chronotype and then reflect back to you.

Dave: Can you talk about what happens with your nightly temperature if you're a woman? What does it do during the time you're ovulating?

Petteri: Yeah, actually we have validated that we can see and we can show the menstrual cycles and even detect the ovulation times. At least it's very useful for females to see the

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menstrual cycles accurately, there in the app and then they can do what you mentioned in the beginning, the female athletes especially, they can really concentrate on those exercises that are good in that phase of their menstrual cycle. I'm not that deep in the biology itself, what's happening in different phases, but it's any reflection of the hormonal balance that is changing during the period. Females are so, let's say, beautiful creatures. We, males, are kind of dull in that sense. Our variation in our hormonal functions, it's not that interesting or it's not that big, like females. They are beautiful creatures in that sense that that is needed for fertility and for many other things, kind of what it can reflect and in relation to your sleep and readiness, how your menstrual cycles are affecting them. There are plenty of different kind of insights you can derive from that.

Dave: What's your take on EMF and bio monitoring? We don't want to break our bodies because we're monitoring them so much. Kind of walk me through your thoughts.

Petteri: Yes. Yeah, so definitely that's very important thing that we've taken into account at the very beginning of designing the product. That's one of the reasons why we wanted to make it completely stand-alone device, so that it doesn't need your mobile or anything else to be able to do all those things that it does, so all the algorithms are running inside the ring itself and it can store the data for three to four weeks without having connection to the mobile and still you have all the data. That was the first thing.

Dave: But it can't track the data for three to four weeks without being powered, right? It just stores the data from a few night?

Petteri: Yes, you just need to charge it but it continues to store the data and calculate everything.

Dave: And you charge it basically every two days, it needs about an hour of charging?

Petteri: Yeah, yeah. Yes, yes or if you charge every day, it's 15 minutes or so. If you just keep it charged, you don't need to connect it to your mobile. It continues storing the data for three to four weeks at least and then you get all the data. That was the first thing. The second is that that we wanted to minimize the time that the ring is communicating with the mobile. Bluetooth was the only kind of acceptable way for us to do that and we minimized the time that there is the communication between the ring and the mobile. The longest time of that communication is in the morning when the ring moves the ... transfers the sleep data to the app and photo visualization. It takes about 45 seconds or something like that. That's the longest time and then the rest of the day, if you don't switch it to the airplane mode, then every now and then, it uses the advertising mode to check whether the mobile is there or not.

Dave: And about how frequently is that?

Petteri: If you think about 24 hours, it's less than 1% of the time. It's very rarely.

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Dave: But compared to wearing a set of Bluetooth headphones around your neck that are turned on, that you're not talking on, it's far less than that or if you use Bluetooth headphones for a 10 minute phone call, especially in your brain, that's not a great idea, but it's very small compared to that.

Petteri: Yes and also, in the power levels, we wanted to minimize that and we used ... It's less than one milli watt. Normally, your cellphone normally, the outward power is typically between one thousand to two thousand milli watts. That's big and approximately 120 to 220, 240 during the call, so it's huge difference there.

Dave: If you're listening to this and you keep your cellphone in your front pocket by your junk, even if you're not on the phone, you're getting tens of thousands of times more EMFs than you would get from an Oura Ring. All right, so we talked about electrical pollution and how you've addressed it from the design. Something else we didn't talk about and I'll be really straightforward, I've never worn any tracker for more than about six weeks. They just get irritating and the value of the data isn't high enough to justify continuously charging it and downloading and syncing and all this stuff but this is the first device that I've been able to wear it for more than six weeks. I'm like, oh I'm still getting good data. It's not that much work.

Dave: I look forward to charging it less and all that but the amount of thought and management required is very very low, which is thought I'd have you on the show, just because hey, I think you guys kind of cracked the code because you get more valuable data in less work and with less inconvenience, so the equation is there that I would tell my mom to wear this ring and I wouldn't tell my mom to wear any of the stuff that I've worked with previously. I think you guys moved the needle just from a consumer usability perspective and that's actually hard to do. Kudos.

Petteri: Yeah, yes. That's fine. Yes. Our retention rates also show that we have a really committed user base and we highly respect that because that's the way for us to get to know everyone as users and the uniqueness of every person. The longer term data that we get, the more we can learn and more we can customize the algorithms to bring in more value.

Dave: Well I think you guys are doing something pretty special here and I appreciate it. All right, if you enjoyed today's episode, you know what to do. Do something to make yourself more self-aware and you may decide you want to incorporate some tracking tech, I've been doing it, geez, for 20 years now and it's made a huge difference just in me understanding, when is my biology doing what I want it to do, when's it not, and whether or not you choose this piece of technology or something else or just to wake up and say, how am I doing right now? Things like that are so profoundly important to just doing what you're here to do and just not wasting that precious gift that is your life here and I've had so much change in my life by just knowing what's going on in there that I couldn't see and making it visible and this is one of those many pieces of technology in addition to the practices of meditation and awareness and all the other things you can do. If this is valuable for you, great and I'd encourage you to share it with someone. Have an awesome day and I'll see you on the next episode.

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