How to Enhance Performance With Better Sleep

Perform with Dr. Andy Galpin · Episode 5 · July 10, 2024 · Transcript

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Dr. Andy Galpin
The science and practice of enhancing human performance for sport, play, and life. Welcome to Perform. Hello, everyone. I'm Dr. Andy Galpin. I'm a professor of kinesiology in the Center for Sport Performance at Cal State Fullerton. In today's show, we're going to be talking about sleep performance. Now, I like the term sleep performance to really indicate the difference between going from good sleep to great sleep. And so what I don't want to spend much time on today is talking about things like complete sleep deprivation, so what happens to physical performance when you go 24 hours or 48 straight hours without sleep. I don't even really want to talk about what I'll call extreme sleep restriction, so sleeping for two hours a night, four hours a night, things like that, or even a single bad night of sleep. What I really want to spend most of our time here talking about is what really happens, does anything happen, when I go from six or seven hours of sleep to eight or nine?

Dr. Andy Galpin
How much of a competitive advantage am I getting over other high performers when I can go from that good to great sleep? We're also going to talk about why you should be approaching your sleep with the same vigor and specificity as you're doing your nutrition or your exercise training. Think about it this way. If you were trying to perform at your absolute highest and you had the resources, or if you simply look at the model for those individuals who do, you would see that they have dedicated professionals for high-performance nutrition. And you probably have done, or would do rather, some sort of extensive blood work or testing so that you can get the best nutrition supplementation for your unique body. We would take a similar approach, right? Some sort of advanced testing, perhaps, and an individualized program that is being modified and adapted as our goals are changing, as our body is responding, as we move throughout our life.

Dr. Andy Galpin
Now, in the sport performance world, we call this periodization. So this is a phrase where we have different volumes or intensities or exercises and goals based upon different phases of the year, trying to get to a specific outcome. We wouldn't necessarily eat the same thing every day if our training wasn't the same. We would adjust our food intake or our calories. We would have more volume in our workouts. We'd have less volume. We would have more days off, less

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recovery, and everything else that goes into this. So you see what I'm getting at here, right? This is the idea that what we eat and how we train are highly responsive and adaptive to both our unique physiology as well as what we're expecting out of our body. Why do we not have the same approach with sleep? Well, the answer is we can, and in fact, I'll try to convince you here that we should. We should be taking the same level of specificity and precision with our sleep.

Dr. Andy Galpin
Our plan and protocols should be adapting and changing based on how our body is responding and what we're asking our body to do. Now, as you can probably tell, I'm so fired up about this, I'm doing my best to mentally go slow here so I don't trip over my own words. I'm completely obsessed with this topic, and I've been on it for a while now, and that's because the data are so robust and impressive about what happens when you optimize sleep performance. So again, I'm not really talking about the consequences of bad sleep on your long-term health or things like that. It's the opposite. It is how much of an advantage you can create in your performance when you sleep better. One quick example here, because it's something we're dealing with right now with a handful of our NFL athletes, and that is the ability to aid in injury recovery, post-surgery, as well as even return to play for concussion and other physical problems when we're maximizing sleep.

Dr. Andy Galpin
But then there's also the direct performance benefit. Pick your metric here, whether you want to look at surrogates and physical attributes, things like endurance, coordination, speed, physical strength, et cetera. You want to look at on-field play, so basketball shooting accuracy, tennis serving accuracy, or other markers of, again, performance directly on the field. But then probably the one we use most often is it directly translates into more wins, and these data are very well-rounded from a number of areas, the NFL, the NBA, the NHL, the Olympics, PGA Tour, et cetera. There is clear and impressive evidence that those who maximize their sleep win more games. Now, I know what you're probably thinking. That's great, Andy. I'm sold, I'm bought in, I want those benefits, but it's just not feasible for me to sleep more. Any number of reasons, whether you're an athlete or not, that could be legit.

Dr. Andy Galpin
And so I want to make it ultra clear here, I'm not only talking about the need to just extend sleep and sleep more hours, but how you can mimic the benefits of sleep extension for these performance enhancement, for these injury mitigation, and return to play benefits without just extending the hours you sleep. Let me give you a couple examples here. What you may or may not realize is, depending on the study you pull, somewhere between 20% to 40% of athletes have clinical sleep disorders. And so by simply treating those things with any number of simple and specific solutions, you can create such improvements in sleep quality that you're effectively

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extending sleep. An easy example here for a Major League Baseball player I worked with for a very long time. We had no reason to think he had a sleep disorder. Slept pretty well, but not great. Kind of the same thing you'll hear most people say.

Dr. Andy Galpin
I think I sleep pretty well. I'm not having huge issues, but I also don't feel incredible either. And so we were actually to get a full appropriate diagnostic of him, found he was actually having a large number of sleep issues at night. But the solution is the fun part here. We were able to actually buy him a very cheap pillow, if you will. It kind of looks like a fanny pack that you wear in reverse, and that kept him from sleeping on his back. That reduced the amount of times he woke up throughout the night by about 80% in the very first night, and it stayed that way ever since. So again, just another example of the power of precision in treating your sleep the same way you would treat your training and nutrition allowed us to create an incredibly powerful sleep extension solution with very minimal effort, and it didn't require us to change his daily schedule, ask him to get to bed much earlier, or any other things that are sometimes not realistic for your personal situation.

Dr. Andy Galpin
So for those reasons and many, many more, I'm super pumped to be talking about sleep performance today. Now, in doing that, we're going to cover a lot of the research, both systematic reviews, meta-analyses, as well as direct studies on this. I've also talked to a number of professional experts in this field, and so I'm going to be bringing you a combination of what the research says, what these experts in the field say, what I've used in the athletes I've worked with, and my personal experience, and we're going to bring all that together in a cohesive system to help you do what we always do here, and that is address the three I's. So we'll start off by investigate. So how do you investigate? How do you measure and diagnose and manage your sleep? The second I being, of course, how do you interpret that? How do I know if that's good, great, okay, sufficient, good enough, or et cetera? And then three, how do I intervene?

Dr. Andy Galpin
So what do I do about it? What are protocols and approaches and solutions we can take to solve any of these individual problems? As always, throughout that, I'll try to cover the landscape. So we'll talk about cheap solutions, free solutions, what can we do if I manage a team of people, if it's for me personally rather than people I'm coaching, all the way up to what are the best in the world doing, what are things that are maybe within your financial reach or not, but what is the gold standard in all of these things? While I'm going to be spending most of my time talking about the research directly on high-performing athletes, I do want to remind you that it's not necessarily our core interest here that you play sports, coach sports, participate or ever want to be involved in sports. It's just that that, to me, represents a great surrogate for people that are

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trying to maximize their total human performance, whether this is their physical performance, cognitive performance, mental performance, or otherwise.

Dr. Andy Galpin
And so understanding this gold standard of high performance allows us to use some of the same skills and tools and tactics for folks that are also trying to ask the same out of their individual body, but perhaps not applying it to sport. So whether this is things like physicians, night nurses, military folks, judges, anyone else who's really trying to ask your body to perform at the highest level possible. Now, before we go too much further, I'd like to take a quick break and thank our sponsors, because they make this show possible. Not only are they on this list because they offer great products and services, but because I actually personally love them and use them myself. Today's episode is brought to you by AG1. AG1 is a foundational nutrition greens supplement. What's that mean? It means that AG1 provides a comprehensive variety of vitamins, minerals, probiotics, prebiotics, and adaptogens in an easy-to-drink greens powder.

Dr. Andy Galpin
Getting your nutrition right is hard for many people. I certainly know that I have clients who really struggle, for whatever reason, to get the proper nutrients from whole food sources. Now, AG1 is not a replacement for eating high-quality whole foods, but it is a great foundational supplement for filling in the gaps where needed. I've also personally found that with many of my clients, AG1 helps move them just in the right direction for eating more high-quality foods, because it helps them with cravings, digestion, and many other benefits. I especially personally like taking AG1 when I'm on vacation or traveling because it helps me just sort of stay on track with my nutrition. I know that missing a few days of getting the proper vitamins and minerals and other micronutrients is not a big deal at all. That's not really how those things work. But for me, again, I just like knowing that I'm kind of staying somewhat on track when I'm definitely not making the best nutrition and food choices of my life.

Dr. Andy Galpin
If you'd like to try AG1, you can go to drinkag1.com/perform to receive five free travel packs plus a year's supply of vitamin D3 plus K2. Again, that's drinkag1.com/perform to receive five free travel packs plus a year's supply of vitamin D3 plus K2. Today's episode is also brought to you by LMNT. LMNT is an electrolyte drink mix that has an ideal ratio of sodium, potassium, and magnesium, but has no sugar. Electrolytes are critical to proper hydration, which I've been harping on for years, but you can't do that by only drinking water. In fact, many of you will probably remember that I featured LMNT in my YouTube series on optimizing hydration all the way back in 2020, which is obviously long before this podcast even existed. So I've been a fan of LMNT for a long time. In fact, astute listeners will also realize these hydration videos were the genesis of the Galpin Hydration Equation, named not by me, but by the legendary

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neuroscientist, Dr.

Dr. Andy Galpin
Andrew Huberman. I featured LMNT in these videos because their blend of 1,000 milligrams of sodium, 200 milligrams of potassium, and 60 milligrams magnesium really is different than any other electrolyte on the market and has great scientific support. However, I want to be ultra clear, 1,000 milligrams of sodium is a lot, and not everyone needs that much. In fact, that may be way too much if you don't exercise or sweat much, already eat a lot of salt in your diet, say, from a lot of processed foods, or otherwise have sodium-related medical concerns. I personally use the citrus and watermelon flavors a ton to pre-hydrate before heading out on a full day of training or a long hike or a hunt, since I know I'll be losing a bunch of fluids and won't have many opportunities to take things with me. LMNT has also just released a new line of canned sparkling LMNT, which I am all about. If you'd like to try LMNT, you can go to drinkLMNT.com/perform to claim a free LMNT sample pack with the purchase of any LMNT drink mix.

Dr. Andy Galpin
Again, that's drinkLMNT.com/perform to claim a free sample pack. Now, before we get started, I need to clarify a few things. As always is the case in science, we need to make sure that we're understanding the same words, we're operationally defining terms, so there's no confusion. And so the first one I want to talk about really here is the difference between sleep deprivation and extreme sleep restriction. I've mentioned that a second ago, but just really wanted to double down and clarify that. I'm not really going to be talking about research, the benefits, what happens to performance when you go through things like complete sleep deprivation. There's actually a lot of research on that, a lot from the military, when you take people, and you have them go 24 or 48 hours without sleep, and then you return. There's tons of evidence on what happens to performance in a lot of areas, but again, I'm really not going to pay attention to any of that stuff because that's not what I'm getting at.

Dr. Andy Galpin
And I'm also not talking about short-term studies that use extreme sleep restrictions. So this is maybe two, three, or four hours of sleep per night for the course of three to 14 days. Those are important things to do, and they have a lot of applications for a lot of individuals, but really, I'm keeping most of what we're going to talk about exclusive to the evidence behind, again, what happens to this suboptimal sleep. This is defined typically as folks that are trying to sleep normally, but maybe only sleeping between six to maybe seven and a half hours versus those that are getting seven, seven and a half, up to eight or nine. Okay? So it would take us a long time to get through that other research, and it is, but sometimes it over appreciates or can conflate the benefits or consequences of bad sleep in those special situations. So just want to make sure you're clear when we're hearing the numbers and the evidence behind what I'm going

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to talk about later.

Dr. Andy Galpin
It's not coming from studies using those types of examples. And so what we're really talking about here is chronic suboptimal sleep, and there's three areas. First one being duration, so what we're talking about is how much time you sleep. Second one being quality, and as you'll see later, that is extraordinarily difficult to get our heads around. There's no universal definition there, and so we've got to have some extensive conversation about what to do about that, and we absolutely will. And then the third is timing. And so there's a lot that goes into timing of the day, circadian rhythms, chronotypes, and stuff like that. And so that's where we're going to spend most of our time in our conversation today. If you really want, I've got a handful of systematic reviews in a number of areas that I think are super effective, all coming in the last couple of years. I've spoken with a number of sleep professionals.

Dr. Andy Galpin
These are PhDs, MDs, as well as on-the-grounds practitioners of sleep and professional sports coming from the NFL, the NBA, the military, Special Forces specifically, those dealing with the astronauts, et cetera. And they all have given me confidence that these handful of articles are very good. So I feel strong in them. I've read them extensively. Those will all be in the show notes available, but just want to read the title off of some of those right now. First one is "Sleep and the Athlete: A Narrative Review and 2021 Expert Consensus Recommendation." This has got a large number of authors on this. If you're unfamiliar with what consensus statement means, it generally refers to a number, typically five to 25 or more scientists in a given area come together and say, "What are the things we all agree upon?" And so they tend to be very strong in confidence because so many authors from different institutions worked on this.

Dr. Andy Galpin
So this paper, I know, came from Neil Walsh, who's a well-respected and extensively published scientist in the area, as well as Amy Bender, whom I spoke to directly about this. And so this is a great article to get you started on that. Another is "Sleep Hygiene for Optimizing Recovery in Athletes: A Review and Recommendations." Again, from another strong group of scientists out of UC San Diego, published in the last couple of years. And then the final one is "Managing Travel Fatigue and Jet Lag in Athletes: A Review and Consensus Statement" from 2021. So there are many other papers there, but I chose those three specifically. I thought they were easy to read, very useful, and can get you started in a lot of the major areas. And so that being said, we need to recognize a couple of final things before we dive into the details of this episode, and that is this field is honestly quite emergent.

Dr. Andy Galpin
People have obviously been studying sleep for many decades, but it's almost exclusively from

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the perspective of disease and overall health. In fact, over 80% of the research on sleep in athletes has been published in the last decade alone. We have other major limitations. A lot of it has come from research on questionnaires, so using things like subjective analysis of your sleep, and they haven't necessarily always been validated as quality in athletes. So another challenge there. Research on females specifically is exceptionally limited, and so there is some initial indication that the requirements may be different for females, maybe not, but we just really honestly don't have enough information there to make a firm conclusion. So something that needs to be increased in the future. And then lastly, it is honestly challenging to control or blind people in sleep studies. You going to know pretty quickly if you're in the sleep for 10 hours per night group or in the six hours per night group.

Dr. Andy Galpin
And so that is a limitation in a number of the studies we're going to cover, but that is always the case in science. There's no panacea. There's no perfect study. So it's always about evaluating the quality of that study, other studies in the field from other laboratories, and then making a consensus based on the information that you do have. So while the evidence base here is more limited than we would like, there is enough there for the authors of these papers, as well as honestly myself, to conclude a couple of things, and the first is that athletes need to be screened for sleep disorders. We'll talk about why that matters so much and how to get it done a little bit later. The second is we have a huge opportunity to create a competitive advantage by developing more precise and effective sleep plans for our athletes. Now, this needs to be done based on people's unique physiology. But even more broadly than that, can just be done from sport to sport.

Dr. Andy Galpin
And think about it this way. The reasons or the ways we can enhance sleep in a football player are probably different than those in a swimmer because the challenges they face in their schedule, in their body size, in the demands, energy expenditure, are quite different. So giving them all the same solutions, well, hey, it's better than nothing, but that lacks the precision we're looking for. So in both those cases, we could create more effective sleep extension by being more precise with what we're asking them to do and probably then have less roadblocks, less problems with adherence, and less overall complaints from the athletes. With that, you get more adherence, you get more success, and we get more performance benefits. Now, I would love to tell you I'm the first and only one who's onto this secret area, but that's not the honest truth. The research is growing. The emphasis of this in individual sports and organizations is also growing.

Dr. Andy Galpin
In fact, I get asked all the time in interviews, what do I think the next big area of human performance is, and sleep is often my number one or two answer. It's extremely clear. There's a

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really interesting paper that came out recently by Dr. Allison Brager called "Sleep Is of the Muscle, by the Muscle, and for the Muscle," and in that, she called sleep the easiest and cheapest way to enhance athlete health and performance, and I think Allison is dead on there. If you look at what's happened, the International Olympic Committee, the NCAA, have both came out with statements in the last couple of years putting sleep as fundamental to athlete health and putting large emphasis on this. We see a growing number of sleep performance specialists popping up around, at least in the United States. The University of Washington, I know, has recently had every one of their football players diagnosed for a sleep disorder.

Dr. Andy Galpin
I've been in conversation with a number of professional sport teams who are either trying to build sleep performance programs, hire specialists in that area, and to really put the same emphasis on this that they have their training and nutrition. So while it's not there yet, it is clearly something that behind the scenes is being worked on. In fact, I would even say that if you're not doing that, you're going to get left behind pretty quickly, because this is such a clear and obvious win. Sleep affects nearly every physiological process, whether we're talking about performance enhancement or recovering from injury or concussion. It's also really, really bad in so many people. I've mentioned that depending on the study you look at, somewhere between 20% to 40% of athletes have sleep disorders. And then, as I've teased a couple of times, the solutions to sleep have traditionally just been like, "Hey, yeah, man, sure, that's great, but try to have my 19-year-old NBA player sleep more.

Dr. Andy Galpin
Good luck." That's not where the field is anymore. The solutions that are available are way more realistic and effective than that. And so as we continue to see these people put a greater emphasis on sleep, I wanted to make sure that that wasn't just information hid behind the scenes to some of these high performers, that everyone had access to the same tools and tactics. So as we start jumping into the details now, I want you to remember, I think about sleep in three major areas. The first is duration, so hours or time amount you've spent sleeping. Second is quality, and third is timing. So let's get started with duration. Now, I think what's most interesting here is a field of research called sleep extension or sleep banking. This is the idea that you will add on the amount of time you're sleeping. So you're asking people to increase the amount of time they are sleeping from anywhere between 30 minutes to up to two hours.

Dr. Andy Galpin
Now, this always brings a smile to my face and other people's when I talk about this because they're like, "Yeah, sure, I'm just going to sleep two more hours?" Yeah, you're going to. And the reality of it is, the research on this shows that it is quite effective. You will, again, see studies that have done this. They'll ask people to either do a combination of things. They'll simply give them

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a time, and they'll say, "Try to sleep for 10 hours per night." And so as a result of that, they'll increase their sleep by an hour or two hours or wherever they started with. Others, they'll actually just give a number, so let's try to sleep for 90 more minutes or 30 more minutes or something like that. And if you look at the results of most of these studies, you will see, for the most part, these groups will increase the amount of time that they sleep from plus or minus 30 minutes to up to two hours.

Dr. Andy Galpin
So it is very effective and plausible. Where this all got started was actually around the year 2000. This kind of study came out initially looking at work in cognitive function, reaction time, and mood, and stuff like that. But this field really launched off in 2008 with a seminal and classic study that "shocked the sleep world" from the Walter Reed Institute. This is a facility that does a lot of research for the Army. And what they found was effectively huge benefits in people who went through sleep extension prior to known sleep restriction. And so this is very interesting. Now, the same year, Cheri Mah from Stanford came out with the classic basketball sleep extension study, if you're familiar with that. And this is really what set the field on fire, and there's been a ton of work since that, but I think it's such an important paper that I want to go through it in detail because effectively what they did was found massive improvements in sport ability, so whether you're talking about free throw shooting percentage, reaction time, three-point shooting percentage, in the Stanford basketball team.

Dr. Andy Galpin
So you're talking about Division I athletes that had 9% improvements in shooting accuracy over the course of a season by sleeping two additional hours per night. And so there's a lot to unpack there. How do you get college kids to sleep two additional hours per night? And did you really say a 9% improvement in free throw and three-point shooting accuracy throughout the course of a season? Yes. And plenty of things more. So I want to go through that paper in a little more detail because, again, I think it really highlights the power of sleep extension as a huge performance-enhancing tool. So as I mentioned, this was conducted at the University of Stanford with their Division I basketball players, and I want to compliment Cheri and her team. Having done research like this, I know how extraordinarily difficult it can be. There are, of course, limitations to get you started right away. There's no control group here.

Dr. Andy Galpin
We also don't know how much of a benefit they had in their performance just because of the course of the season and a bunch of other issues. But doing research like this on actual high-performing athletes is next to impossible. This actually took her several years to complete because of just how difficult such a process would be. So lots of limitations, of course, but still lots of things we can glean from this, especially because it launched the entire field, in my

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opinion. There are other studies that have come out since this, both from Cheri's group and others, looking at endurance cyclists, swimmers, tennis players, rugby players, and a bunch of other stuff. So, yes, some limitations to this specific study, but let's really rather than worry about the details and the numbers here, let's just pay attention to the thought and the exercise of how much this stuff can help. So getting us started, what they did is they took the athletes, and they were able to get 11 of them to complete it.

Dr. Andy Galpin
They had to screen out for anybody with any sleep issues or use any drugs. They didn't allow alcohol or caffeine use the entire time, and they had them perform their normal sleep for two to four weeks or so. Now, the reason it's two to four weeks is because the challenges of working with real athletes in real time, in real sport seasons. As I mentioned, it took them a couple of seasons, so not all the same participants came from the same year of play. So they were able to get folks in, and just depending on preseason scheduling, testing, and other stuff like that, the acclimatization period there was a little bit different, so two to four weeks. The study itself lasted five to seven weeks for those same reasons. So they had people sleep normally for two or four weeks, and then they asked them to sleep for 10 hours per night. Again, that resulted in about a two-hour sleep extension on average.

Dr. Andy Galpin
Some participants had less, some did more. They tracked their sleep with a combination of sleep logs. So just think about a notebook, and the athlete wrote down how long they slept and the quality of their sleep and things like that, as well as what's called actigraphy. You'll probably recognize that as wearables. So think about a device on their wrist that measured their sleep. So not the gold standard polysomnography, of course, but still a lot of insightful stuff in the application of a high-performing athlete. What was really cool about this is they-- And kudos to the coaches, too. They worked directly with the sport coaches, so they had a bunch of physical performance testing. So they did one test that's called a 282-foot test. So I think this is, they ran from baseline to half-court, to back to baseline, to the end of the full court, back to baseline, and they were timed on that. They had a bunch of other physical performance metrics as well.

Dr. Andy Galpin
Again, as I mentioned, three-point shooting, free throw shooting, and I'll talk about those in a second. But they did those because those were a part of their normal standard testing anyway. So they weren't asking the participants to do anything differently. They weren't having them come to the lab and do additional work. And why that, I think, is very important is because getting an athlete to come to your lab and do testing for a study in the season, in my experience, I'll just tell you again, a little bit behind the curtain here, you're probably not going to get a great effort. And so when you start looking for maximal results and performance, it really comes down

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to how motivated the person was that day or not. But this was different. This was in their practice with their coaches. So I promise you, they were trying to shoot as best they could, not just in the post-testing, but the preseason testing, too, right?

Dr. Andy Galpin
You want to make your team, you want to play more. Same thing with their conditioning test. So really strong evidence there for the performance benefits because they're trying to do their best, because that's what their coaches are asking them to test there. They also did a combination, like I said, of shooting. I think they shot 10 free throws, and I think they shot 15 three-pointers, and they kind of took the how many did you make out of 10 sort of thing. Also, this stuff was not done one time. This was a common performance test done multiple times throughout the year, and so they're not just affected by, hey, was it one bad day? Was that person sick or hurt or had a bad night's sleep the night before? Something like that. So very robust testing from that perspective. They took psychomotor testing as well. This is actually a cool thumb tap test, so that this is something they could do on their phone, and it measures reaction time and a bunch of other stuff, where a little thing will pop up on their screen, and they'll tap it with their thumb kind of as fast as they can.

Dr. Andy Galpin
And so they're getting this combination of attention because it happens over a long period of time. So how were they able to focus? Or did they lose track of what they're doing and stop paying attention, as well as the reaction time? So pretty extensive and elaborate study design that maximizes what we call ecological validity, as well as external validity. So how would this apply in the real world? And this case, being able to pay more attention and shooting better in practice are pretty strong standards and metrics that people would care about. So what actually happened here? I'm going to walk you through the results in both absolute and relative terms. If you've been involved or read much human performance research, you'll know both of those metrics are actually important when you're considering the context of whether or not this was something to pay attention to or not. Easy example here is, sometimes a 1% improvement in performance may not be enough to reach statistical significance, but it might be practically relevant if this resulted in you, say, jumping two inches higher, but it wasn't enough, again, to reach stat sig here.

Dr. Andy Galpin
But most practitioners would care about two inches. So let me walk you through both so you have the most appropriate and accurate information, and then you can judge yourself whether or not you feel like this is worthy of note or not. So, as I mentioned, they did the 282-foot sprint test. That's that half court and back, et cetera, test. At baseline, it took them about 16.2 seconds to complete, and at the end of sleep extension, it was down to 15.5. So they reduced that time by

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0.7 seconds. Again, I'll leave that up to you to decide, but to me, that's a pretty impressive improvement throughout the course of a season. Free throw shooting percentage, again, this was out of 10. And remember, this is not just one test pre, one test post. This was done routinely throughout the season, and then you're getting an aggregate score here. So on average, they made 7.9 shots out of 10, so you'd call it an 80% free throw percentage, which we expected for athletes at this high quality in a practice situation.

Dr. Andy Galpin
And they were up to 8.8, or almost 90%. This is a lot. You're effectively making one more free throw out of 10. This is huge. And definitely the difference between winning and losing, making a team, playing, et cetera. Three-point percentage was a similar story. So again, these are out of 15 shots. So preseason, they were making about 10 out of 15, 60 percentage, and all the way up to 11.6, so added one to one and a half extra makes per 15 attempts. Again, a really important, both statistically significant improvement as well as practically important improvement. Other metrics that were included that were cool, subjective rating at practice improved. Scale of one to 10 here, kind of seven out of 10 before, all the way up to almost nine out of 10 at the end. Same thing with their subjective rating at games. 7.8 out of 10, all the way up to 8.8 out of 10. So lots of improvements in actual performance and perception of performance.

Dr. Andy Galpin
And then they're not going to run you through all of the other metrics in the study, but you're going to see a similar theme with weekly reaction time, daily morning reaction time of this PBT test I talked about, daily evening stuff, et cetera. So not everything came up as statistically significant, but most of it did, and all of it was a pretty similar magnitude. So it really just kind of looks like this, call it 3% to 10% improvement in most variables measured. So I don't know about you, but if you walked into any performance staff or coach's office or walked into an athlete's locker and said, "I'm going to get you a 10% improvement in all these metrics throughout the year," I think you're going to catch their attention. So this stuff has certainly caught mine. Now, if this seems a little bit too good to be true, I'll be honest, I had the same feelings. Right? When you look at some of those numbers, it's like, wow, that's a lot.

Dr. Andy Galpin
And then you look at the study, and you're like, hey, there's no control group, and et cetera. And so I said, man, how do I think about this? I started calling friends and colleagues of mine. I called Geoffrey Dermer, who's worked with the Atlanta Falcons and USA Weightlifting and tons of other professional sports. I called Amy Bender, PhD in sleep science, and worked with tons of professional athletes, and they basically all said the same thing. Okay, great. Let's say the results are slightly exaggerated. Let's say they're exaggerated by 25%. Let's say they're exaggerated by 50%. Wouldn't you still take a 5% improvement? I would. In those metrics, in

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that level of athlete, where the margin for improvement is so small anyways, call it 75% exaggerated. That's still a pretty big impact. And so when you compare that also with the research in the same area, you're talking about studies that have been done, of course, that one in basketball players, but similar work from Cheri's lab in swimmers, similar thing, as I mentioned, in rugby players, and you're all going to find this kind of global two to four to up to 10% improvement in performance, depending on how you want to look at it.

Dr. Andy Galpin
These sleep extension studies range from three nights of sleep extension all the way up to seven weeks, and it seems to me as the evidence continues to grow, you're just seeing the same thing played out more and more. So while, again, the specifics of can I guarantee you sleeping two more hours improves your tennis serving accuracy by 10%? No, I can't. But am I confident it's going to improve your performance? Absolutely. Just to give a little more context about the sleep extension research in athletes, there's a couple of other studies worth noting. One of them looked at an additional 1.7 hours of sleep per night over the course of a week, and this was done in tennis players, and they found that it improved tennis serving accuracy by about 6% or so. Another one looked at a little bit less, so 45 minutes of extra sleep per night, but for a longer duration. This was now three weeks. And they found a improvement in reaction time by 4%, as well as a reduction in cortisol by 19%.

Dr. Andy Galpin
This was in rugby players, so a little bit different demand, a little bit different test, but still a similar story. And the final one of note was more similar to the basketball study, in which they asked them to sleep for an hour and a half extra per night, but just for three total days. And so their sleep time actually went from about 7.1 hours per night to almost 8.6 hours. This is another example of, I'm not talking about going from four hours of sleep tonight to six hours of sleep a night. We're talking people who are already sleeping a decent amount, seven hours, and pushing them all the way up to close to nine hours. In this particular study, they found a 3% improvement in time trial performance, this is a 60-minute cycling test, in these highly trained endurance cyclists and athletes. So again, wanted to share all of those studies because it highlights it's not really specific to basketball.

Dr. Andy Galpin
It's not just physiology of endurance. It's not just skill. It is really robust in terms of how much it improves, what areas of performance improve, how long you need to do it for, how much you need to sleep for. And so I don't want you to get too caught up in either the numbers in terms of the percentages of the improvements or even really the protocol. How many more minutes for how long? I think the take-home point is if you can get people to start sleeping longer for a couple of days or even for a couple of weeks, and if longer means 45 minutes or two hours, it

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doesn't really matter. If you can get that stuff, you're going to see performance improvements regardless. I'd like to take a quick break and thank our sponsors. Today's episode is brought to you by Absolute Rest. Sleep is the bedrock of human performance, which is why I always focus on it with my elite athletes. But despite trying every wearable and even sending people to full-blown clinical testing in sleep labs, we rarely got very far.

Dr. Andy Galpin
That's why two years ago, I co-founded Absolute Rest, which redefines what it means to be a high-performance sleeper. After tremendous success, we are now ready for our next challenge, a first-of-its-kind sleep optimization program that combines advanced sleep technology with personalized coaching, all at a fraction of the cost of a traditional sleep study. The Sleep Lens program allows you to run a full FDA-approved, clinical-grade sleep study from your fingertip every single night. Our team of sleep scientists then use your data to create personalized solutions that drive real changes in your sleep. No more overnight stays in creepy sleep labs, no more wearables with questionable accuracy, and no more wondering if the changes you're making in your nightly routine, habits, or supplements are actually working or not. If you'd like to try Absolute Rest, go to absoluterest.com/perform to secure your spot in the Sleep Lens program and save $100.

Dr. Andy Galpin
That's absoluterest.com/perform. Today's episode is also brought to you by Momentous. Momentous makes supplements of the absolute highest quality because, in my opinion, no one is even close to their quality and safety standards, and they've got the data to prove it. For example, we've long known about the numerous health and performance benefits of fish oil. I've personally been taking it for probably 15 years or more. Numerous studies have consistently demonstrated positive impacts of EPA and DHA, the two primary fish oils, on everything from cardiovascular and brain health to exercise performance and joint pain. Now, you can get fish oil anywhere, but personally, I only use Momentous because it's never once given me a fishy aftertaste, and more importantly, every single batch is NSF tested to ensure the lead and mercury levels are undetectable for purity and safety. Their fish oil is pure, potent, and sustainably sourced.

Dr. Andy Galpin
Another major benefit to their fish oil, and you can check the record here, because I've been talking about this in my slides in class for over a decade, is that you won't find any fillers in their fish oil. See, the dirty secret in the industry here is that most companies will add non-EPA and DHAs to their fish oil to keep their, quote, "fish oil count high," but to keep the active ingredients, and therefore costs, low. And it makes you actually feel like when you're purchasing it, you're getting more fish oil at a cheaper price, but you actually have to double or triple your dose to get

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the same amount of active ingredient, which means you end up spending more money in the long run, or you don't, and you get worse results. If you want to give their fish oil a shot or any other Momentous product, go to livemomentous.com/perform to get 20% off your order. Again, that's livemomentous.com/perform to get 20% off.

Dr. Andy Galpin
Now, one more thing I wanted to pass along to you that I thought was actually pretty interesting regarding sleep extension, and you're not going to find this in the peer-reviewed research. This is an anecdote, to be totally candid with you, but it's still really important. I talked actually at length with Dr. Jeffrey Durmer, who's an MD PhD in sleep and has been around for decades, one of the most profound and prolific sleep scientists really of our time. And he did a lot of work in the NFL, and he told me that, I'll have to say this as carefully as I can here, but he basically said when working with one particular NFL team that he noticed there wasn't really a huge improvement in performance or cognitive function or reaction time that they could really tell, but the sleep extension was incredibly powerful at helping people return from injuries. The performance staff felt it was very clear that their guys were either getting hurt less often, but more specifically, coming back from those injuries faster than they were in the years prior to not paying attention to sleep.

Dr. Andy Galpin
So again, a number of potential benefits here and rationale to exploring this idea of extending your sleep. But I know what you're probably thinking. Okay, how do I do that, number one, and then what if it's just not possible? You have got various sleep restrictions. Now, in this particular case, I'm talking about athletes as well as everybody else. So sometimes people don't realize athletes want to sleep more, but they don't have the option to. They've got schedules, they've got practices, they've got flights and travel, and they've got the same restrictions that the rest of us have. So again, as I've mentioned, I really feel like the benefits of sleep extension are quite profound. The biggest issue, though, is really practicality. And what I mean by that is you're probably thinking, "Dude, I'm sold. I'm in. I want to sleep more." It's just not possible. Whether you're an athlete or non-athlete, all of us have restrictions on our time.

Dr. Andy Galpin
You may have other obligations, you may not, and you just can't sleep any longer throughout the night, or have any number of reasons. So what do we do if we believe in sleep extension, we want to get these performance enhancement benefits out of it, but we just are not able to sleep for more time, for whatever reason? Well, you've got a number of different options here, and the very first is being more specific and intentional about when you're trying to extend your sleep. The reality of it is almost nobody has the ability to sleep for nine or ten hours a night every day, every night, the entire year. That's an unrealistic expectation. You're setting yourself up to fail.

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Just like you wouldn't do that with your nutrition. You wouldn't do that with your training. You wouldn't just run as many miles as you can in a week. You wouldn't lift as many reps as you can. You would have a periodized approach.

Dr. Andy Galpin
So go through periods where you're going for more volume because you're going for less volume in other periods. You're going to have more calories during this phase and less calories during other phases. I would say the same thing with sleep extension. And so think about your schedule, whether you've got an important travel coming up, you've got a really tight business schedule, you've got work obligations. We have a training camp, so we're starting preseason training. We're in fight camp for MMA fighters. We just have some other area of time that is most important to us or is a time of known sleep loss, right? In that, we probably want to go in front of that and get our what's called sleep banking in. And so we're going to look and say, "All right, great. I'm going to remove things in my life, if I can, or add things in my life, like napping or other things, that allow me to get towards that sleep extension in the, say, three to 30 days prior to those big known losses of sleep."

Dr. Andy Galpin
A really good example of this that I wish I'd known about but honestly didn't. A number of years ago, I was fortunate to travel with a UFC fighter named Brian Ortega that I've worked with for many years, and we actually were able to go to Abu Dhabi and fight at a place called Fight Island. So this is really interesting. This was during the COVID pandemic, and the world was basically shut down, and the only fighting, and really the only sport happening, was the UFC in this specific fight bubble out in Abu Dhabi. Now, the challenge with that is I live and Brian lives in Southern California, and we had to go all the way out to Abu Dhabi. So we had time change to deal with, we had travel to deal with, and at the same time, we've got a very extensive weight cut. So Brian has to lose a decent amount of weight like every fighter does. Brian's pretty normal in that area, but he's got a decent amount of weight to lose in the four to five days prior to that performance.

Dr. Andy Galpin
In addition to that, we have to fight in a five-round fight. We have just a number of media obligations. Brian is the headline event. So there's just a lot of challenges that go into this. So we've got to go over there, and we've got to try to manage one of the key variables, which is sleep. Well, we get over there, and we've got to now also deal with the fact that we have to fight not at local time, but because the UFC is an American company, for the most part, they generally want their fights to happen during American primetime. So I think we end up fighting, if I remember correctly, something like 6:00 a.m. local time in the morning, so then it could be at 7:00 PM PST in California or whatnot. And so we went over there with the idea of saying, "Okay,

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great." And I timed everything out. I pre-prepared. I used an app called Time Shifter to help make sure all of our circadian rhythms were on the right point, and everything was plotted out weeks in advance, and I thought we had a perfect system there.

Dr. Andy Galpin
Unfortunately, what I didn't realize is when we got there, all of Brian's media obligations were still at Abu Dhabi local time. So this was right in the middle of our sleep window. So we've tried to stay on California time, but he's being woken up all day to do press conferences and weigh-ins and media and things like that. And so it ended up being an entire sleep disaster. He got almost no sleep. I probably had one night of straight sleep the entire almost two weeks we were there, just disrupted. His body was all over the place. Every metric we had was just off the charts, gone cuckoo. He had no idea when he was awake or sleeping. It was a really, really challenging thing. We were fortunate. Brian actually went on to perform, had one of his best performances ever, and won the fight. We got to come home, but it was an absolute disaster. Looking back on that, there wasn't much I could do. He had to perform at that time.

Dr. Andy Galpin
He was going to have to do the media obligations. There's just nothing we could do about it. The only real solution I would've had was to bank his sleep prior to going out there. He would not have performed at his best, no question. The research, especially from the military, is really clear here. Now we're talking really known sleep restriction, sleep deprivation, which is where we were at. If you go through sleep extension prior to events like that, you can blunt or attenuate the drop in performance, which is to say, the performance drop will happen, but you can have it go down slower if you bank some sleep going into it. So I wish I would've known about that. I didn't. This was, again, many years ago, and I just didn't know that information. So would've gone back next time if we ever have to go through something like that. We're absolutely going to bank probably at least three weeks prior to, as much as we can.

Dr. Andy Galpin
Of course, we're trying to sleep as much as we can, being in fight camp regardless, but we would've made other changes to ensure he had access to more sleep because we knew we were going to have such a challenge over there. So didn't know it at the time. We were in a unique situation, lesson learned, but a key tool and tactic I will certainly use in my coaching practice for the rest of my career. So why is it sleep extension is such a powerful performance-enhancing tool? Well, it's because of what I call the athlete sleep paradox, and that is, despite what you may think, athletes tend to sleep less and worse than non-athletes, despite the fact that they probably actually need more sleep. And so you can look at this from a lot of different ways. There's been a number of longitudinal studies done on divers and rowers and skiers and cyclists, and what you're going to kind of collectively find is most athletes tend to

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sleep in the neighborhood of six and a half to seven hours per night.

Dr. Andy Galpin
Now, the average person is in that range, maybe in the seven hours or so. And so you can see the athletes are a little bit lower, but they actually need even more. Cheri Mah, actually, from Stanford, the sleep extension study, also published another paper, and in that, she looked at 620 athletes at Stanford across 29 different sports and found that almost 40% of those athletes reported sleeping less than seven hours per night during the weekdays, and over 50% reported extremely high daytime sleepiness. And so again, you can chop this up and look at all the different papers, but you're going to find a similar note. Athletes tend to sleep worse, and there's a lot of reasons for this. Some of it's very practical. They have early morning practices. They have extensive late-night games or competitions. Some of it is because of physical nature. Athletes tend to be bigger than other people, and so their necks are larger, and this alone can be a predictor or cause of sleep disorders.

Dr. Andy Galpin
They tend to have worry and anxiety the night before sport competitions and things like that. Depending on the sport they're in, they may have caloric restriction or other excessive training, just a lot of other things that go into it. And so some of it is behavioral, some of it is lifestyle, some of it is physiology, and some of it is just the nature of what they go into in terms of competing. And so they're in this really hard spot. They need more sleep, arguably, than other folks, and yet they're sleeping actually less. So it puts them in a really big bind. So it's really no surprise then when even if they're sleeping at seven hours and we take them to nine, we see these giant bumps in performance. It's almost like minimally or lowly active individuals going from six hours a night to eight and a half. Because they're almost in a little bit of a pseudo sleep debt because they're simply not matching the demands for what they need, let alone going all the way up to the top to maximize recovery and performance.

Dr. Andy Galpin
And as I mentioned, this is really not extreme sleep restriction. So there's a lot of really cool papers, and the line seems to be somewhere in this seven to seven and a half hours range. There is a significant difference in all things. There was one study looking at getting a cold or being sick and found that an additional 30 minutes a night decreased your chance of getting a cold by fourfold. So huge in performance there. There's a really cool paper on tweeting, I guess we'll call it X-ing now, but tweeting in NBA players, and all they did was look at just publicly available tweets on NBA players and looked at how late they were tweeting at night post-game and found there was a 1.7% improvement in shooting accuracy in those who are not up tweeting late at night. And so just that alone, a really low-quality indicator of sleep, how much are you tweeting at night, explained almost 2% of shooting accuracy.

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Dr. Andy Galpin
Again, you take Any NBA coach, you take any basketball coach and say, "We can give you a 2% bump in shooting accuracy," this is a really big number, especially in a high performer who doesn't have much room to go. Again, rugby, similar thing, right? There was a really cool study looking at rugby in kind of a three-week preseason training phase, and they found both body composition and aerobic performance were significantly better in those athletes who slept more than seven and a half hours relative to those who slept less than seven and a half hours. All right, and then finally, there's been a number of studies kind of on injury, and then the line there is, again, you go from seven hours of sleep at night to eight hours of sleep per night, and then this one study in particular found that that increased injury risk by 1.7 fold. So again, there's lots of examples I can come up with here, but there is just a lot of information suggesting it really is not the same.

Dr. Andy Galpin
Sleeping seven and a half hours or seven hours is like, "Okay, I feel fine. I feel normal, and I'm a little bit sleepy, but it's not that big a deal. Would 30 more minutes really matter? Would an hour really matter?" And hopefully, I'm convincing you that, yeah. Yeah, it does. It matters a lot. So I could keep going here and share with you more research, but I think you're getting the point. Generally, athletes are not sleeping enough for their demands. What actually is, I think, really interesting is this sets up this athlete sleep paradox I talked about a second ago, and that is athletes don't sleep enough even though they actually probably need more. That second part, though, is a little bit more confusing, why athletes need more sleep. There's not a strong relationship, at least scientifically that we know of yet, between energy expenditure, say calories or how much work you put in, and minutes needed per sleep.

Dr. Andy Galpin
It doesn't seem to work like that. So you can't simply say, "I ran a few more miles today," or, "I was a little more active. My steps were higher, therefore I need X amount of minutes per sleep." Or maybe you do, but you actually won't sleep that much more. So there isn't a tight relationship. There clearly seems to be some relationship between energy output and some sleep, but again, it's not a one-to-one relationship. And so when I talk to a lot of the people in this area, I kind of pressed them on that, and there's a couple of different reasons. One of them is those studies really just haven't been done, and they haven't been done in high performers. So there may actually be that relationship. There may not. We don't know. That's an omission of the research at this point. But there's actually enough biochemistry here for us to intuit that there's probably something happening here. And so a couple of things to think about.

Dr. Andy Galpin
One, we're not talking about returning to baseline. We're talking about people who are trying to

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create new adaptations. So it is not just recovering, it is now optimizing or maximizing. So that's one. The second thing is, think about what we're asking athletes to do. So let's remember some basic, or let's learn some basic biochemistry of exercise here. Now, everything in biology uses a single molecule for energy called ATP. Stands for adenosine triphosphate. So it is an adenosine molecule with three, that's why it's called tri, phosphates attached to each other. It doesn't matter where you're getting the energy from to create that ATP, fats, proteins, carbohydrates. Doesn't matter what animal you're in, frankly, or what you're using energy for, digestion, exercise, recovery, brain function. It's irrelevant. It's all using that magic energy currency called ATP. All right. Now, the way that this operates is there are high-energy bonds that connect one of the phosphates to the second phosphate to the third phosphate.

Dr. Andy Galpin
So you can kind of think of this adenosine in the middle, and this little tail of the three phosphates. When you break off one of those phosphates from the other, you end up with a molecule that is not adenosine triphosphate, it's adenosine diphosphate, because it now has two phosphates, and then you have that third phosphate is what we'll call an organic free-floating phosphate, okay? Now, by breaking that phosphate off, you broke that bond. That has a net release of energy. You put some energy into the system to break the bond, but it gave out more energy after it broke than it did to break it, and so that's an exergonic reaction. You've generated energy, and you use that energy to power your exercise or recovery or whatever you're doing. So as a net result of that, every time you've asked your body for energy, you have created an ADP and that phosphate, okay? The fate of the phosphate we'll talk about in another episode or conversation.

Dr. Andy Galpin
If you were to ask yourself for more energy, or ask your body for more energy rather, you would break that ADP again. So you'd snap that second phosphate off, and you would turn it into adenosine monophosphate. So one of them. You do it one more time, now that third phosphate's gone, and you just simply have adenosine. Well, why does that matter? Adenosine is a little molecule that binds to little ligand receptors all throughout your body, particularly in your brain, and this controls fatigue, or rather, sleepiness. And so what happens, and in fact, this is exactly how caffeine works, right? So caffeine competitively binds to those adenosine receptors, and so then it blocks the perception of fatigue. So when more adenosine accumulates throughout the body on those receptors, more sleepiness, more fatigue. And so throughout the day, as you're going through metabolism, you're generating more energy, you're creating more free amounts of adenosine.

Dr. Andy Galpin
More of it is binding to those receptors, and you're increasing what's called your sleep pressure.

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So your sleepiness and fatigue is building over time. And this is great. When you sleep at night, you remove those adenosines, you recycle them, create them back into ATP, and so you've recycled your energy. Your sleepiness goes away, your grogginess goes away, and your energy comes back up the next day. This is our sleep-wake cycle, right? When you wake up the next morning, that feeling of grogginess, that feeling of sleepiness, is called sleep inertia. And this is getting up in the morning, right? This is related to how much adenosine you've effectively cleared throughout the night. And this is one of the many, many reasons why sleeping better at night or sleeping more effectively, sleeping more, allows you to feel less groggy the next day, sleeping of a higher quality, et cetera. It's also why, as I'll talk about in a little bit, things that people tend to think are normal with their sleep are not.

Dr. Andy Galpin
So it is not common to feel groggy all day. It is not common to be able to sleep kind of on command throughout the day. Those are strong signs that you are probably not clearing all the adenosine. There could be other things going on, but that could be one of the things that's happening. It is still left there. It's why you also potentially don't have as much energy the next day because you don't have the adenosine to make enough ATP. That becomes a problem. So where caffeine enters the picture is caffeine competitively binds to the same receptors. So when it is stuck onto that receptor, the adenosine can't bind there, so you don't get that same sense of fatigue. And so that's why caffeine has both a stimulation effect as well as an anti-fatigue effect. So there. It's also, again, why if caffeine is consumed too late or not metabolized sufficiently enough, that you're going to have a hard time sleeping at night because you're not getting that same adenosine binding, not getting that same signal for sleepiness.

Dr. Andy Galpin
So it would then make sense, and we could intuit someone who's going through more ATP recycling and production throughout the day, like an athlete, like somebody who's more physically active, would need more sleep, more time for the glymphatic system to operate, more time to clear our overall adenosine. Now, again, we do not have direct studies of this, but intuition says this makes sense. There have been some studies looking at things like endurance athletes versus other, say, strength and power athletes, and it initially suggests that the amount of time during the sleep stages were particularly effective at clearing this stuff is enhanced. And so that's, again, another indirect information. And so I think at this point, there's enough for us to say, all right, we can turn to mechanism. When we don't have direct human trial evidence, then this is an appropriate time to look at mechanism.

Dr. Andy Galpin
Since we don't have those trials for energy expenditure and high athletes and sleep duration, we can look in the mechanism, and the mechanism makes sense. It makes teleological sense. It

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makes intuition sense. We have some other similar studies, like with endurance athletes. And so you kind of combine that story on top of the evidence that we know that athletes still don't sleep enough as normal people, or even less than, and it makes sense for us to say, okay, you need to sleep more, and you're probably not sleeping enough as it is, and you probably have an argument for needing more sleep than everyone else anyways. I'd like to take a quick break and thank our sponsors. Today's episode is brought to you by Eight Sleep. Eight Sleep makes smart mattress covers with cooling, heating, sleep tracking, and more. I've had one for years, and it is glorious. I even put one on the bed in my guest bedroom because as you'll hear me talk about endlessly here on the "Perform" podcast, there really is nothing you can do that makes a larger impact on your health and performance than getting tremendous sleep.

Dr. Andy Galpin
The Eight Sleep is a game-changer because I run hot, or as my wife calls it, I'm a furnace. And that's particularly driven by the fact that I often have to do my exercise training in the evenings, which is honestly not always great for sleep. But this is also the case of many of the athletes that I work with who don't have a choice when they compete. And so being able to cool down immediately in bed does wonders for both sleep latency and sleep quality. Eight Sleep recently launched their newest generation of the pod cover, the Pod 4 Ultra. The Pod 4 Ultra has two times more cooling power, yet is virtually silent and even has snoring detection that will automatically lift your head in a few degrees to improve the airflow and stop you from snoring. Go to eightsleep.com/perform to save $350 off their Pod 4 Ultra. Eight Sleep currently ships to the USA, Canada, UK, and select countries in the EU and Australia.

Dr. Andy Galpin
Again, that's eightsleep.com/perform. Let's move on now and talk about sleep quality. Now, as I mentioned, this is very challenging because there is no specific set definition for what quality means. In fact, scientists argue about this stuff constantly. So as we go through this research, keep that in mind. I also want you to keep in mind that not all studies have used the same methodology. Some have used what's the gold standard, so polysomnography, actual tests where they hook up electrodes to athletes and clinically diagnose them. And others have used things like questionnaires that have been scientifically validated, but they probably result in a higher percentage of diagnosed disorders than the direct test. But nonetheless, I'm just going to give you some ballpark numbers here based on the collective amount of research. All right, so if you look across the studies that have been done on Division I football players, the NFL, the NHL, Olympic athletes, rugby, and things like that, you're going to see the number at 20% to 40% or so, meaning that percentage of athletes have clinically diagnosed sleep disorders.

Dr. Andy Galpin
But what's crazy is over 80% of those will go undiagnosed, and that's the same in the general

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population. So the overwhelming majority of sleep disorders are never actually known or identified, and then, of course, because of that, they're not solved, which is a huge problem. In terms of which disorders are most prevalent, you've really got the big three. That is obstructive sleep apnea, you have insomnia, and then the third one is restless leg syndrome. How much of these exist in each? Well, OSA or sleep apnea is pretty common, most common, 10% to 20%, probably has a lot to do with physical size of athletes, but can be around quite often. Insomnia is the second most common, and that's somewhere between four and 12% of athletes will exhibit signs at some point in their life of insomnia. This is particularly problematic in sports like wrestling and swimming, who utilize a combination of late night or afternoon evening training sessions, as well as very early workouts, so 4:00, 5:00, 6:00 a.m.

Dr. Andy Galpin
workouts. This can either exacerbate insomnia symptoms for those that have it or, in some cases, unfortunately, create it. We'll talk about solution steps for that a little bit later. Restless leg syndrome is also somewhat common, somewhere between four and 13%. So another one to keep out for. This is why in many of the consensus statements, you'll see people advocating for athletes to get tested at least once a year for sleep disorders, because this is a really high number. Let's even say that some of this is a little bit exaggerated, and it's not 40%, but it is 25%. That still means one in every four or five people in your room, on your team, in your locker room, has a clinical sleep disorder. And almost surely, and 80% likely, they're never going to know about it. So we're leaving a lot of health and performance on the table by not addressing our sleep quality and addressing, most specifically, sleep disorders.

Dr. Andy Galpin
Again, no specific definition exists for sleep quality, but there's a lot of metrics that people will use to infer that. Some of the things that jump out are efficiency, so this is what percentage of time you spend sleeping at night versus awake. Another one called WASO, wake after sleep onset, is a very common one. There's latency, how long it takes you to fall asleep, and then fragmentation. And you look at the research on all of those, and these globally tend to be worse in athletes. So you may or may not qualify for a clinical sleep diagnosis, but that's not really what we're concerned with. So the analogy here would be an X-ray. So your knee hurts, you go in to the doctor, they take an X-ray, and they say, "Well, it's not broken, therefore it must be optimal." That's not how it works. I'm still in pain. I'm suboptimal. So there's a difference between getting a clinical diagnosis or meeting a threshold for a sleep disorder and still having very poor or low-quality sleep.

Dr. Andy Galpin
So one actual study I'm thinking of, this colleague of mine, Cory Peacock, did this, and this was cool because this was in UFC fighters. He tracked them for an entire, I think it was somewhere

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between a six to eight-week camp for an actual UFC fight. And they found that sleep latency was one of the telltale signs of problems. And so this continued to get worse throughout the camps, and it was actually directly related to a number of performance metrics. So their sleep latency was negatively correlated to VO2 max, heart rate recovery, vertical jump height, and then what's probably most important, which is the amount of workouts or training sessions that they missed. And these correlations were strong. All of these were about 0.8 or higher. One is the highest you possibly get. And so that alone is a phenomenal thing to take a look at and pay attention to as a way to identify, am I sleeping at the highest quality, maybe or maybe not clinical disorder level?

Dr. Andy Galpin
So in addition to sleep duration and quality, another lever we can press to enhance performance is sleep timing. Now, this is actually really cool. A lot of people think about this simply as the context of jet lag, but it is more than that. There are circadian rhythms that you perform the best in, and it tends to be your local time, tends to be your afternoon. And so if you're traveling and you're changing time zones, this matters, but if you're also manipulating when you're performing, even within your time zone, it can mimic the same effect. So what I'm getting at here is if you can optimize timing, you can get the benefits of sleep extension and improving sleep quality without changing either of them. And what I mean by this is the research is so cool here because it comes directly from games one. There's a lot of research across a bunch of different sports, the NBA, the NFL, Major League Baseball, the NHL.

Dr. Andy Galpin
There's a bunch of studies going back through 10 years, 30 years, up to 40 years of historical games, and they look at these things and they say, "Okay, can we predict who's going to win more games based simply on a combination of are they playing in their right circadian time or not?" So the example here would be, let's imagine you have a West Coast team, and they're normally used to competing at 4:00 PM on the West Coast, and they travel to the Midwest or the East Coast, but they compete at a time that is still 4:00 on the West Coast time. So it's their normal circadian rhythm. They have a big advantage over the other team because they're playing in their normal rhythm, despite the fact that they've changed time zones. So it's more complicated and more interesting than just jet lag, which is obviously very, very important. So this rhythm, there's a ton of information here. Steven Lockley from Harvard, he's been around for forever, has published a ton in this area, was monumental in developing the circadian rhythm and light timing for the International Space Station.

Dr. Andy Galpin
He has a great app. I have no affiliation to this. It's called Time Shifter, which helps you set your supplementation, and light, and food stuff for if you're traveling internationally. I've used it for years. I've paid full price for it. Lots of stuff there, but he's done a ton of research on this stuff,

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and it's really compelling. So Steve has done so much cool work in this area, but I'm going to condense it to just hit a couple of points. One study I think of in particular was they went back and looked at performance in Olympic swimming from 2004 to 2016, and they were able to predict 0.3% of performance based simply on circadian timing. So again, we're not talking about who slept more or who had sleep disorders or anything. It is simply, can you play and perform in the right time for your body? I think more interesting is Cheri Mah from Stanford, who I've mentioned before, spent I think about three years working with ESPN.

Dr. Andy Galpin
And what she was able to do was predict somewhere between the neighborhood of 70% to 80% accuracy of who would win NFL games based simply on the team's time zone. So this is incredible. Obviously, this is stuff that people use in those in the sports betting world behind the scenes a lot, part of their information. If you ever wonder why a betting line is where it is on some teams, this is a huge component to that. It's certainly not the only one, but it's really cool stuff. So, again, be able to understand and enhance your performance. If sleep extension is out of the question, if sleep diagnostic is out of the question, if sleep quality, you're trying and it's not working, whatever, another way, again, you can get yourself to huge performance enhancements is manipulating your timing. The more you can stay consistent in performing in your own local space, whenever you're used to performing, the better you're going to be.

Dr. Andy Galpin
Let me give you one tangible example so you have something to lock onto here. The University of Washington football team, my hometown team, candidly, is going to be dealing with a unique challenge. They are right now in the Pac-12, which means every team they play is on the West Coast. They're moving to a division that is in the Midwest, so they're going to be playing Ohio, and Pennsylvania, and Iowa, and Minnesota, and things like that. So let's imagine this. Let's imagine the University of Washington typically played their football games, as they do, either at 4:30 PM or 7:30 PM Washington time. Okay, great. So if they played a team at 4:30 at home, and that team came from the East Coast or Midwest, the University of Washington has an advantage. The other team traveled, and now they're competing at their normal local time. Huge win for the University of Washington. But another scenario gets more interesting.

Dr. Andy Galpin
Let's imagine that they're on the road, and let's imagine they went to Ohio State, as an example, and they played that game at 7:30 PM Eastern time zone. Now, this is actually still, despite the fact that they're on the road, this is still a huge advantage for the University of Washington, because 7:30 East Coast time is still 4:30 West Coast time. So not only is the University of Washington competing on their normal circadian rhythm, but Ohio State, in this case, is competing at a way delayed rhythm. Typically, those teams are going to be playing at about noon

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local time. So instead of playing at noon local time, they're now playing at 7:30 local time. They've shifted their performance window seven and a half hours. So in this particular case, despite the fact we would be on the road, we'd have a three-hour time zone difference, there would still be a slight 1% to 2% advantage for the University of Washington.

Dr. Andy Galpin
Third example here would be the opposite. Let's imagine again, University of Washington typically plays at 4:30 PM Seattle time, and they go to Columbus or Ohio State, and they play a game at Columbus or Ohio's normal time, which is noon Eastern time. Right? This is now 9:00 in the morning for the University of Washington. This is now many, what are we, almost eight hours earlier than normal, would be a massive advantage, not only because the time shift change, the travel, being on the road, but because of circadian rhythms. You would probably be looking at maybe a 4% to 5% to 6% advantage just on that fact alone to the Ohio State team. So something to really pay attention to. Those of you that have the opportunity or ability to manipulate this, I would encourage you to do so, but something, again, we can really pay attention to when sleep extension or sleep quality are not on the table as variables that we can improve.

Dr. Andy Galpin
It's now time for us to really get into the details of the three I's. The first I being investigate, which is how do I assess and analyze my sleep? The second being interpret, so how do I know whether that's good, bad, great, terrible, or otherwise? And then third being intervene, so what do I do about it? What protocols and solutions do I have to solve these problems? So we'll start with the first one, and that's investigate. Now, the consensus article I talked about at the very beginning of the show here has a really nice model at the end to kind of walk you through the steps. So the way to think about this is, I'm probably not going to be able to send every person I know, or even myself, go to a sleep lab and get a full sleep study done every month, or every week, or even every year. And so how do I actually use a combination of free to maybe moderately to all full-blown sleep studies, and how do I decide who to use that?

Dr. Andy Galpin
And so they have a really nice overall testing model that we'll do. Now, to me, this is really important because I've talked to you already about how prevalent sleep disorders are. The other thing that I haven't mentioned yet, though, is how bad people are at assessing their own sleep. You can look at any number of publications here, but specifically those on athletes show that they are notoriously bad at estimating both their sleep quality, their sleep quantity, how long it took them to fall asleep, as well as, and this is one that matters, how much it's actually affecting their cognitive and physical performance. A colleague of mine, Ian Denikin, has done a number of studies in this area, and it is mind-blowing how bad athletes are at this. We actually just

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recently completed a paper together where we assessed sleep and nutrition and training in combat sport athletes across the entire globe, both professionals all the way down to amateurs and elite, and we saw the same story.

Dr. Andy Galpin
They are really bad at understanding the basics of sleep knowledge, as well as really estimating their sleep quality and the effect it has. So all that to say, really worth your time to do something here. I generally recommend getting a sleep study done at least once a year, but this is really the model that that consensus paper laid out. So kind of level one is basic sleep education, and I'll talk about more details on that later, why you want to do it, how effective basic sleep education actually is, despite what you may think. And then from there, you go on to your next level, and that's some sort of free or low cost, in this case, completely free, screening. See, these are questionnaires. The one I like the most is called the Athlete Sleep Screening Questionnaire, is ASSQ. This is a validated study in athletes. Again, I'm emphasizing that point because there are lots of validated sleep questionnaires, but this one is specifically in athletes or high performers.

Dr. Andy Galpin
And again, that's something you can deploy to anybody as often as you'd like. You could use it monthly, or once a year, or daily, really, if you wanted to, at almost no cost. From there, that's going to help you kind of triage where you put your emphases a little bit. The model they've got here is if they identify no sleep problems whatsoever in that screener, then you go back to first step, which is you still continue to educate, because sleep problems can start. Just because they don't have one now, doesn't mean they won't have one later, and just because they don't have a sleep problem that qualifies on that questionnaire, doesn't mean they're not suboptimal, doesn't mean they're not 80% or 90%. As we've talked about earlier, hopefully I've made the case that even those last few percentage points absolutely matter. So that's one order, no sleep issues whatsoever according to the questionnaire.

Dr. Andy Galpin
Now, according to the questionnaire, if they have mild sleep problems- Then in that case, you would go on to more advanced questionnaires. The one here you're going to go after is called the ASBQ, so Athlete Sleep Behavior Questionnaire. A little bit different than the previous one, but this can help you kind of identify if some other issues are going on. If data come back from that and it says, "Hey, everything's all clear," then you go back to step one, which is education. If not, then you may want to invest in some sort of long-term either sleep log or wearable tracking device, something like that. Now you're going on to either continue to use free tools, sleep logs. This is just a journal. You're writing stuff down. You're tracking how good you feel. You're tracking how bad you felt your sleep was, how long you slept, things like that, totally free. Or you've

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invested somewhere between maybe a couple of hundred dollars to 500, 600 bucks on some sort of wearable.

Dr. Andy Galpin
I'll cover those here in a second.

Dr. Andy Galpin
If we go back to the beginning now, and we've identified from our ASQ a either moderate to severe sleep issue, we've got different steps here. And now what's important, and I want to say that one more time, is this is not just severe. This is moderate to severe. Either one of these get the same next couple of steps, which is you're going to refer to some sort of sleep specialist. Unfortunately, there's not a lot of high-performance sleep-trained people at this point. You're really going to have to kind of go the medical route, but worth it if they have a medical disorder. You're going to do some sort of consulting and testing, then you're going to go into differential diagnosis. Do they have a sleep disorder? If so, which one? Et cetera. You're going to treat that athlete or have the physician treat that athlete, and then go right back to step one with education. So overall, as a framework, I think this hopefully has been helpful.

Dr. Andy Galpin
If those of you that are working with many people, either you're setting up a clinic or a coaching practice or something like that, or even if yourself, and you're trying to figure out, man, should I spend money on a sleep study? Should I spend money on a tracker? Well, maybe just start with these free versions first, and then if you don't flag for anything, you can continue to just use high sleep quality behaviors and hygiene and things like that. But if you do flag for anything, even what's considered to be, again, moderate or severe, then maybe invest exploring into higher fidelity types of analyses. Now, something really important I want to point out. If you were to use something like the ASSQ, in and of itself, does not determine whether or not you have a sleep disorder. It is just information that gives you a likelihood. Another way to say this is, hey, you should probably go get checked out from a true, full clinical analysis.

Dr. Andy Galpin
Well, you may be then thinking to yourself, "I don't have a sleep disorder. I'm not even going to take the questionnaire." But I'm trying to really convince you that that's the wrong approach because, like I said a second ago, one, prevalence of sleep disorders are very high in everybody, and over 80% go undiagnosed. Two, we know athletes or anyone who's really pushing high performance or physically larger is more susceptible than the average person, 20% to 40%. So high numbers right there. Three, athletes in general are very bad at understanding and recognizing how poor their sleep is, and that's generally because there are a ton of signs and symptoms that you go through and you deal with in your day that you think are benign, you think are normal, you think that's just how you are, you think that's just how your body is. You

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think you're tired because you're training so much. You think you're fatigued and sore because of what you're doing in practice, and all that is partially true.

Dr. Andy Galpin
It's all also signs of sleep disorders. So you're probably going to be pretty surprised if you take this questionnaire at what they're asking, and how they can actually ask these questions, and based on your response to these alone, are validated ways to identify sleep disorders. Remember, that's what validated means. It says when we gave people this questionnaire, and we compared that directly to the gold standard polysomnography, this is all the wires and electrodes hooked up to you, the full shebang, that the people who score a certain way on this questionnaire also then have actual sleep disorders. That's what it means to be validated, okay? So again, I would still say get that doubly verified, but that's what it really means, okay? So if you start looking through the questions and you start seeing things like, do you snore? Most people just think that is a normal thing or it's not a big deal, when in reality, it is a, not a guarantee, but it is a sign of a sleep disorder.

Dr. Andy Galpin
How much caffeine do you use? How rested do you feel throughout the day? We talked earlier about other symptoms like it should not take you more than 20 minutes to fall asleep at night. That's your sleep latency. Another common sign, how hard is it to get to sleep? How long does it take you to fall asleep? You shouldn't wake up with-- There's going to be some inertia in the morning, a little bit of grogginess, but it shouldn't be extreme. It shouldn't be prevalent. You should not be able to fall asleep all day at any point in time throughout the day. Those are other common signs and symptoms. So it is some very basic questions, and you may be thinking to yourself, "Oh, yeah, I don't have a sleep disorder. I don't sleep as much as I want," or maybe a little bit slower, "But I wake up really tired all day. Oh, yeah, I do snore. Oh, yeah, I'm fatigued. I wake up more than once per night, most nights."

Dr. Andy Galpin
All of these are signs of, if not clinical sleep disorders, certainly sub-optimal sleep. That all said, I hope I didn't dramatize or overly attempt to scare you into thinking you all have sleep disorders. That's not the case. It's just more the point of, look, this is an opportunity for some pretty tremendous performance enhancement. The likelihood of you having worse sleep than you think is reasonably high, and the cost here is nothing. It takes a few minutes to do, easily scalable. The solutions are easy to find in terms of how you scored. And so to me, it just seems to land on the, boy, we should absolutely do this. The benefit is really huge, and the cost is quite low. Okay, so to recap, for most people, starting off with a questionnaire is probably a really good strategy. Now, the upside of it, as we mentioned, is it's free, quick, and easy to interpret. The downside of it is it's really just subjective data.

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Dr. Andy Galpin
It's not an objective look of what's actually happening. To do that, you've got to go to the next level. You're introducing some cost there, but you're going to trade that off for accuracy. So the next kind of step up, which is in this moderate, again, usually two to four or $500 range, is using what's called actigraphy. These are your wearables. All right? I'll talk about the pros and cons of those in just one second. So those commercially available devices are objective. Some, but most aren't clinically validated or FDA approved to actually be able to diagnose sleep disorders, but some are. But they have other value and stuff that I'll talk about here in one second. The highest level up, and now you're talking the most cost, the most invasive, but most accurate, are clinical sleep studies. This uses a technology, for the most part, called polysomnography. This can be done at home or in a clinic, and there are many pros and cons to that as well.

Dr. Andy Galpin
So what I'd like to do now is really quickly talk about each of these different objective methods, discuss the pros and cons so you can make the best decision possible for you in your given scenario. I'm going to start off with polysomnography, or what I'll refer to from here on out as PSG. Now, some of the benefits here are it has a ton, in fact, more than anything else, data behind it. So there's a lot of comparisons you can make. There's a lot of science, there's a lot of support, and you can really get a true sense of what's going on. It is objective. It is something that can be done in your home or in a hospital setting. Now, the hospital setting is the overwhelming majority of PSGs, but more and more companies are, and technologies are coming on board that allow you to do this from your home. And so the ability to diagnose and interpret clinical sleep disorders is really high here. The downside, though, is it's kind of the same thing as the upside.

Dr. Andy Galpin
One, if you're doing this in a hospital or clinical setting, it's not a realistic picture of what's happening in your life. You're not going to sleep the same when you've got these electrodes hooked up to you, and you're in a funky bed. You're probably only going to be able to do it one or two, maybe three nights, and so we're getting maybe not a great picture of exactly what's happening. We're also basically scanning just for disorders, and so if you don't meet those certain thresholds, which are honestly somewhat arbitrary, then you may be kind of basically told, "Hey, you're fine." And this is similar to the X-ray thing I talked about earlier. So they're coming in saying, "Hey, I don't see a broken bone, so you're fine." But just because your bone isn't broken doesn't mean your joint's functioning correctly either. And so there's some downside there. They tend to be pretty costly, and the wait line can be very long, but they are, again, the most accurate picture, and because they are clinical, then you're able to work with a physician that can help you treat anything if you do have something that is worthy of medical consideration.

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Dr. Andy Galpin
So a lot of pros and cons to that. If we move to the PSG in-home, still pretty expensive. Typically, still people are only doing a night or two, maybe three of that, but we're getting a more realistic picture and setting of that. So options are available depending on where you're at. Sometimes you can get it covered from insurance, which is nice, and other times not. But PSG would generally be the gold standard. Now, another way to approach sleep at the highest standard is to use a method called cardiopulmonary coupling. Now, this has actually been around for a long time. It's got dozens and dozens of studies behind it, though most people have never heard of it. It's a little bit different than PSG. It approaches different things. It has a different target. It's looking more at your physiology, your autonomic nervous system, your respiratory rate, and things like that. It was developed by Dr.

Dr. Andy Galpin
Robert Thomas from Harvard, and again, it's been studied in a lot of areas. It's FDA approved as a way to diagnose sleep disorders. And so there are some pros and cons to each of these approaches. I would recommend, if you're interested in that, to talk to your physician or medical team to decide which approach, PSG or CPC, is better for you based on the questions you have and trying to get answered. But I wanted to make sure you knew that both of those options are available. Taking it down to the next level is what we call actigraphy. There are commercially and research-grade available devices. To be candid with you, we use the research-grade ones a lot, and more and more of those are actually becoming commercially available. And so that's something to pay attention to. But the other ones you're more familiar with. These are watches and rings and wrist straps and chest straps and different things like that that can be used.

Dr. Andy Galpin
Depending on which one you want to talk about, the data are quite different. They all have their own unique value benefits and things like that. I don't want to get into the details of all those quite right now. But I think globally, you can think about actigraphy or wearables as, hey, they're a couple of hundred dollars, and they have generally some pros and cons. Many of them are pretty accurate at measuring things like whether or not you're asleep. In fact, some of them are really accurate, over 90, 95, some of them higher than that percentage accuracy of measuring when you're asleep. Measuring when you're awake becomes more challenging, and so they tend to have problems in those areas. Those can range between 50% to 80% accuracy. Again, really depending upon the device you're in. So using it to identify whether you're asleep or not, great, but past that, we start to get into problems.

Dr. Andy Galpin
Now, the reason I don't want to honestly spend a lot of time here is because I believe in the technology. I think it's going to get better. So I'm not super concerned that any of those given

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devices are at 90%, because I'm probably going to figure they're going to be 95% soon enough anyways, or closer than that. And so it's really not that big of a deal at the current moment. The issues with actigraphy, I think, are different, and that is really they're trying to put together, with the best intentions, collective scores for optimization, for quality. And as we've talked about earlier, that is very challenging. I don't necessarily need or want or should have the same amount of time in each one of my sleep stages. It's probably dependent upon what I'm doing. And in fact, sleep stages themselves have some problems. Maybe that's a conversation for another day, but if you poke into the research here, you'll find plenty of sleep scientists who just fundamentally disagree with the idea of trying to optimize or maximize a certain amount of time spent in a slow-wave sleep or deep sleep versus REM or things like that.

Dr. Andy Galpin
We don't necessarily know what those optimal numbers are. We definitely don't know what they are in athletes. There's no data on that almost whatsoever. And so really Being overly concerned with your score on your wearable is where problems start to come in. And in fact, there is something that's growing in this community called orthosomnia, which is insomnia that is induced by people trying to optimize their score on wearables. And so I don't want to paint a bad picture here because wearables can be incredibly beneficial. We see tons of evidence of people getting better at their sleep simply because they're more accountable. They are more calibrated. They thought they were getting more sleep than they actually are. They tend to make better habits and choices because they know they're going to look at their score in the morning, and they want to get better. And so this is not all bad. It is like anything else we've talked about, and like anything else we probably will talk about ever in this podcast, and that's pros and cons, right?

Dr. Andy Galpin
So weigh the downside with the balances. It's maybe not as accurate, but it's an order of magnitude cheaper. And instead of having to do one or two nights, you can now do every single night. At the same time, maybe there's problems with that. You don't necessarily want everyone-- And I could tell you countless stories of athletes and clients I've worked with where we take their trackers away from them, or maybe we keep them tracking, but we block their ability to see their own score because it just leads to all kinds of problems. And so it's a viable option. Use what's best for you in your situation. Okay, so at this point, hopefully, I've covered a tool that's accessible for just about everybody listening here. We talked about screeners, which are completely free, to low, moderate cost wearables, all the way up to the highest standard of either polysomnography or cardiopulmonary coupling testing done at your home or in a sleep lab.

Dr. Andy Galpin
Also, to continue on with that, I'll share with you a little bit about what we do with our

professional athletes and elite executives that really don't have time or cost limitations but want the best possible solution. What we actually do is build full functioning sleep labs in their home, as well as a scalable version that they can take on the road. So we are running FDA-approved clinical sleep studies on them almost every single night, and we're measuring everything about their sleep. We're doing things differently based on their sport. So our golfers go through a little bit different protocol than our UFC fighters, and that's different than our Major League Baseball players, et cetera. And so the testing, the things we're measuring and monitoring are slightly different. And all that tells us in the highest fidelity possible how they are sleeping. But we also care about why they're sleeping that way.

Dr. Andy Galpin
So as a part of that, we're running four separate analyses, so we're always looking at the environment. Hopefully, by the time you're listening to this, my paper's been published, so we've got a literature review out right now in review, and that covers 11 unique factors like CO2 and a bunch of other things that are involved in your environment that can be influencing your sleep and explaining why you're sleeping the way you are. Outside of that, there's physiology, so there's a bunch of specific sleep blood work and blood panels that we've created, things to go after your thyroid and iron and a bunch of other stuff that you may be not paying attention to. There's a behavioral component to it, and there's also psychology. So all four of those unique components are going to tell us why you're sleeping the way you are. So we do this, again, pretty extensively, and the reason we put so much effort and energy into this is, well, everything I've been talking about.

Dr. Andy Galpin
It is really a huge performance magnifier. So solutions like that are available for those folks that want to go to the nth degree here with their sleep optimization. So now that we've fully investigated or analyzed our sleep, how do we interpret the results? So let's move on to our second I there. Please also remember, we're not talking about how do I interpret my sleep from a risk of disease later in life or anything like that. We're talking about how do I interpret it from the perspective of maximizing performance. So what should my sleep look like if I'm trying to get the optimal performance results? In terms of duration, the number seems to be about nine hours. Of course, there's lots of individual variation here. Some folks may truly be at their best at eight hours or seven and a half, and some might actually need nine or ten. But nine seems to be the number that came up a lot in the research.

Dr. Andy Galpin
Also, in my conversations with these sleep experts like Amy Bender and Steven Lockley and Jeff Dermer, they all basically came back and kept saying nine hours. So I think that's a pretty good starting place. In terms of other metrics of quality, we mentioned latency. Five to 15 minutes

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seem to be the sweet spot. If your latency, again, this is time it takes you to fall asleep at night, is under five minutes, this is probably an indicator of the fact that you're underslept. If it's longer than that, we're probably in an area of maybe suboptimal sleep routines or habits or environments or something like that that's delaying us from getting into sleep. We also may be doing something throughout the day, like excessive caffeine, training too hard too late at night, or other issues like that that are delaying our time to sleep. Efficiency, if you're getting that metric on your wearable, you're going to see, again, the medical numbers say, "Hey, be above 85%."

Dr. Andy Galpin
I personally, and this is just my Andy's interpretation here, I always like to see it above 93%. Efficiency is generally a problem of sleep latency or waking up too often throughout the night. Those are the two biggest contributors, and so I want to see that number above 93%, and if I can, above 95%. Waking events I've already talked about. It is absolutely normal to wake up once a night, but we're not trying for normal here. My goal is to get people to sleep through the night every night. In other words, say, "I don't want you waking up at all." That's the target. We should be able to sleep through the night on most nights. That doesn't mean if you're waking up every night, you've got a disorder or anything close to that. Again, we're pushing for optimal here. As you age, this gets more challenging, but certainly waking up twice or more per night is almost always, in my book, going to be suboptimal sleep.

Dr. Andy Galpin
And then finally, we want to have some subjective measures of how are you feeling? How does that make you perform the next day? So how is your daytime sleepiness? I want you waking up With a little bit of sleep inertia, but not a ton. I want you to feel pretty refreshed when you wake up. You're going to be a little bit sleepy throughout the day, especially early afternoon, but I don't want you walking around all day, the ability to fall asleep on command. Okay? So daytime sleepiness is how we kind of coax this. So for me, that's the general picture of what I'm looking at for sleep quality. Now, we need to mention this again because it comes up so commonly, and that is your sleep stages. People are very concerned about how much time they spend in, say, deep sleep or REM sleep or any other styles of sleep. Now, this becomes really challenging, and I have to be honest with you, in my coaching experience, I've generally found this to be more problematic than it is helpful.

Dr. Andy Galpin
Doesn't mean it hasn't helped some, but this causes a lot of issues. I mentioned earlier, it's somewhat arbitrary. Most wearables are taking a measure of your sleep kind of once every five minutes or so, and then they're arbitrarily defining your sleep based on 30-second epochs or time domains, and they're using standards that are really, really old, in this case, 40-plus years old, and they change. Sometimes the scientific community says, "Okay, now this thing is defined

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as N2 or N3 or whatever." Sometimes they take them out entirely. And so it just hasn't been that helpful to worry about. I generally feel like if you pay attention to the other stuff, your sleep behavior, so your sleep environment, your sleep relationship in general, what we want to do is not have you obsess over some arbitrary or, in this case, sometimes proprietary equivalence of optimization, meaning depending on which company you bought it from, they define optimal differently, and there's not even a scientific consensus of that.

Dr. Andy Galpin
So we're really chasing a rabbit that may not actually be something we want to go after. And so I don't want to be too negative here, but really people have worked themselves into a bit of a tissue here trying to optimize their sleep based on those trackers when I don't think that's the best case use for them. There's a lot of benefit from trackers like we've talked about earlier, but I'm just generally going to caution you against this one in my personal coaching experience. We talked about how they are problematic in terms of accuracy, some better than others, and they're getting better, but they're not there. And why this really matters is there have been some studies that have looked at, in fact, Steven Lockley's stuff, have looked at things like sleep deception. So imagine being in a study and being told you either slept for five hours when you actually slept for eight, or the opposite.

Dr. Andy Galpin
And that research is pretty clear, you will perform the next day based upon what you think you slept rather than what you actually slept. And so imagine what's happening when you're getting false or inaccurate information from your tracker. It is absolutely impacting how you're performing the next day. And so the people that are just like, "Well, I just track it. I don't do anything with it." Okay, we talked about orthosomnia earlier, now we talked about the research on deception. This stuff is making an impact on you, and so we really want to be judicious and careful with how we're using those trackers. My recommendation, again, one more time, to be clear here, is just really not to worry too much about the sleep staging, how much time you spent in deep or REM or things like that, and pay attention to the other things, sleep latency, sleep behavior. Use it for accountability, making better choices.

Dr. Andy Galpin
Maybe you don't have that extra cocktail. Maybe you don't do that other thing you know is going to be bad for your sleep because it's going to impact your score tomorrow. To me, those are beneficial uses of it, and just really be cautious and careful of spending too much time worrying about those sleep stages. Just as one final note before we go on to our third and final I, and that is, as always, me wanting to be transparent with you and share what I do in my coaching practice. If I'm interested or feel like I need to dive deep into somebody's sleep quality or look at their what's called sleep architecture, I'm going to use cardiopulmonary coupling, or that CPC we

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talked about, and I'm going to go after three things. And this is not specifically based on the research. It's honestly my personal experience and the ones that I've found to be most important and the biggest indicator of opportunity to improve sleep.

Dr. Andy Galpin
And those three metrics are going to be their sleep stability, sleep fragmentation, and then finally, their respiratory rate and effort. We're going to talk a lot more about that third one in future episodes. There's a lot of interesting things there. So to summarize everything about sleep quality, a lot of ways you can go about it. Define it, how it's most important for you, be careful of the pitfalls, and use it to develop more resilient sleepers, not more sensitive ones. With that being said, it's time for us to jump into our third and final I, and that's intervention. Now, frankly, we could probably do an entire episode on different ways and tactics and tools to improve sleep. But given we're this far in, what I'd like to do is just focus on a handful that have been shown in the research as well as in my own personal experience to be particularly helpful at improving sleep duration, quality, and timing.

Dr. Andy Galpin
And so the very first one I like to start with is maybe not going to apply to everyone, but I think really important that I don't want to miss, and that is the importance of sleep education. Really specifically, sleep education has been shown to enhance sleep duration by anywhere between up to 20 to 90 minutes. It reduces sleep latency by up to 30 minutes, can improve efficiency by over 5%, and has been shown to reduce sleep onset variance by almost a half an hour. And so it's not just duration, it's quality as well, so really worth your time. There's a lot of research on what happens to athletes' and individuals' sleep duration and quality when you simply educate them. So step number one is telling your kids and telling your athletes and telling the people that you're training and coaching how important sleep really is. I know what you're feeling. It's the feeling I get when I have to talk about sleep sometimes, is, "Man, I'm going to say this, they're not going to pay attention, and it's not going to matter."

Dr. Andy Galpin
But the research shows the opposite. The research is really clear. When you spend anywhere between 30 to 60 minutes educating people on sleep, you can see pretty important improvements in duration and quality that last up to a month with just a single session of education. And so this stuff is really important to talk about. You want to teach a handful of different things. Number one, the value of screening, like we've established earlier, checking out whether or not you have a disorder. The need for duration. So telling them people don't know that nine hours is the number that sleep scientists recommend for high-performing athletes. That fact alone can change behaviors. And then third is actually sleep hygiene. In fact, there's a really cool study on soccer players that asked them to do very minimal, I think it was about 10 or 15

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minutes before they went to sleep, to not use their phone.

Dr. Andy Galpin
They used an eye mask and then a couple of very standard, non-invasive approaches to sleep. And what they found was the groups that did that were able to sleep almost an hour and a half more on the days following a game. And so what that means, as anyone who's played sports know, when you play a night game, it's really hard to sleep that night. It's very common for athletes to sleep four or five hours after that. And so the group in this study that didn't do the hygiene steps slept for four and a half hours on average that night, and the group that did slept for almost six. So they were able to add an hour and a half of sleep by having them do just a few very basic sleep hygiene steps. But this really is not an explanation or example of the quality of the hygiene. It's the education piece that matters here. Just telling them they need to sleep more and giving them a few tips really does make a big impact.

Dr. Andy Galpin
So want to make sure that you have that information. I realize not all of you, in fact, probably few of you are coaches, but for those of you that are out there, I wanted you to have that information. So outside of education, the next big rock to move is opportunity. And so this is really a conversation with you and yourself for the most part. Everyone has the ability to give themself more opportunity to sleep. So when we're talking sleep extension, of course, just giving yourself more hours is the obvious solution. How do you do this? Well, generally, we don't like to schedule things first thing in the morning if possible. I personally don't use an alarm clock. I have not in many, many years. I get up very early, personally, but I don't schedule things I have to do within the first couple of hours, so I don't have to have an alarm clock. More importantly, probably, is getting to bed at a consistent time, shutting things down earlier, if you can.

Dr. Andy Galpin
Avoid night exercise very late at night, avoid working late at night, and things like that, if at all possible. That gives yourself the opportunity. Another thing to do is making sure that you are creating what we call a pro-sleep culture. This could be within you and your team if you're leading individuals. And by this, don't think about just sports. Think of this as running a business and a company. Are you creating a pro or a negative sleep culture? Right? Are you allowing people the opportunity to embrace sleeping well, or are we still thinking about poor sleep as a badge of honor, if you will? In fact, there's a lot of research on this and how important it is and how impactful it can be to just promote sleep as a performance-enhancing tool, not just something getting in the way or taking away training time. This is something that we're going to use as a competitive advantage. So making sure we have the opportunity from ourself, as well as the people that we're guiding and leading, to have a pro-sleep culture.

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Dr. Andy Galpin
The next one is what we've talked about a little bit earlier, and that is making sure we have a structured sleep plan. So what I mean by this is when you're organizing your day, like I've talked about, or you're organizing your team meetings, or when you're working out, are you doing it in a way that allows you the chance to sleep appropriately? As we mentioned before, not doing things at night that we know disrupt sleep if we can do them earlier in the day. Are we giving ourselves the opportunity to bank sleep prior to major competitions or major periods of lost sleep? So say you're traveling a bunch, you've got a heavy workload coming up, finals week, or whatever the case may be, and you know sleep is going to be a problem, are you removing things in the three days to 30 days before that, that are optional, so that you can maximize sleep in that particular time? In any given day, if you can't get enough sleep, are you giving yourself the opportunity to take naps?

Dr. Andy Galpin
Twenty to 90-minute naps are very effective for performance enhancement acutely, but more importantly, to just add back some of that sleep time. So all this falls under the umbrella of you'll never sleep enough if you never give yourself the chance to sleep enough. The next set of solutions really deal with improving the quality and timing of your sleep. Getting started right out the gate, the most important thing you can do to improve your sleep quality is treating your sleep disorder if you actually have one. There are a number of really easy solutions depending upon what your sleep problem actually is. Think about this from the perspective of a football player. They're probably more likely to be dealing with things like sleep apnea because they're larger, relative to, say, maybe a swimmer whose issue is more likely to be dealing with circadian rhythms because they're oftentimes practicing and training early in the morning.

Dr. Andy Galpin
So right out the gate, just thinking about what we're asking our bodies to do gives us some strategies for what type of disorder we may likely have, and then, of course, then the solution for that. In order to make my solutions a little bit more straightforward, what I want to do is talk about getting to sleep faster and then staying asleep more effectively. So what are the reasons why people struggle to fall asleep, and how can we improve that? It can be a number of different things. The obvious ones, but still important, are we using stimulants or caffeine too late for our own physiology? Some folks can metabolize caffeine very quickly, and it doesn't affect them. Others really struggle if it's within eight or more hours of sleep. It can affect their overall sleep quality. That's a common one. Working or doing any other stimulating events at night can be a problem. Where people really miss this is the best way to probably think about it is novelty.

Dr. Andy Galpin
So it's not the fact that you're on your phone or the fact that you're watching TV or anything. It's

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seeking of novelty. That seems to be the big problem. So it's okay for some folks-- I will be candid with you, I watch a little bit of TV basically every night before sleep, but what you don't want to do are things that cause you to seek novelty. And so your phone becomes problematic because something new will pop up, and it'll reward that pattern of seeing something new and novel and get you excited. And so what you don't want to do is watch TV shows that are that. You don't want to watch things that are aggravating or arousing or exciting. You want to watch typically things that are more interesting but not overly stimulating. This is planet Earth. This is not murder mysteries. This is not things that get you aggravated and irritated, like the news and political events and things like that.

Dr. Andy Galpin
And so, that is what you want to be cautious of. Eating too close to bed can be a problem. However, and this is important, people miss this, there is excellent research showing small snacks before bed can enhance sleep quality and reduce sleep latency. Specifically, kiwis are well-studied as effective sleep aids. Higher glycemic index meals pretty close to bed, again, low amounts can be great. We certainly don't want to eat high amounts and increase digestion, our heart rate, and problems like that. But small snacks for some people can actually be really effective at putting you to sleep. Probably most important to all this, though, is really the pattern. And if you look around at any of the sleep research or talk to sleep experts, they're going to talk about the need to make sure that your sleeping environment is really a sleep sanctuary. Our body has probably one tool better than anything else, and that's the ability to pattern recognize.

Dr. Andy Galpin
And this becomes a problem. If you go into sleep environments and you are anticipating a pattern of sleep issues, then that pattern is going to persist. If you have the opposite, then that pattern will persist. And so what we see a lot of times, our solution strategies for people having a hard time going to sleep, despite the fact that they're doing all these other things right, and this is common, right? "Oh, I don't have caffeine. I stop working many hours before. I don't eat before. I meditate before. I do breathwork. I do all these things, and then I still struggle with sleep." Okay, great. "I'm not watching TV," all those other things. Why am I still struggling to fall asleep? Well, oftentimes, it's the fact that you think about struggling to fall asleep that's causing that pattern to persist. So how do we solve that? We take clocks away. You don't get to measure, and you don't get to see your sleep score.

Dr. Andy Galpin
You don't get to see your sleep latency number. You don't get to look at the clock and think about how long it's taking you to fall asleep. So all of those are also tools to take that out of the equation and reframe the approach into thinking, when I get into bed, this is an awesome opportunity to sleep, rather than, oh my gosh, I'm going to get into bed and have another night

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where I can't fall asleep. That's a bad framework to be in, and you want to get out of that as quickly as you possibly can. These environmental pattern recognition things are so strong, you can actually use it to your advantage, especially when traveling. Everyone knows of the first-night effect, which is when you are in a new destination, you struggle to sleep the first night, but tend to sleep a lot better the second or third and subsequent nights. Well, a lot of that is because you're in a different environment, right?

Dr. Andy Galpin
We aren't seeing and smelling and hearing the same things we do in our house. So if we can artificially create that in our house and take that on the road, we can dramatically improve our sleep quality and specifically our sleep onset. Think about smell as the easiest one. If you take a scent that you like, common ones are lavender, and you put a little lavender on your bed at night in your house every night, you stand to associate that smell with safe, secure, high-quality sleep, et cetera. You take that on the road with you then, put that on your new mattress or bed or wherever you go, those same scents will kick in, the same pattern recognition will happen, and ideally, you'll have the same quality of sleep. You can do a similar thing with temperature, right? If you have a set temperature of your bed, you may not be able to take that entire cooling mattress with you on the road, but there are things like cooling pillows.

Dr. Andy Galpin
So you use that same temperature on your pillow at home, take that pillow or pillowcase with you, and now you have a mimicked environment. You combine a couple of different things like that, and you should really improve your sleep latency when you're on the road. Now, when it comes to staying asleep at night, there's a bunch of different solutions we can talk about. One of my most common ones is hydration. If you drink too much water, of course, you're going to wake up and have to urinate, and that's going to cause you to get up a whole bunch. But really, some folks don't understand that sleep quality will be a big determinant upon how frequently you get up to go pee. If you're waking up more than once and you go to pee, there's a large volume there, it is clear, and that's happening the next morning as well when you wake up and you still have a lot of pee, then you probably have an issue of drinking too much pure water.

Dr. Andy Galpin
In that case, just reduce your water intake for a couple of hours prior to bed, and you should be fine. Funny enough, we've had plenty of our high-performing clients, our high-performing executives in our coaching programs, come to us with all kinds of problems with their physiology and performance and brain fog, and really, all of it boiled down to the fact that they drank way too much water at night. It was tanking their sleep. We moved that, and within days, they're sleeping for 10 hours for the first time in 15 years. And I have so many examples of that where it's pretty silly, honestly, where I'm like, "Man, you spent a lot of money and time to figure out you

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drink way too much water at night." So it can be quite that simple. Other times, though, it's a little bit deceiving. So folks will oftentimes think that's the problem. If it's not the case, you're waking up and there's not a lot of volume there, or there is one time, and then the second time it's a lot less, or it's more yellow-colored, or in the morning you wake up and realize you didn't even pee for 45 minutes after waking up, this is sometimes an issue of sleep quality.

Dr. Andy Galpin
And so what happens is, typically at night, you're supposed to be sending signals to your kidneys that says, "Hey, stop filtering and producing urine." And so obviously, we don't want to be waking up to do that all throughout the night. If you're of a low-quality sleep, though, for any number of reasons, that signal can continue to be sent, and so you can continue to make the urine. And so people think that their sleep quality is being ruined by the fact that they have to get up and pee, when the honest reality is they're peeing because they're already basically awake. And so that is another way to figure out, hmm, maybe I have a disorder. Maybe I should get checked out. Maybe something is going on because I'm waking up to pee a lot, and really there's not a lot there. I probably should get checked out. Another really common one is sleep position. We see this routinely, where 80-plus percentages of people's sleep problems happen when they're on one position of their body.

Dr. Andy Galpin
Most commonly, it's your back, and so avoiding sleeping directly on your back and sleeping either on your sides, as a blanket rule, though not true for everyone, can really dramatically improve people's sleep. I've told this story earlier of one of my professional athletes I worked with having this issue, but we have seen this time and time again. So getting some assessment or analysis of what's happening in your sleep position, this is a similar story to ergonomics, so making sure that your bed and mattress and pillow are all comfortable can also be really important factors to your overall sleep quality. Outside of that, we start now talking about environmental factors. You probably have heard ad nauseam about, of course, temperature. You want to be comfortable there, and we want to be probably a little bit cooler than we are during the day. But even noise, we want to be less than 35 decibels.

Dr. Andy Galpin
Anything above that tends to create problems. This is where actually things like pink noise start to come into play. There's a lot of really interesting research coming out on that. It's a little bit deeper than white noise, and it's not really publicly available for the most part, but the research thus far is quite impressive. The issue with white noise or sleep machines is the fact that above 35 decibels, they can actually create sleep problems because they're so loud. And so while it's great to kind of drown out the background information, you don't want to be in a position where you're actually too loud. Depending on where you live, if you're especially in an urban

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environment and you have lots of external sound stuff going on, you may want to actually turn to something like earplugs instead of a sleep machine for that purpose, though earplugs may create problems with ear pain and discomfort and stuff like that.

Dr. Andy Galpin
So again, choose the best tool that you have for your situation, but really below 35 decibels is the gold standard there. Again, ideally, in the show notes here, we've got the link to my paper that you can go through all 11 factors, but other ones that are really common are CO2. There's emerging evidence that when that thing gets above 900 parts per million, and then really specifically in exaggerated scenarios of above 2,400 parts per million, that this can dramatically impact sleep quality, sleep onset, and sleep latency, as well as next-day wakefulness, memory, and decision-making, and a bunch of other cognitive performance tasks. So, many other factors that go into your sleep quality, such as your environment, that we'll have in the show notes. Last thing I want to talk about here is snoring. Now, I don't want to overly concern you. Everybody snores at some point or another. It probably doesn't mean you have a sleep disorder, though it's not totally benign if you're a chronic or excessive snorer.

Dr. Andy Galpin
That's really the problem here. It's not a normal function. It's common, but it's not normal. Now, one thing that's actually quite funny that we laugh about on my team a lot is how frequently people come into our programs because of sleep issues, and they've tried everything. They've done all the stuff we've talked about. They've had sleep studies done before, and they came back either really moderate or nothing at all, and they maybe think their testosterone is low, or maybe it is, and they've run through everything like, "I just cannot sleep." And we do one little test on them and realize, "Wow, has your sleep partner been assessed?" Like, "Oh, my sleep partner just snores like crazy." And we always chuckle because I'm like, "Man, I got really bad news for you. Your sleep is fine, but your partner's sleep is a complete disaster, and they're ruining your sleep." So we've had a lot of people come into our program and then basically switch.

Dr. Andy Galpin
So the person that paid initially said, "Don't even do me anymore. Do this on my sleep partner, my husband or my wife or whatever, fix their sleep," and then that original person's sleep disorder, quote-unquote, goes away immediately and permanently. And this has happened-- You can hear me literally laughing because it's happened so many times, and I don't feel bad about it because the people sleep perfectly afterwards because we found the real problem, and it had nothing to do with them. And so snoring can be a real problem with sleep, and so really making sure that it's not you, it's not your sleeping partner, or a lot of the cases, it's their dog. Not often cats are snoring that loud, but dogs, that's really common. And so that can be really disruptive to

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overall sleep. If it is you personally, we'll go back to that example, you can try just going with something like mouth tape. I've done that a ton.

Dr. Andy Galpin
I use it a ton, especially using a combination of nasal dilators, so either nasal strips or something like that to open up your nasal passageways, as well as mouth tape. And I will be candid with you, we've had a lot of success with that, and sometimes that step alone really can improve snoring and solve a lot of sleep problems. It doesn't always happen, though. So if it doesn't, then you probably need to go to the next step one way or the other, but it can absolutely be a viable solution and is a nice place to start. And just to be really clear, the next step I'm talking about is usually getting a sleep study done. But you can try other stuff as well. We've already talked about position is another common solution. Generally, people don't snore on their sides. If they do, not nearly as much or as loud as they are when they're on their back. So just try investing in one of those sleep pillows I talked about earlier that forces you to sleep on your left or right side.

Dr. Andy Galpin
Sometimes that solves the problem immediately. There are also tongue exercises you can do. We actually have a whole protocol here in the show notes. This is very free. It's going to take typically four to eight weeks to have some sort of an effect, but there is strong research behind tongue-strengthening exercises to resolve that problem. Sometimes there is no solution. It is anatomical, and you either have to have some sort of nasal surgery or put in some sort of a mouthpiece to resolve that problem. And then sometimes not even that works. But for the most part, something in that solution bin I just went over is going to either dramatically help, if not completely solve, your snoring problems. I'd like to finish with a couple of quick tips for sleep timing. Now, mostly we're thinking about this in the context of jet lag. If you're interested in that I'd recommend checking out Dr. Andrew Huberman's excellent podcasts and toolkits on that.

Dr. Andy Galpin
You can go to Huberman Lab and just search jet lag protocols, and he's got a bunch of free information on optimizing and maximizing performance through jet lag. You can also use the app I mentioned earlier, Steven Lockley's Time Shifter. Again, no affiliation there. But really what I want you to pay attention to is not creating jet lag in your own self. And what I mean by that is making sure your sleep timing is consistent. We generally like to look at 45 minutes, maybe up to an hour at most, of waking and going to sleep. And so if you are waking up at 6:00 a.m. during the weekdays, and then you're sleeping in until 10:00 a.m. on the weekends, you're effectively creating a four-hour time shift every single weekend. That's going to be highly problematic. It's almost no different than you getting on a plane and changing time zones every single weekend. And so really being consistent with your waking time is the best strategy.

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Dr. Andy Galpin
I like to anchor that. That's the easiest one to manipulate. It's hard to force yourself to go to sleep when you're not tired at night, but you can always wake up at or close to the same time. So although you may want to sleep in many times, you can do that, but try to keep it within an hour or so. If you need more sleep outside of that, try to go to bed earlier the next night, or perhaps add in a nap like we've talked about earlier. If you're really going to be extending your transition, I would use a more diligent approach, and I would like to finish here because I think this culminates in exactly what I've been talking about the entire episode here, and that is using sleep to our advantage for performance enhancement. It is creating optimal plans based on unique and specific solutions and treating it like the true performance-enhancing variable it is. And this is how the United States weightlifting team handled sleep prior to the 2020 Olympic Games in Japan.

Dr. Andy Galpin
Now, as we talked about earlier, if you don't handle this appropriately, not only are you missing out on performance gains, but you're having a serious competitive disadvantage. So all the diligence and attention you put into your training for the years ahead of that, and your nutrition, and your physical therapy, and your mental health, and everything else like that, can completely be smashed by a bad sleep transition approach. The data are overwhelming here. And so what they did was, number one, they hired a full-time sleep consultant, and they built them out a sleep plan that started six weeks prior to the Olympic Games. They did three weeks at home, where they transitioned and got them on a training, light, and eating time that was on Hawaii time. And the reason they did that is because they went to Hawaii, spent three weeks there, and then transitioned over to Japan. And so remember, six weeks total here.

Dr. Andy Galpin
So three weeks at home to get onto Hawaii time. Again, three things they manipulated was their exercise training, their light exposure, and their food. They then moved over to Hawaii. They spent three weeks there getting then on Japanese time. So by the time they left Hawaii and got to Japan, they were already on optimized Japanese time. This allowed them to then land, and remember, this was during COVID, so they couldn't hang out in the Olympic Village for all the time like they typically would do. These athletes were oftentimes competing two to three days, maybe five days at the most, from when the time they landed in Japan, but by the time they were on their podium. So to me, again, that was a great example of taking sleep seriously and making sure we're not only not ruining our performance, but optimizing it and getting the most out of our system. So to wrap everything up, let's summarize what we talked about today.

Dr. Andy Galpin
We started off by going over the power and benefits of physical performance, and strength, and

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power, and reaction time, as well as on-field performance, so accuracy of shooting and things like that, to actually winning more games. But it extends beyond that. We're really talking about the ability to maximize our physical performance in any domain or capacity in which we're asking our body to perform. Remember, as always, if you have a body, you're an athlete, and we all want to perform at our best, and it would not make any sense for us to think that sleeping okay is okay. We want to sleep great so that we perform great. In doing that, we talked about three major areas, sleep duration, sleep quality, and sleep timing, and how various strategies can be used based on our own individual needs and demands to create specific solutions to maximize all three of those areas of sleep to get the best out of our body that we can.

Dr. Andy Galpin
We also talked about how that can help us recover from injury faster. And as always, we covered a combination of free to moderate to what the best in the world are doing for the three I's. That is, how do I investigate or analyze my sleep? How do I interpret it? And then how do I intervene to make changes on it? I hope you enjoyed all this and that you don't use any of it against me when your athletes are competing against mine, because I want to win. Thank you for joining for today's episode. Our goal is to share exciting scientific insight that helps you perform at your absolute best. If the show resonates with you and you want to help ensure this information remains free and accessible to anyone in the world, there are a few ways that you can support. First, you can subscribe to the show on YouTube, Spotify, and Apple. And on Apple and Spotify, you can leave up to a five-star review. Given that we're a new podcast, subscribing and leaving a review really does help us a lot.

Dr. Andy Galpin
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Dr. Andy Galpin
I use my Instagram and Twitter also exclusively for scientific communication, so those are great places to follow along for more learning. My handle is Dr. Andy Galpin on both platforms. Thank

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you for listening, and never forget, in the famous words of Bill Bowerman, "If you have a body, you're an athlete."

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