



Episode 522: Dr. Erik Korem on Adaptability, HRV,  
Sleep and Stress as a Gateway to Growth

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Katie: Hello, and welcome to the "Wellness Mama" podcast. I'm Katie from [wellnessmama.com](https://wellnessmama.com) and [wellnesse.com](https://wellnesse.com). That's wellness with an E on the end. And I personally really, really enjoyed recording this episode, which goes deep on topics like adaptability, HRV, sleep, and stress as a gateway to growth. And I'm here with Dr. Erik Korem, who has done many, many things, we've talked about quite a few of them. But his mission is to help people pursue audacious goals, thrive in uncertainty, and live a healthy and fulfilled life. He considers himself a high-performance pioneer. He introduced sports science and athlete tracking technologies to collegiate and professional sports over a decade ago. And he's worked with the NFL, the NCAA, with gold medal Olympians, Nike, and the Department of Defense. So he's extremely qualified.

He's now an expert in sleep and stress resilience. And he's the founder and CEO of something called AIM7, which I'm personally excited to start using, which is a wellness app that provides custom recommendations to improve the outcomes of workout programs by taking into account data in a completely new way. And in this episode, we go deep on a lot of things like everything from fitness and so many different aspects of that, why women are just as strong as men, pound for pound, in the lower body, how to best train for power, speed, balance, and adaptability. Why the best woman he's ever trained...or the best athletes he's ever trained were

female sprinters. Why improving lean muscle mass reduces all cause mortality, and helps slow aging, and how to do it. A whole lot of new terms that I hadn't even heard of, including things like the DC potential of the brain, the five things that we should all be addressing for optimal adaptability, and so much more. I definitely took a lot of notes for this one. Check those all out at [wellnessmama.fm](https://wellnessmama.fm) in the podcast notes. I hope that you enjoy this episode as much as I enjoyed recording it. So let's join Erik. Erik, welcome, and thanks for being here.

Erik: Thank you for having me on. I'm excited to be here.

Katie: Well, I'm excited for this conversation. And there's at least three directions I can already think of that I wanna go with this. But before we jump into the things that you're an expert about, I have a note in my show notes that you train and compete in Jiu-Jitsu and that your wife beats you up regularly. And since a lot of listeners are women, I just have to hear a little bit more about this.

Erik: Yes. So we started Jiu-Jitsu... My youngest son started Jiu-Jitsu when we were in Houston. And one of our other NFL players we're working with, I was talking about, you know, martial arts for my son. He said, "Hey, Brazilian Jiu-Jitsu is great." So he got in. My wife is a phenomenal athlete. She was an all-SCC softball player. And so, she was watching him train at 5. And I could just tell that she wanted to get in. And so I looked at her, I was like, "Hayle, do you wanna do this?" She said, "Yes." So she just started doing it. And a few years later, I hopped in. So all of our kids minus the 20-month-old do it. My wife and I actually just competed in Master Worlds. And she's a purple belt, but she's knocking on brown, but she is... I knew I had to do this when we were in our closet. And she, like, did a fire... She, like, knelt down and threw me over her shoulder and I was, like, okay. And she's, like, the sweetest, kindest person but it was, like, I need to, like, do this or I'm not gonna be able to defend myself against my wife.

Katie: Oh, that's fun. And it's so funny you guys get to do it as a family activity too, and it's active, and right brain, left brain learning all kinds of skills. That's awesome.

Erik: Yeah, it's the ultimate thinking person's game. And my wife actually works on a number of MMA fighters. She's a physical therapist. And she hosted a night for women at our church. And now we got all these ladies at church that are now doing Jiu-Jitsu. It's pretty cool.

Katie: That's awesome. For about almost a year now I've been training Jeet Kune Do, and Kali, and a bunch of other arts like that. And it was so challenging at first. And it's been fascinating to see my nervous system adapt and how at first, any punches coming my way, I would freak out. And now as the body learns muscle memory, and you start to just be able to respond without having that nervous system freak out and feel good for the movement side, and also the nervous system side, it seems to be really beneficial.

Erik: No question. It's a great sport for aging people because you can scale it up and scale it down. And as we age, the thing that we don't do is we don't address power and speed. And those are things that you can continue to refine. So, I love it. Kudos to you.

Katie: Oh, I'm glad we got to start with that. And I love that you just brought up that we don't address power and speed as we start aging. I think there's a lot of factors that come into play there but I've heard of those and I've also heard of the fact that we stop having new experiences, which actually slows down a lot of these pathways in the body. And I think that all kind of ties into that process. And maybe that's a great segue into one of the things I did wanna talk about with you, which was adaptability, and especially those of us who are reaching our 30s and 40s, and hitting that aging a little bit. Like, let's talk about that. Maybe start by explaining how we don't really address the power and speed aspect and what that would look like to address and then we can segue into adaptability.

Erik: Sure. So, something really interesting is, there's no such thing really as muscle memory. The muscle is like a dumb piece of meat. And so the central nervous system, which is your brain and spinal cord, has another branch called the peripheral nervous system, which goes out and innervates your muscles, right? And so, what you wanna do is you want to tap into high threshold motor units. And the only way to do that, and at least we wanna recruit more motor units, which means you're recruiting more muscle is to do things that require a lot of strength or you add velocity to the equation. So power. And then if you lower the amount of force, you get into more speed things.

So, what would this look like? Like, for instance, medicine ball throws, you can throw a medicine ball, a 5 or 10-pound medicine ball at any age. But instead of like your workout, maybe or taking a part of your workout, instead of it just being this continuous water, this long HIIT session, do something that's incredibly explosive, like a medicine ball throw, like 4 or 5 medicine ball throws and then rest for 90 seconds to 2 minutes. Because the only way to tap into real high CNS recruitment activities is you have to rest completely or else the amount of power that you can produce goes down, down, down, down.

That's why I work for 14 years in professional track and I've coached a number of Olympic sprinters in the short sprints. And we would do, like... Let's say you did an 80-meter sprint, you would rest for 10 minutes. People are like, "What?"

But the only way that you can replicate these high outputs is complete rest. So you could do medicine ball throws. You could do a box jump onto a box, you know, jump onto the box, lightly step down with a box that's at a reasonable height where you're not tucking your knees to your chin. These are simple ways or you could literally just do bodyweight jumps. You know, stuff like that, and there's a lot of ways you can progress and regress. But you could lift a weight for more power. You could do, for instance, like, let's say you do a trap bar deadlift. You could lift lighter weight with a very explosive effort. These are simple ways that you could do that. But those are things that we neglect. And so we're not recruiting these high threshold motor units and, you know, we've become less powerful.

And then also we don't prioritize balance and stability as we age. And, you know, something that's really important is to prevent falling. I'm talking as we get in our 60s and 70s. You know, it's usually not the hip that goes, somebody trips and falls and breaks the hip. And so, power, speed, balance, those are things that we should continue to include, instead of just going as hard as we can for 45 minutes until we pass out.

Katie: Yeah, I love that. I'm so glad that we've gotten into this topic because I think a lot of the workouts, especially as people get older, that are kind of marketed at them are more just consistent steady-state cardio or fitness classes that aren't incorporating a lot of the elements that you're talking about. And I know for me, personally, the balance and stability, like, I feel like maybe the stability system changed after I had kids, and I'm working on trying to regain what I used to have for balance and stability and looking back as a high schooler, I could do backflips and it didn't scare me at all. And now I'm like, that feels terrifying. So I'm trying to learn.

Erik: Aren't you training for pole vault?

Katie: Yes. Yeah, I'm training for pole vaulting. That's definitely helping. I can get upside down without freaking out now.

Erik: That's a pretty bold venture. Congratulations for that. So, power will be really important. Polling is very important. Being able to jump and extend. I'm doing all these crazy motions on camera. But yeah, like, those things would be very important for you as you're trying to throw yourself in the air with a stick and go over something and land on a mat.

Katie: And power and speed both become very important. I'm learning the physics of it and how much speed comes into play. And I love this because... And I love what you said about the rest being important because I feel like that doesn't get talked about enough, and it's very liberating, or at least it was for me to realize you don't actually have to do a huge amount of these things. Like small numbers of rapid speed or power activities with rest in between, you can get an extremely effective workout. And you're not actually having to do that. Like, it doesn't feel like that much. And it feels so much more fun than just getting on a StairMaster for 30 minutes or something.

Erik: Yeah, and I know you want to talk about measuring stress later but misnomer is, and there's actually some technologies out there that measure, you know, how much work you should do is that when you do these high central nervous system, fatiguing activities, it takes longer to recover. It can take up to 48 hours, sometimes 72 hours. So you may only do let's just say a pole vaulting. You may only do 20 repetitions with complete rest or you may do a session of power training. And you may not feel it afterwards but 24 hours

later, you may feel the sense of like, I'm just like generally fatigued. It's central nervous system fatigue and it's very different than fatigue at the local muscular level, which is mostly metabolic.

Katie: Yeah, that makes sense. I've definitely felt that and it makes me curious for someone who maybe has done just more of the, like, steady-state cardio type in the past. It'd be a good just overview for a plan of how to incorporate these elements in the right timing so you're not over-stressing your nervous system and you're getting maximum benefit.

Erik: Great question. So, first of all, I'm making generalizations, if you're going to get a recommendation, just make sure to talk to your doctor orthopedically to make sure you're okay to do these things. But I've always implemented this when training athletes or anybody, minimum effective dose, maximum orthopedic soundness. What does that mean? You need the tiniest dose when you first do this to elicit a positive adaptation. Don't go in there and try to do 50 different reps of this. So, you may start with, okay, I'm gonna do a 12-inch box jump and I'm gonna dip and I'm gonna jump as explosive as I can, as high as I can near and gently land on the box. My first session I'm gonna do three sets of five and in between sets, I'm gonna do 90 seconds rest.

There's two ways that you can intensify this. You can intensify it by increasing time between sets because now you're more rested. You can intensify it by increasing the box height. You could then say, "Okay, now I'm really good at jumping and landing. Now I'm gonna start jumping and landing with my body, not on a box." So now you maybe do like three sets of eight, same type of rest, then let's say after three or four weeks, you've increased the volume, then now you wanna hold a light dumbbell between your legs, 5 to 10 pounds. So you see what I'm saying? So you jumped up... Like the landing was a very gentle landing, then you jumped up and landed, and now you're learning how to absorb force, which is really important. Now you're jumping and landing, you're adding external weight. The key is to intensify is to, like I said, increase the restoration. You could add some more reps, but you really don't want the duration of the set to last longer than 10 seconds or it's not tapping into what's called the phosphocreatine system, which is gonna allow you to do these explosive activities. So keep it short duration, long rest, and then intensify the exercise using different methods.

Katie: And then it sounds like also rest in days. So don't do these in consecutive days. Give at least one or two days, like the same types of things?

Erik: At least. So, if it's your first time to ever do this, do it once that week, and then the next week, do it twice, Monday, Friday, and then do that for three or four weeks. And they may go Monday, Wednesday. There's a lot of ways you can increase training responses through volume, which is the number of reps, rest. You can change between density, between days. So like going from one day, a week to two days a week to three days a week with 48 hours in between, but do the minimal amount and see how you feel, and then slowly creep it up.

Katie: Yeah, it's important. I've learned that the hard way a couple of times when I started lifting weights that were heavier. It's like more is not better. And often undo the effects you're trying to get when you push too hard. And I'm also curious, are there differences in this for men and women? Because I know, at least from what I've read in the past, men have... There's just different ways the body reacts or seems to with men being more anabolic and women being more anti-catabolic if I'm remembering that correctly. But do women need to approach this differently or is it just more of, like kind of knowing your range of where you're starting with so you're not overtraining early?

Erik: So many factors. But this is like the one piece of advice I could give to your audience. Every situation is complex, multi-dimensional, and relative. So, women are pound for pound just as strong as men in their lower body. Their upper body, if you were to do upper body explosive work, you know, things would change. I've trained females...The best athletes I've ever trained were female sprinters. Besides working in the NFL, Veronica Campbell Brown was an eight-time Olympic medalist, three-time Olympic gold medalist, and she could do things that you and I could only dream of.

So there's stuff all along this spectrum. Your menstrual cycle can impact things. Women don't have as much testosterone as men. So that does impact anabolic processes. But I wouldn't discount that at all. I would just say it depends on your current state of fitness, your training history, orthopedic history, there's so many factors but I wouldn't say, oh, black and white, men versus women, I think that's too broad of a generalization.

Katie: Okay. And I wanted to, like, in a minute segue into other aspects of this and adaptability but before we move on, I also wanna just make sure we put a pin in that, for women especially because I think women are historically discouraged from activities like lifting really heavy weights, or sprinting, or like power-based activities, or at least men are more encouraged in those areas. But at least, like, I spent a lot of time in reading studies and it seems to be very, like, strong evidence that one of the best things you can do for your health as you get older is to maintain your lean muscle mass. And one of the best ways to do that is with those particular types of activities. So I would just love to hear your take on that and any other insight related to it.

Erik: You are hitting it on the head. Maintaining muscle mass is related to all-cause mortality. It's gonna make you be more functional as you age. So what's a great way... Like, you don't have to go into the gym like, okay, you know, Wellness Mama said that I need to lift heavy weights. I'm just gonna go pick up the heaviest thing I can. Like, maybe you're a parent, you're picking up kids all day. You ever picked up a wheelbarrow before? You know, there's things that you pick up that are heavy. And so I would start with very functional patterns. Like, I think a trap bar deadlift is one of the best safest things that you could do, work with a qualified professional.

But you know, a simple scale you can use is called an RPE scale it's a rate of perceived exertion. You don't have to know how much your maximum is and, oh, 60% of your max, or whatever. Like, RPE is a valid and reliable way to measure intensity of exercise. And you could be like, "You know what, I'm going to start an RPE of five to six. I'm gonna do several warmup sets and I'm gonna work with a qualified professional. I'm gonna learn how to trap bar deadlift." It's something that's moderately heavy. And then over time, slowly, slowly adapting

over three, four, or five months, you could start doing heavy doubles and triples or even singles with long rest because lifting something heavy is something you're gonna do for the rest of your life. Maybe you have to move, you have to pick up a mattress, learning how to hinge with weight. Learning how to pull, really important now that we're at our computers all day long, shoulders, you know, pecs get tight, shoulders rolled forward, really bad posture. So, I would encourage everybody to slowly work your way in that continuum.

And if you're like, "Oh, I'm gonna get bulky," that is a complete lie. If you wanna add muscle mass, do low to moderate intensity for high volume, and you'll start packing on the pounds. Lifting heavy weights does not mean that it's more of a motor unit recruitment. And unless you're doing long essentrics, which means very, very slow lowering, you're not gonna get a huge stimulus for muscle gain, like, for putting on muscle. It's gonna be more of a neurological stimulus.

Katie: That makes sense. And yeah, I think that's a really important point. I think of a lot more now is like, I'm not, I don't foresee myself entering like fitness competitions or bodybuilding competitions. My main goal is centered around, I wanna be able to keep up with my kids and all of their athletic endeavors right now. And I wanna be active with my grandkids and hopefully great-grandkids and be able to pick them up when I'm 90. Not that I'm trying to... Even though I'm actually currently trying to deadlift quite heavy, it's because it's gonna be functional for me later on, not because I plan to compete in it.

Erik: Yeah.

Katie: And I'm glad you dispelled that myth about women getting bulky because I will say, having now done this for a couple of years, it does not seem to be a thing you can accidentally do is get too much muscle as a female. Like, those women who get very muscular work very hard at it.

Erik: And sometimes they're using things.

Katie: Yeah. Yeah.

Erik: I'm being serious. It's more common than you think. And so, like, you look at these body types, like, "I don't wanna go in that direction," 99% likelihood that you won't. So...

Katie: Yeah, and you're certainly not gonna do it by accidentally lifting heavy one day in the gym. So...

Erik: No.

Katie: Well, I think this also speaks to a level of adaptability, which I think is not talked about enough in fitness. And I know my background being in nutrition, I feel like it's also not talked about enough in nutrition, and people get kind of centered on these particular diets. And then they get really dogmatic about certain macros, or they only are gonna eat Whole 30, ketos, or they're only gonna eat low carb, or they're only gonna eat super high protein, or whatever it is. And for a couple of years now, I've been saying the goal actually, in my mind, should be to be metabolically flexible and adaptable to whatever inputs you put in your body.

To me, that's a more accurate reflection of health than, like, my body functions great when I only eat in this very narrow range of foods with this very narrow range of macros and take 100 supplements but that's not adaptable, nor is it sustainable for a lot of people. And I know you talk about adaptability a lot as well. So I'd love to hear, just starting off kind of a broad overview of how you look at that, and then we can go into some different directions from there.

Erik: Yeah, that was a really great point you just made. But yeah, what adaptability is, is I got really curious when I was working with athletes is the best athletes could train really, really hard, and come back, quickly adapt and do the next training session, both psycho and physiological stress, physical psychological stress.

So what is adaptability? I think a simple way to think about it is like this, if I'm a bowl that's in my hands, okay, and I fill that bowl, it's a small bowl, all the way up to the brim with all the mental and physical stress that I can handle, any little jostle or turn is going to cause that to spill out. You're gonna have maladaptation. You're going to get fatigued. You're not gonna be on your A-game. You may get sore. You may get tired. You may get grumpy. You may start feeling like, you know, like, the world's kind of coming down on you.

Now, imagine we can make this bowl really big, both arms hold this bowl, and we take that same amount of stress and we pour it in the bowl. I can move that bowl. I can run across my house and nothing's gonna spill out. What we want to do is increase your capacity to handle stress. And so I wanna tell you about a little research that we did and then I wanna talk about five pillars to this. But when I was at the University of Kentucky as the high-performance director for football, I did my doctoral research in how sleep impacts the brain's ability to adapt to stress. We can talk about that here in a second. But my doctoral student, Dr. Chris Morris, who now is the director of sports science there, we started looking at early days... I pioneered the use of athlete wearable tracking technology over a decade ago. So, now that, you know, people got Oura Rings and all this kind of stuff, we were using that like way long time ago. And we started using some sophisticated technology, which help us understand how the body is adapting to stress, including heart rate variability and something called direct current potential of the brain.

And what we found was is this, okay, we wanted to see... We have somebody that's on a training program, a fitness... Actually, these were football players. So they were training over an eight-week period of time, four times a week. We wrote these programs, the sophisticated periodized training programs. Half of our team decided to use some technology where we could measure stress, okay? And what we did was is we increased or decreased their level of training based on their state of adaptability or functional state, which means how much stress can I handle today?

When the autonomic nervous system is in a good spot, when the central nervous system is in a good spot, it means you're more adaptable. So what we did was is some days when the body was less adaptable, we dialed it down. Some days, when it was more adaptable, we pushed the athlete 20% harder than we thought, you know, that was planned. And over an eight-week period of time, the people that used that methodology, it's called fluid planning or fluid periodization had anywhere between 150% and 500% more improvement than their counterparts training right next to them, scholarship football players. And so we really started digging into this idea of adaptability. The first thing we wanna do is you want to create the conditions for adaptability, where you can be presented with stress and your body can adapt, and you can move to a new state of adaptability.

And so that has to do with something called allostasis or maintaining stability through change. And there's something called allostatic load, which is the cost of adaptation. So when we're training an athlete, you wanna keep that allostatic load appropriate to where the body is. So, the five things that anybody can do, and we'll talk about how you can do this with exercise, but the five things that people should be addressing to create an environment or the conditions for adaptability is number one, sleep. Number two, exercise. Number three, nutrition. Number four, mental resilience. And then number five is their relationships or their association with their community.

And I'll talk about that for a second. So in my research, we demonstrated that to put yourself in a state of adaptability, and athletes needed seven to nine hours of sleep a night to be at an optimal state of adaptation. We measured that through something called direct current potential of the brain. DC potential is basically like a huge part of a universal language that is most appropriate for studying the central nervous system, and what's called the functional state. Most people haven't heard about it. It's a slow cortical potential that's a very constant physiological process. It's an objective, measurable short and long-term stress. And it's in a frequency of like 0 to 0.5 hertz. So like you've heard of delta or theta ways, you can measure DC potential. So it's a great way to measure the functional state of your brain's central nervous system.

So we found that when you slept between seven and nine hours of sleep a night, your brain was in an optimal state to take on stress. There's a lot that we could talk about sleep. But we talked about the conditions, you know, how to create the conditions for that. The second thing though is mental resilience, where is the ability to adapt to adversity well. And there's a considerable element of resiliency in something called psychological flexibility. And my good friend, Dr. Peter Haberl, he's a senior sports psychologist for the U.S. OC, U.S. Olympic Committee. And he defines it as being able to be in contact with the present moment, so you know where your attention is, and where it's pointing at. And being open to your thoughts and feelings and taking

committed actions based on your values. And when you're psychologically flexible, you don't get overwhelmed by the moment. And as he says, attention is the currency of performance. And you can put your attention where you want it when it matters the most. And if your listeners are more interested in that, my podcast, he was on there, I think Episode 5, and he talked all about this.

The guy's a brilliant human being. He's a former hockey player, national team, hockey player. There's an amazing look on this whole thing. And mindfulness meditation has been demonstrated to improve attentional focus. There's a really great review in the Frontiers of Neuroscience on this. But when you can have your attention where you want it and then you're in contact with the present moment and you can, like, take in difficult situations, you can think about them, you can adjust to them, you can be open to your thoughts and feelings, you're gonna be more resilient to mental stress.

The third thing is exercise. And I know a lot of people on here are physically active and they exercise, which does improve your resilience. It blunts stress reactivity. But the key thing with exercise is this, the exercise dose must be appropriate for you that day. And writing down a workout is a great thing. But like I talked about earlier, when we were training elite athletes, we found that we would come up with these amazing periodized plans for volume, intensity, density, speed, power, strength, work capacity, all these things were manipulated with these huge Excel spreadsheets. We found that about a third of our athletes would get better, about a third would stay the same, and about a third would get worse. And that really sucks. It's when you go through all this and your athlete, like, doesn't perform better. And it's because they were using a static plan and not a fluid plan. And so, do you wear a wearable, Katie?

Katie: I do, I have an Oura Ring. And I've also done WHOOP in the past. I've pretty much...a Biostrap. I've tried pretty much all of them.

Erik: Yeah, so I got an Oura Ring on right now. A lot of great data. Like, from a scientific perspective, phenomenal. But, like, how do you actually use that to adjust your plan? It's just data. And what we learned early on, when we first started pioneering the use of these devices is that data without insight is completely useless. Like, it may say, "Hey, you slept seven hours last night, but okay, what does that mean? Or your HRV went down. Well, how should I adjust my training?" And so, my company AIM7, that's what we do. We actually have an app that actually sucks all this data in and provides these custom recommendations.

But what you wanna do is when the window of adaptability is open, HRV is good. Sleep was good. Subjective assessment of your current state, which most people don't do, which is... Have you ever used like a modified Hooper MacKinnon questionnaire, like on your mood, energy, sleep? Okay. You're waving your head no. So really quick, objective data is great. You need objective data, but you need to combine it with your subjective perception of your well-being. Research demonstrates that your perception of your well-being is directly correlated to physiologically how you're adapting to stress. So for instance, if you apply the right math, and you were to say, let's say we were measuring, every day you fill out a little questionnaire, it says, I feel on a 1 to 10 my stress is this. And one day, your stress was like a two standard deviations above the mean. If we were

to take cortisol sample, your stress would probably be really high. Or if you were to say you're very sore, we could take blood biomarkers for creatine kinase, we used to do this, like, salivary testosterone, and all that stuff. And we found that if you just ask people and apply the right math, that you can know what's happening biologically.

So in our app, we actually use objective measures and subjective and combine them. So when you know, like, the window is open for adaptability, maybe you only had a 45-minute session plan. If you have time, like, you could do two things, make it more intense, lift heavier, increase, you know, maybe your heart rate zone. Maybe you're gonna push to Zone 4 or 5, or increase the duration. If the window was smaller, if you can go and train, but the cost of adaptability is gonna be really high and it's gonna push you down this curve, where if you keep trying to train more, you're gonna become maladaptive and you're gonna end up burning out. You're gonna get injured. You could have endocrine issues. You could have a whole host of issues.

So, this is something that has not been addressed for the regular consumer yet. So, you gotta create the conditions for adaptability with sleep, with psychological resilience, mental resilience, psychological flexibility, with exercise, in general, but then, like, tailoring the dose and then as you talked about nutrition, you know, I don't ascribe to a specific diet, more like an anti-inflammatory diet, you know, whole foods, variety of multicolored vegetables, and fish, and things like that. And then our relationship to people, that's the fifth thing, our living in community. There was a really interesting paper that was published, I'm looking at my notes, by the British Psychological Society that pointed out that greater social connectedness during lockdown periods during COVID was associated with less worry and fatigue as well as lower levels of perceived stress. And so, like, by staying connected to a community and people, like, you create a buffer against poor mental and physical health outcomes. And it enables you to adapt to stress more. So, those are like the five big things but they're nested in that is like the daily approach to how much stress you take on.

Katie: I just took so many notes and I love those points that you brought up. I've seen in my own life how the mindset piece and the community piece, I think I ignored aspects of those for a long time. And I hyper-focused on nutrition and exercise, thinking that was gonna fix things. And it was amazing to witness firsthand how when I dialed in having strong relationships and community and that mental mindset resilience piece, the other ones got so much easier. And I was shocked how important those pieces were. So I love that you brought up both of those. And I'm really excited to hear more about your app as well because I actually, last year had a time when I was probably overtraining, but my Oura Ring said I was doing fine. I felt like I could push myself probably more than I should have. And then a couple of random things like I gave blood and drew labs in the same week. And so my blood volume was down, ended up going to the hospital with rhabdo. My creatine kinase was in the thousands.

Erik: Oh my gosh.

Katie: So I love that there's now a resource that kind of takes those things into account. But...

Erik: Holy cow, you got rhabdo?

Katie: Yeah.

Erik: That's scary.

Katie: Yeah. It was not the most fun experience. I don't recommend it.

Erik: How long did it take you to recover?

Katie: I was in pretty intense pain for a couple of weeks, and then I was, like, low energy for a while after that.

Erik: Golly, yeah, it's scary. Yeah, I could tell you a little more about AIM7. Do you wanna hear about that?

Katie: Absolutely.

Eric: So, like I said, like in 2011, I brought athlete wearable tracking technology to the United States. And I was at Florida State working with Jimbo Fisher. And we were looking for a way to, like, obviously win. And we were really injured. But we had great coaches, great players. For the first time ever, we quantified the game of football. Our athletes were wearing these GPS tracking devices. We can measure heart rate, all this amazing stuff. And we were able to use that to train better, to understand where our athletes were, to give them the appropriate dose of training. And we lowered our injury at 88% in one year, and we went on to win a championship.

The NFL flew in, they're like, "Erik, what are you doing? Like, this is interesting." And it literally got adopted all over the place. And it opened up a billion-dollar market in the U.S. for sports wearables and data. So I got curious in 2019, I was working still in high performance. And I'm like, "Huh, I wonder if the problems that we had, you know, just eight, nine years ago, if consumers are having these problems with their wearable devices. We got all this data from your Apple Watch, your Oura Ring but, like, what does it mean? So I started doing some research, and I found out the number one complaint about wearable tech users is their data is useless. And that's why about a third of people that buy a wearable after six months stop wearing it. And so, I started surveying people. You know, I'm an academic. I got a doctoral degree. So I'm like, "Okay, I'm gonna figure this thing out." So I sent out surveys to several hundred people. I'm like, "What do you want from your wearable?"

People are like, "I want more energy." Like, interesting. That's why you have, you know, five-hour energy, Starbucks, all that stuff. So, ran a pilot with Apple Watch data, and some of those subjective measures I was telling you about. And not only can we predict people's energy level, but we could predict their energy and mood multiple days in advance using some very novel machine learning methods.

So a friend of mine was like, "Man, you've got to build this." So he was, like... He wrote me a check and was like, "Get started." I was like, "Okay." So I made this shift in 2020. So what AIM7 is, is we're building a custom platform that unlocks wearable and in health data, to provide customized and predictive wellness recommendations. So, our way is, like, you know, when I was working with elite athletes, you had all these amazing people working around them, so managing if you had a group of world-class coaches and scientists focused only on you and your wellness goals. So we went out and got the best in the world, and we're using technology to do that.

And so, the first thing we do is these custom recommendations I was telling you about. So like, let's say you go in and you're like, okay, like, go into the app and you're like, "Today, I'm gonna do cycling." It's gonna be like, "Hey, Katie, today, you can go this long and this hard." So it's the brain on top of it. We layer on things like Peloton and all this different stuff. But then what we do after 30 days is we give people a deep dive on their data. Like, we analyze it and we look for something called limiting factors. So in sports, what we would do is like, you'd be me, let's say you're like, "Erik, I wanna pole vault." I'm like, "Okay." So you would come in, my team would get around you, and we're like, "All right, we're gonna take you through a movement screen. We're gonna measure your autonomic nervous system, all these different things. We're gonna look at your adaptability. We're gonna put you under stressful situations, blood draws." And we're like, "Okay, here are her limiting factors." We're gonna train her to her strengths and we're gonna address these limiting factors. So we do that for people. And then what we do is after 30 days is we identify that and then we unlock all this content and features in the app to help you fix it. So we pick off where apps, where these wearables fail you.

So we'd work on these five things I just talked about. It's like your personalized masterclass. So, we're in private beta right now. You can't get us on the app store. You can sign up like on our website AIM, A-I-M-7, but that's what we're building. So I was like, "My mom deserves this." You know what I'm saying? Like, anybody with a wearable deserves to have that type of treatment. And now that the world is so stressful with all the different things coming in, I think the timing was right. And I'm really glad I made the move. So kind of scary, but you know, you're an entrepreneur.

Katie: Well, I'm excited for this personally, because I am a data nerd as well. And I am still stuck in the spreadsheet game with trying to interpret all the data. And I've run my own spreadsheets with analyzing everything from genes to the supplements I'm consuming to my current labs to exercise and try to, like, run through it. But I realize most people don't want to do that. So I'm really excited for things like this. And it will also make my life much simpler in trying to interpret it all.

This podcast is brought to you by Paleovalley. You might have heard me talk about them before because my family really loves their products, especially their beef sticks, but another one we use daily this time of year is their Essential C. Vitamin C is well known for its ability to support a strong immune system and They use 3 of the most potent, vitamin C rich superfoods on the planet: The Amla Berry, The Camu Camu Berry, and the Acerola Cherry - for 450 mg of natural, whole food sourced vitamin C per serving. Nothing synthetic. No harsh chemicals. Just food. And this is important because food doesn't have the nutrient density it once did. In fact, because of the damage done to our topsoil from overharvesting and aggressive agricultural methods, the soil is less nutrient dense and therefore the food that grows in that soil is less nutrient dense. One study found you'd have to eat 8 oranges today to get the nutrients our grandparents would've gotten from one orange when they were young. And, humans are one of the only mammals that don't make our own vitamin C, meaning it's vital we get it from our diet. Studies have shown that Vitamin C can benefit mental health, sleep quality and of course immunity. And can also lower the stress hormone cortisol in the body. Check out this Essential C supplement and all of their products at [paleovalley.com/mama](https://paleovalley.com/mama) and use code mama15 at checkout for 15% off your order!

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I do know one thing, like I paid attention to quite a bit with Oura Ring, and I would love your take on is HRV.

Erik: Yeah.

Katie: Just pay attention to that. If it's down one day, I won't typically train as hard. And it's been really good to see like alcohol 100% tanks HRV. So I tend to avoid alcohol. Sleep definitely tends to improve it, when I take magnesium, it's often better. But I would love to hear your opinion on HRV, and also, if there are any reliable ways that seem to be helpful in improving it because it seems to be for people who are wearing these wearables now and are aware of their HRV, I think that's top of mind quite a bit.

Erik: Yeah. What a great question. So the first question you need to answer is, why are we using HRV? We use HRV to measure the functional state of the autonomic nervous system or how much stress the autonomic nervous system can take on, and what that... Remember we talked about the cost of adaptation or that allostatic load is. And so, research demonstrates that, like, when you encounter stress, physical, or psychological, it does not matter. The body does not differentiate. There is a predictable response and an

acute activation of what's called the sympathetic nervous system. People heard of fight or flight, right? And that's a good thing because your body is trying to mobilize resources, specifically proteins to address a dominant need. It could be a hard workout. It could be a dispute at the office. It could be, you know, a whole bunch of stuff.

But your body has finite adaptive reserves, which means, like, you may go back to that bowl idea again, right, you only have so much stress that you can adapt to. And once you exceed that capacity to adapt to stress, you decompensate or you have maladaptation, which could be an injury. It could be depression. It could be a whole lot of things. So by monitoring the functional state of the body, you can understand where the body's at and how much stress it can handle. So, HRV actually was first used in the Russian space program, I don't know if you know that to understand physiological responses to flight. And Baevsky is his name, did some amazing stuff with this. And actually, if you Google if you go on NASA and lookup Baevsky Stress Index, you can find this. And I have a feeling you're gonna go deep down the rabbit hole. I could send you some papers. I wanna give like some like myth-busters for you. Okay? High HRV isn't always good. Okay?

Shannon Collins looked at weightlifters and they did a 10-day detraining. So they didn't train for 10 days and then trained really hard. Okay? And what they found out was there was an increase in sympathetic tone, which is good. Okay? That's normal. So the initial response is you get an increase in sympathetic tone.

However, there was research with wrestlers, which found that when they got overtraining, if you wanna look at an overtrained population, look at wrestlers, okay, them and MMA fighters. They actually had an increased drift in parasympathetic tone. So an increase in HRV. Why would that be? When you're in a parasympathetic dominant state, it's harder to activate the body. You need stimulatory things.

So here's how we would use this with athletes. And having a minor like parasympathetic overdominance is okay, but if it goes extreme, that's bad. So, a couple of things you wanna look at is let's look at the long-term picture of your HRV and where is it trending, up or down? Okay? If it's gradually trending up over time, that's fine. When there's acute spikes in HRV, up or down, that means your body is probably trying to adapt to some type of stress and you need to dial it back. So, when we're working with athletes, if somebody has more of a parasympathetic dominance, this rest and digest it, we would do things that are more stimulatory in nature to get them going. So very aggressive warm-ups. So maybe they do some more high CNS activity, more cold exposure, things like that, contrast therapies. For people that are more sympathetic dominant, which is probably where most people are trending, we actually did... Chris I should say, Dr. Morris, when he was a graduate student, actually did a really cool research study with headspace. And we found that when you did mindfulness, people improved sympathetic tone. We actually had one athlete that could not gain weight. This is football. This is kind of important to have some muscle on you. And he was chronically sympathetic, started doing mindfulness, complete shift, put on weight. It was like a miracle.

Zone 2, cardio, any type of cardiovascular exercise in Zone 2, which is 60% to 75% of max heart rate has a very strong parasympathetic stimulus. So there's nothing wrong with low and slow. I do it, you should be doing it,

at least 120 minutes a week, increases cardiac output, has a strong impact on parasympathetic tone. Things like massage increase parasympathetic tone. You know, so those types of things can be, like, quick manipulations but, like, long-term, things like mindfulness, including rhythmic activities, if you're always engaged, power speed, high-intensity interval training, you're gonna have a really hard time getting your HRV up for most people.

Katie: Got it. That's helpful, I think, especially for people who feel like they're just low to know probably, you're not trying to drastically increase this, like, you wanna see that slow growth but it seems like that's what we can know from data a little bit more, where I'll be like if you see a big drop from a particular thing that you can correlate, that would be good to pay attention to, for instance, alcohol. If alcohol tanks your HRV every time, that seems like a reliable thing to pay attention to.

Erik: I think most people, that's the case. Sugary beverages, like when they eat, like, foods with simple sugars at night or have a large meal, that can decrease HRV. That's a really interesting one. Like, it's really impacted when I eat my food. Although I do wanna say this, I intermittent fast, really good for blood sugar regulation, blood pressure, all these different things. But some people, what happens when you're fasting, you get a dump of catecholamines, which makes you feel more mentally sharp. What is that? A sympathetic shift. Some people, they can't do it. And that's okay. Some people that I really respect in the field are like, "It's just not for me because I actually feel jittery." And that's a response. Your body's like, "Oh, we need energy," it starts dumping all this in the bloodstream.

So you have to look at things but there are some heuristics or rules of thumb that everybody should apply. And you should take that and apply it to the most dominant stressors in your life, exercise, how much workload you take on, how much sleep you're getting, things like that. And what I find is we build our app for people that don't have time. Most people aren't you. I would love to see your spreadsheets. You probably got some pretty gnarly, oh, what are they called? Oh, my gosh, macros in there. Do you have like macros built? Yes, you're nodding. I love this.

And we had all these crazy dashboards for our coaches, right? So, like, when we started, we had all this stuff, and they're like, "Yeah, just tell me what to do." Like, I don't have time for that. But if you're really into it, you know, look at the long-term trends, look at little perturbations, big spikes, big drops, make sure that the way the... I like the way Oura Ring takes it, or you can do it right upon waking. You could do it with your Apple Watch with a three-minute breath session, right when you wake up in the morning. That's a really good time to measure it too. So it either needs to be a consistent sample during the evening, or during bed, or the last sleep cycle, not the last sleep cycle, last slow-wave sleep cycle, or right when you wake up.

Katie: Yeah, I definitely have some spreadsheets that are well over 500,000 lines of code and lots of macros and can decode...

Erik: Code?

Katie: Yeah. Yeah, they're very complex, but I don't think they're actually... Like I said, I've waded through this data for a long time. And I don't think most people want to or need to do that. I'm just curious about it. And it's funny because you're going through all the data points back to the simple things, which is often I feel like the case in life of the things that are recurring recommendations on this podcast, from, like, neuroscientists, from top doctors and researchers, which are, don't eat right before you go to bed. Don't drink alcohol right before you go to bed. If possible, get up pretty soon after the sun rises and get morning sunlight. Like, that's a big one for hormones. It costs nothing. It's simple to do. And it actually, you know, in all the data I track and hormone levels, that is a consistent one that seems to improve things.

And I feel like in a world of all these expensive bio hacks, it's funny because the more data I get into, the more it points back to the simple things that don't really cost anything, like hydrate, sleep well, get up with the sun and go outside, like, very basic things. But I feel like that is also a great segue into sleep, which is a pain point, obviously, for many, many parents. And you've mentioned several times how that is one of these really big factors in a lot of areas of health and adaptability. And I think it's an area that statistically Americans especially struggle with. And there's a lot of probably potential reasons for that. But talk to us about sleep and how we can really hone that in since it seems to be kind of the foundational one for some of these others feeling easier and better too.

Erik: Yeah, I'm so glad you brought up the sunlight. You know, sleep is... I think Thomas Dekker, who is a British dramatist is sleep is the golden chain that ties our health and human bodies together. I think that was like 1500 or 1600, something crazy like that. It's so true. Like, you know, the simple stuff is what... I was trying to focus on creating the conditions for sleep. Like, when you show somebody like their ordinary day and like, "You need to sleep more." And, like, "Okay, thanks. Appreciate that. Like, what do I do?" Well, the first thing you do in the morning is probably gonna impact when you go to bed. And there's a whole host of reasons.

But I can talk about, you know, the super... So you have something called the circadian pacemaker which sits above the roof of your mouth. It's called the suprachiasmatic nucleus. And sleep is a circadian process, which is endogenous, which means it's internal. But there are environmental factors called zeitgebers or time givers, it's German, that can influence it and train it, so light, temperature, humidity, etc. So, when you see sun first thing in the morning, especially low on the horizon, it sends a signal to the circadian pacemaker, the SCN, that then sends a signal to every cell in the body through an increase in temperature, that it's time to wake up and be alert. That also increases cortisol, which is great. It's gonna help you feel more energized. But it also helps about 12 to 16 hours later with melatonin secretion. Super interesting. I don't know if you saw this study by researchers at the University of Colorado and the Broad Institute at Harvard and MIT that showed that going to bed earlier and waking up earlier by an hour can reduce risk of major depression by 23%. So they looked at people that were, like, and here's how this ties back in, going to bed really late. So let's say they're going to bed at midnight or 1 a.m. and I only went to bed at midnight, 23% reduction.

And this was with over 800,000 people in the UK Biobank. They used genetic information from 23andMe, 85,000 of these people wearing sleep trackers. So they found that genetic early risers had a clear reduction in depression. So if you can, and you go to bed late, you need to shift it back, but why? What was the link? It was because if you go to bed earlier, you get up earlier, and you get sun exposure. The author's discussed this in the paper. Why? Because of all the hormonal triggers and things that you just discussed. So if light is an alerting signal in the morning, wouldn't it also be alerting signal later in the day? So, when the sun's going down, it's also good to go outside and see some sun but you should go outside frequently during the day, like, every couple hours to anchor your circadian clock, to let your clock know, okay, this is where we are. You weren't meant to live inside all the time. And like really simple things.

Like, I'm sure people have talked about sleep hygiene before making sure that, you know, I always say sleep, make your room like a cave, cold, dark, and quiet. Temperature 69 to 72 degrees. You know, it's no more than 72 degrees, more in the upper 60s. Cold temperatures help usher your body into sleep. Don't stop drinking a lot of fluids, like, maybe an hour or two before you go to bed. So you don't have to wake up. You know, frequent urination. If you find yourself urinating a lot at night, it could be that you don't have enough electrolytes. So adding things like magnesium and a zero-calorie electrolyte solution may be helpful or some extra salt. The light in your room, you know, no light at all, like, pitch dark. If you're in a hotel, roll up a towel, put it under the door. And then noise is really important. Like, you want it quiet. Now if you're in a city, you can use a white noise maker.

You know, the last thing is phones. And a lot of people were like, "Oh, the blue light, the blue light." Well, not really. Blue light is actually good earlier in the day. You don't wanna cut out any spectrum of light. It actually helps with alerting. But there was some research I read... I could find the article later but it wasn't the blue light that kept people up when they looked at cell phones. It was the emotional stimulation. So you're looking at your cell phone late at night, you're laying in bed, and guess what, you read an article that stimulates you, maybe it makes you mad, or maybe it gives you an overwhelming sense of grief, or even joy and you get excited. Well, you don't want that right before you go to bed. Like, save the joy for tomorrow. Like, you wanna transition slowly and so you really have to consider your environmental factors and behavior.

Katie: So many great tips. I definitely took notes on those and I learned myself that even if I'm not doing blue light, if I'm listening to anything that's mentally stimulating for me personally, like, it could be scientific studies, it could be a podcast, it could be reading a book that's interesting, my brain is just on. And then I don't sleep for a couple of hours. So I've had to learn to do other things like meditation, or drawing, or art, or things that are less mental focus, just because that's how my brain works. And I think those kinds of tips can be really, really helpful when you learn how to just figure out what your own rhythm is gonna be. And to your point earlier, like, there's such individuality in this. Like, there are those commonalities, of course of, like, if you can wake up a little earlier and get sunlight throughout the day, and hydrate, those are all very common things. But the specifics in each of those are so personal. And that's why the...

Erik: No question.

Katie: Each of us kind of being our own study of one and constantly experimenting and then finding the things that are working best for us.

Erik: No, you're exactly right. You are. I would love to hang out with you because, like, you're a pole vaulter now, you have spreadsheets on all your data. Like, it would be really fun to, like, kind of peek behind the curtain but we're probably very similar. My mind's always going. My wife is very different. Like, we'll be laying in bed. She's super smart. She has a doctorate degree at physical therapy. But I'm like, "Hey, what are you thinking about?" She's like, "Nothing." And I'm like, my brain's always going. And so I need to be very aware of the mental stimulation I get at night or it's gonna be really hard to fall asleep.

Katie: Well, I feel like I can't believe we're already at the end of an hour, and I would hope you'll agree to another episode at some point because I feel like there's more to talk about.

Erik: I'd love to come on.

Katie: But a few questions I wanna ask you before we wrap up, the first being, if there's a book or a number of books that have profoundly impacted your life, and if so, what they are and why?

Erik: Yeah, the number one book would probably be the Bible for me. It's just taught me to forgive, to be compassionate, to love and serve others. That's probably the number one. You know, there's a book called "Insanely Simple." It's by the guy that did all the marketing for Apple. And it really impacted the way I look at things, of how I translate information. As I'm building, like, this app, as I'm communicating with people, like, the simpler the better. And it's about Steve Jobs' obsession with simplicity. Let me think of one more.

You want a nonfiction that's kind of a story? Tori Murden McClure, "A Pearl in the Storm." It is about the first person to ever solo row across the Atlantic. And I had her on my podcast. She is, I mean, brilliant. She also cross-country skied to the Geographic South Pole. It is a brilliant piece of literature. It's one of Oprah's favorite books. I mean, it's sitting right here next to me. Highly recommend that book. If you're looking for something that's adventurous because I'm supporting a group of four veterans right now that are doing a Talisker Whiskey Challenge, which is a 3,000 nautical mile row across the ocean. And I was looking for information on people that have done this, and I found her, read her book, I was like, "Oh my gosh, she's gotta come on the podcast." And then I connected her with these guys. And it was, like, highly recommend it. You're gonna thank me for that one.

Katie: That's a new one. I'm excited to pick that up. I just put it in my Amazon cart. And ironically, I walked across the country from California to DC, "Do you see when I was in college?" So I have a...

Erik: You walked?

Katie: Walked. Yeah, it took three months with a group of students.

Erik: Oh my gosh.

Katie: So yeah, I love people who take on hard things like that. Our family motto is "You were made to do hard things." And I love hearing those kind of stories. I look forward to reading...

Erik: "Growth Mindset."

Katie: Yes. And Carol Dweck is another great book.

Erik: Yes.

Katie: Well, before, we will have to plan out round two already. But any parting advice related to this episode that you wanna leave with our audience today?

Erik: Yeah, you can do hard things. I mean, I'm gonna just echo what you say but you gotta create the conditions for that. You know, prioritize sleep, exercise, mental health, nutrition, community aspects, and tailor the amount of stress based off of how adaptable you are that day. If you can do that, you can expand your capacity, take on more, pursue audacious goals, thrive on uncertainty, go through hard things, you know, and you can adapt and thrive. Stress is not the enemy. It can actually be your ally. So, there you go.

Katie: I love it. Well, I look forward to a round two. This has been so much fun. I really enjoyed it. Thank you so much for your time today.

Erik: Thank you. Have a good one.

Katie: And thanks, as always, all of you for joining us and sharing your most valuable assets, your time, your energy, and your attention with us today. We're both so grateful that you did, and I hope that you will join me again on the next episode of the "Wellness Mama" podcast.

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