



## **Transcript of “Sleeping for Performance with Neurotechnology”**

Bulletproof Radio podcast #129



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Dave: Today's cool fact of the day is, well, you can't tickle yourself. Recent research has come up with a possible explanation for this though. When you intend to make a movement, your brain is going to send a command to your muscles to make the movement, and it's also going to predict the actual sensory result that would happen from that coming movement. When the prediction and the sensation match, your brain will subdue the nerve response. That's why you just aren't ticklish when you do it yourself. Today's podcast is going to be a lot of fun because we're going to talk about one of my favorite topics, which is brain monitoring, specifically around things like sleep and human performance.

We have two guests today. One is Dan Levendowsky. He's a cofounder of Advanced Brain Monitoring and he has served as its president for more than 5 years. Pretty impressive guy. Dan has been the principle investigator for 17 NIH research grants. He has written more than 20 journal articles, has 18 patents pending, and he's been the CFO of a publicly traded company before he started an award-winning winery. Call him a man of many capabilities here.

Our second guest is Dr. Phillip Westbrook, chief medical officer of Advanced Brain Monitoring, and a clinical professor of medicine at UCLA. He has served as president of the American Sleep Disorder Association, and has had a distinguished service award for that. He has lectured hundreds of times. He is a clinical fellow and associate professor of medicine at the Mayo Medical School in Rochester, and basically knows more about sleep than anyone else that I've come across here. Dan and Phillip, welcome to the show.

Dan: Thanks very much for having us.

Dave: Let's start out with a story. I would love to know from each of you, and Phillip let's start with you. How did you get into spending your life studying sleep? You've been doing this for a long time. Why did you start doing this,

as I would say an early pioneer in this kind of research? What attracted you to it?

Phillip: My first interest in sleep started, other than a recreational interest, was because of this one report by a French man that people stopped breathing during sleep. My background is in pulmonary disease and pulmonary physiology. I was interested in breathing during sleep. Managed to find a patient who actually stopped breathing during sleep, and was very primitive equipment at the time, we put him on a gurney outside my office in the pulmonary function laboratory at Mayo, put in all kinds of monitors and sure enough, as soon as he fell asleep, or someone told me that he fell asleep, he stopped breathing. That changed the trajectory of my career.

Dave: This was an early case of sleep apnea.

Phillip: It was an early case of what, at that time, was a very rare disease called sleep apnea, yes.

Dave: Do you think that people have sleep apnea more now, or do you think that we just recognize that we have it more?

Phillip: I think both is true. I think we do have it more, but I suspect that the sound of snoring reverberating off caves made it apparent through primitive man that sleep affected breathing. It's a particularly human condition, and so it's the price we pay for speaking. Our airways are altered so that we can use this single tube, not only for breathing and swallowing, but now can exquisitely change its shape so that we can talk, so that we can form words. That makes it very collapsible.

Dave: It's a biological fact that that's there. You're working with Dan at Advanced Brain Monitoring. It's interesting that we're already moving from brain monitoring into the airways. Breathing and having a brain sort of go together here. What attracts you to looking at the brain, when your background is in pulmonology? What's the connection between how we breathe and how we think?



## Bulletproof Toolbox Podcast #129, Dr. Phillip Westbrook and Dan Levendowski

- Phillip: How we think certainly does affect our breathing, but state of brain affects our breathing. When we disconnect from our outside environment in this very strange brain states called sleep, it affects the rest of the body. The brain, when asleep, does not send the same kinds of signals to the muscles that control the upper airway opening, and keep it open so that we can breathe in. With sleep, those muscles relax, as all muscles do, and the airway under certain circumstances, can collapse or nearly collapse and interfere with breathing. If you don't breathe, you can die.
- Dave: What percentage of people listening to this show would you guess are having breathing issues when they sleep that are affecting their waking brain state?
- Phillip: The conventional wisdom is about 10%. More males than females. It actually is going up. One of the changes that has taken place as we have evolved is not only a species that can talk, but also a species that can farm. With the invention of farming, there suddenly was excess food, and people could eat, so that led to the creation of politicians and bloggers. It's the increasing obesity, not only in the Western world, but now through much of the emerging economies directly increases the risk of having breathing difficulty during sleep.
- Dave: If someone has put on 20 pounds, which is so painfully common, and you guys may know I used to weigh 300 pounds. Certainly I snore a lot less now that I'm at a healthy weight, but if they're dealing with an extra 20 or so pounds, they go to sleep at night and they probably don't have ... I'm a zombie all the time because I have full-blown apnea, but maybe their sleep breathing isn't as effective as it could be. What is it going to feel the next morning? How are they going to experience this over the course of weeks, months and years? What will the trajectory in their performance look like?
- Phillip: 20 pounds may be significant for any one individual who is sort of on the cusp of having his airway collapse when they're asleep. Maybe it only collapses a little bit when they're on their back, and they're flying when they're on their side, and the airway isn't so influenced by gravity. Even a little bit of sleep apnea, over time, may add up to a significant risk factor for



higher blood pressure, for type 2 diabetes, and for decreased cognitive function, decreased executive function by the brain. If you have even pretty minor sleep disordered breathing, you may have a lot more arousals, or awakenings if you will, unremembered awakenings out of sleep. This interferes with the continuity of sleep and interferes with the quality of sleep, and we would define quality by its ability to be restorative so that you can function well during the daytime.

Dave: Got it. They'll experience lower performance if they do that. It's kind of obvious, right? Your sleep, if it's good sleep, you'll wake up feeling rested and you'll perform better. There are studies that show you don't control your blood sugar very well if you don't get enough sleep. You can have a 40% decrease in your ability to handle a blood sugar swing. Things like that happen. Let's switch gears a little bit to talk about some of the tech. Dan, how did you get into all this tech? I'd love to hear that, and then I want to hear your take on bringing monitoring and feedback tools in on this problem that Phillip has so accurately described.

Dan: From my own personal experience, I was a loud snorer at a very, very young age. As I got older, by the time I was in my early 40s, my snoring evolved to sleep apnea. I met Dr. Westbrook. I was around 43. We started talking about what sleep medicine needed as far as technology that could make it more accessible. We're talking about back in 2000, 2001, and the number of people, the discussion, the public awareness for sleep apnea was quite low. We felt that it was necessary to develop tools that would allow patients to be diagnosed in their home, giving them better access to care. It is kind of like the evolution of our first product that was designed to diagnose sleep apnea went along with my sleep apnea evolving.

When we had our initial devices, then we went into the sleep centers to test them, my initial experience was that they told me I stopped breathing 70 times an hour on my back. I was essentially normal on my side. My oxygen saturations were dipping well into the low 80s when I was on my back. That was essentially normal on my side. That idea that Dr. Westbrook came to Chris Burke and myself and said, "I think we need to develop this



because there's a medical need," has now, that device is the most popular device in the world that diagnoses about 12 to 15,000 patients a month.

Dave: The name of this device is?

Dan: It's called the Aries device. It's worn on the forehead and it's used to diagnose sleep apnea. That was our first technology that went directly at the sleep apnea, in trying to make it more accessible in providing a technology that made it easy enough for a patient to be able to get diagnosed in their home.

Dave: Do you have a desperate burning desire to not wake up 70 times, was it a minute or an hour?

Dan: That was 70 times per hour that I would stop breathing.

Dave: It's amazing. So many of the people I've interviewed on the Bulletproof Executive show are the people who had this desire to fix a problem, and certainly I'm one of those, but for you it was a sleep problem. You ended up forming a career around that. You got to meet Dr. Westbrook, and you created this device. The Aries device is used by medical professionals to formally diagnose sleep apnea. What about some of the newer stuff that you've got? This idea, I suppose, now I'm going to be a little bit rude, but we'll call it spouse replacement. In the cave, it's the spouse's job to kick you when you snore, so you'll roll over, right? But since some spouses don't kick very well, and some people don't have anyone in bed with them, so you guys have a device now that basically will tell you when you're sleeping on your back, which is worse for your breathing, so you can turn on your side.

Dan: Absolutely correct. For 25 years, it's been recommended, the sleep medicine physicians would recommend that the patient go and sew tennis balls in the back of their bed shirt to try and avoid the supine position. When you're on your back, gravity tends to help contribute to the collapse of the airway. Almost everybody is more susceptible to collapse and deeper oxygen desaturations when they're on their back. For those that don't have sleep apnea, they'll simply snore more when they're on their back. This was



the point that you were making about the spouse and elbow. What we wanted to do in thinking about, there are so many patients who are prescribed continuous positive airway pressure for the treatment of sleep apnea, but only about 50% of patients are compliant to that therapy.

We wanted to develop alternatives that patients would be more willing to wear. Our position product is called Night Shift. What we did was we took a little bit of a technology advance. We were using what they call haptic motors, or the vibrations that you get from your cell phone. We were doing feedback and the podcast you were doing with Chris a couple of years ago, she talked about giving the feedback to the marksman to improve their learning. We took that same concept and that same technology, and put it into a device that's worn around the neck so that when you're on your back, it generally vibrates. We did not want to alert the person awake so that they can't fall back asleep. It generally vibrates but increases slowly in intensity until you finally get off your back. That's the product we call the Night Shift.

Dave: If you're watching this on iTunes video or on our YouTube channel, I'm actually holding one. You guys sent me a demo a couple of months ago. I've played around with it. It's just a little device. It looks kind of like one of those shocking dog collars, potentially, but without the electrical shock component. Basically you can put it on your neck and it does exactly what you said. It vibrates. It's a really cool idea. It's a relatively simple idea. It says, "What if you just made this one change?" So many people kick and turn when they sleep, particularly if they aren't reaching a state of deep sleep.

To have a device help you control things you're not conscious of, that's a core biohacking principle. What's the body doing when you're not paying attention, and how do you train the body independently to do things better, or just to make yourself more aware of it. Here you are, you're asleep. You're not that aware when you're asleep. Your body is doing stuff that doesn't serve the body. It doesn't serve your mind or your goals, so you have a little thing that kicks. I think it's a brilliant idea. The other thing that I've come across in my quest for better sleep and all is using a splint to





position the lower jaw forward, so that the airway doesn't collapse. I do that as well. I've done that for almost 10 years now. I have a custom made splint that really helps with my sleep quality. Have you combined this with splinting or non CPAP ways, or is this enough by itself?

Dan: For some patients it will be enough. We actually have another product. I don't know if you were aware of it, but we developed a product that is a trial or a temporary oral appliance that allows the patient to try and see if they get a good outcome before they spend the money for the custom appliance.

Dave: Of course you guys have done that.

Dan: Up in Canada patients have to pay ... What's that?

Dave: I said of course you guys have done that because you're biohackers. I love that. Tell me more. This is exciting.

Dan: This was actually based on the National Institute of Health, gave us over a million dollars to research how to improve outcomes with oral appliance therapy. This product was an evolution of all of that. What we learned ultimately is you need to figure out how to get the jaw in the forward position optimally to take the guess work out of it. We've wrapped a whole system into this and made it available for dentists. Now we're putting it into hospitals anesthesia, where when patients are recovering from general anesthesia, there is a great risk of having the undiagnosed sleep apnea add tremendous complications in the recovery process. That's another area where people who are listening to this podcast, if they're going in and having surgery, they'll need to be aware and would want to know if they have sleep apnea, because they'd be much more susceptible to complications post-surgery if they're not getting effectively treated for it.

Dave: That is fascinating. I never thought of the postoperative state where you're even in a deeper place than you're going to go in a delta sleep. I've done some other things that I haven't talked about so much on this show. I'm a guinea pig. I wore an appliance to expand my upper palate and to bring my

lower jaw forward, and I've artificially raised the height of my back molars, which gave me more chin without surgery, but more specifically calmed the sympathetic nervous response that comes from the trigeminal nerve. If you're driving in your car and that didn't make any sense, I apologize. What I'm saying here is that your fight or flight response gets kicked off if you're clenching your jaw, or if when you're sleeping your jaw falls backwards and impinges on one of the main nerves inside of your face.

For me, this was a big problem. I had no idea how much physical stress I was carrying just because of my jaw positioning, which happened because of what my mom ate when she was carrying me mostly. That would be gluten. Gluten causes these changes in the shape of your upper palate and in the formation of the jaw. I've repositioned that jaw. Mom, I love you, and I wish you hadn't eaten so many donuts. That's a long story to preface a question there, but both post-surgically and sleep-wise, if people have these slight structural changes in the shape of their jaw that affect their ability to get air into their airway and all that, is sleeping on their side going to be enough?

Dan:

As I said before, it could be. Another personal story that you'll love is that I was born with a very narrow arch and back in the early 60s instead of expanding the jaw, they removed teeth. I had braces and I had my teeth removed so that the number of teeth would fit my jaw rather than going the other way. Then it left me predisposed for sleep apnea because the tongue needs to be able to come forward during sleep and I had less area for my tongue. One of the ways of looking at the likelihood of having sleep apnea is simply by looking at the tongue. If they have scallops, and scallops are little grooves in the side of the tongue, what it means is your tongue is pushing up the side of your teeth all day. It just means that the combination of what you're genetically predisposed to in your orofacial structure, makes it more difficult for you, and it will also increase the likelihood of you having sleep apnea, and possibly needing more than just the position therapy.

The idea of combination therapy is where you can do position, and then potentially adding an oral appliance. They have a number. Dr. Westbrook

was involved in another technology that was a nasal strip that is worn, that either reduces snoring or also treats sleep apnea. There was a paper presented last week at the International Sleep Conference, that talked about the Provent therapy, which is the nasal strips that we're talking about, and the number of patients that could adapt to it, increased tremendously when they were off their side.

Dave: So combination therapy can work. Let's say that someone is driving in their car, listening to the show and they're going, "I have no idea if I have sleep apnea. My spouse says that I snore sometimes." How much concern should they have about this, on the overall scope of, "I should eat right. I should exercise. I should meditate," all the things that do that. Is this a big thing or is this a little thing, and how do I know if it's big for me?

Phillip: Snoring is a sign of air flow limitation, as one is trying to breathe in during sleep. It's one end of a spectrum of airway collapse, that is occurring. Snoring is a sign that things are not perfect with your breathing as you are sleeping, but on the other hand, it may be more of an acoustic annoyance than anything else. How do you know if it's important? If it's really loud, you're at increased risk for sleep apnea. If your wife, spouse or otherwise bed partner notices that you appear to stop breathing during sleep, then that's a big risk factor. If you are sleepy at all during the daytime, and that means really falling asleep when you don't intend to, whether it's watching TV or reading a boring book. If you fall asleep, then you're even more at risk. If you are male, if you overweight or as Dan says, have a scalloped tongue or a small jaw, more risk.

How do you find out? Well you find out finally by actually objectively have someone look at your breathing during sleep, and as Dan says, we've invented a design now, owned by somebody else, that does this easily in your own home.

Dave: By now 10,000 people are saying, "Hmm that sounds like a good idea," that some subset of people who are listening this week. What kind of a person do they call? How would I find someone in my hometown if I lived in let's say Colorado Springs? What do I Google for to find somebody who's going

to hook me up with one of these devices and tell me if I should hack my snoring and hack my apnea or not?

- Phillip: Usually you start with your own private practitioner, the guy you normally see and say, “Doc, I’ve been listening to this podcast and I think maybe I have ‘sleep apnea,’ or have trouble breathing during sleep.” Hopefully they would get you in contact with a doctor who perhaps specializes in sleep medicine. Hopefully they would examine you and take a good history and see if indeed you are at risk, and the Aries actually, has a build-in questionnaire that will assess risk for sleep apnea. One would hope that the doctor would then decide to do the right test, which in this case would be a home sleep test for sleep apnea.
- Dan: Dave, one thing we could do is put a link up on your website to the Aries questionnaire, where if people were interested in completing the questions and identify the likelihood of them having sleep apnea, we could make that available to them through the Bulletproof website.
- Dave: I would love to do that, to help people figure this out. Then they can request a referral to a sleep medicine specialist and go down that path. I’m not sure actually, the Night Shift device, the one I’ve been playing with, that helps you to know when you’re sleeping, this is a consumer-grade device, or is this a medical grade device? Can I buy this?
- Dan: It was actually cleared by the FDA last week. It is cleared for the treatment of sleep apnea and snoring. It does require a prescription. It can be prescribed by a dentist or an M.D. A dentist if it’s for snoring, a medical doctor for the treatment of sleep apnea. One of the things you’re asking, I know the concept of the biohacking, and when we were talking before about combination therapies, one of the advantage of Night Shift is that it records information during the night on how you’re doing. It identifies how many times you tend to sleep on your back, how quickly you respond to the feedback. Our measurement of sleep/wake, I know a lot of your followers are wearing the different wearable devices that are giving them their sleep efficiency measures during the night.

What we've done is we provide a report that gives them what they call a hypnogram, or the complete period that they were asleep with little indications of when we recognized that they were awake, so that they could look at not only a number for sleep efficiency, but when it occurred during the night. We aligned that both with what sleeping position they're in, and also their snoring level. They can use the snoring too, if in the example we were talking about with you wearing your oral appliance in the Night Shift, and having some questions of, "Is the Night Shift enough?" They would be able to try different measures of, "Does this have an impact on their snoring and their sleep efficiency over the course of the night with or without the therapy."

For those who are snorers, they can turn off the feedback if they want to look at how they may be able to change their snoring or their sleep quality patterns, using Night Shift simply as a monitor rather than as a therapy. It can be used either way, but it's atigraphy, so it's not EEG-based sleep, but the algorithms, because they're being worn around the neck, is much, much more accurate in measuring sleep and wake than what you're able to obtain from the wrist.

Dave: That was actually my next question. I've got one of these Basis bands here. A lot of people don't know that for a period of a few months, I was cofounder and CTO of Basis. Basis has some new ads out these days, Intel just bought them, around getting sleep quality from the wrist. What you guys have found is you have found that getting sleep quality from the neck, which would be more like wearing a collar but doing it with the Night Shift device, that you're getting much better data. Basically if the arm flips around, you can't tell if the arm is moving or the body is moving. Is that the basic reason?

Dan: The Basis has more advanced technology than say the Fit Bit. I was referring to the Atigraphied based technologies, measuring sleep/wake with the Actograph from the neck, is better than the wrist. The Basis, on the other hand, has some other technologies built into it, that I have not done the comparisons with our device as I have looked in the literature on what a

medical grade, for example, Actograph, that an insomnia patient may wear versus the sort of accuracy we get from Night Shift.

Dave: I haven't had a chance to review the data that comes from my Night Shift device, so I'm not certain, and certainly you guys are way more qualified than I am. I am a biohacker, not a sleep expert, although I know more than the average bear. The other things that I've started doing is I've used a bedded sensor so I can get my full heart rate variability and the changes in my pulse overnight, and I record temperature, humidity and sound levels and light levels all night long. There is so much data that I actually don't really look at it that often unless there's something weird going on, but it's all in the cloud, which is remarkably cool. I'm keenly interested to add this to my arsenal and to decide if sleeping on my side is a better move.

One of the things that is a key variable that we haven't even talked about is, what about your mattress? If you're sleeping on a mattress that's either too soft or too hard, or whatever else, isn't that a huge variable on where your neck and your jaw is going to be, and your pillow size, composition and all that? How do you guys account for that when you're looking at this data?

Phillip: What we're looking at is what position you're in. That may be determined, of course, by the mattress or sleeping surface. Those things are pretty cultural. The kind of mattress you use, we think that having a relatively soft mattress is good, but that's quite Western, in some oriental countries having a board, is considered the ideal sleeping surface, and people sleep just fine on those. Whatever surface you are used to and like, we can tell whether or not your position on that is good for your breathing or not, and also can tell quite a bit about whether it's good for your sleep or not.

Dave: It's relatively difficult to do an AB test to say, "Well if I sleep on a board, I feel this way." I haven't talked about this in my blog. I'm planning on it. I replaced my \$2000 latex natural flame retardant-free mattress with a 1 inch thick piece of closed [cello foam 32:00] and it totally improved my sleep quality. Maybe the Asian sleep practices are better. I was amazed. It didn't do it right away. It was actually uncomfortable for a while. I'm keenly

interested in all these other things. Also, this would work in a hotel room. If you go to a hotel and you stop snoring and you feel better, you've got to ask yourself, "Is it the air in the hotel room? Is it the mattress and the pillows in the hotel room? Is it the light? Is it the sound?"

A lot of people have actually dirty air. They have an air quality problem in their home and they snore more because they're getting allergens because they have dust mites or whatever else, and the hotel rooms are relatively clean. On the flip side, you could have artificial fragrances and recycled air in hotel rooms that might make it worse. It's so many variables that for me, the challenge to understanding my own thing, has always been, "How do I get the data?" This device, the Night Shift, looks like a fascinating way to get really good data, particularly around that sleep movement. How do you correlate this with all the crazy things that affect sleep?

Phillip: Obviously we don't. That's up to you, but the biggest variable is position. Gravity is uniform. You cannot, on this planet, escape gravity, and it is going to affect the collapsibility of your airway no matter what. That's a huge one. Here you can find out whether it does or doesn't, if you do a sleep test. By the way, any sleep test any of your people who are listening get, needs to measure position. You'll ask your doctor or whoever about that. Position is so important. The majority of patients with sleep apnea have a sleep apnea that is strongly influenced by position but needs measuring.

Dave: Speaking of position, I've got the Night Shift sensor here on the video for people who are watching. How does it get positioned? I'll demo it. Tell me how to put this on the best way.

Phillip: The little box goes in the back of the neck. The clasp goes in the front of the neck.

Dave: It's a magnetic clasp, so you put it on.

Phillip: You would need to tighten it.

Dave: Yeah, I would. Let's see if I can find the tightener guy. There it is.



Dan: The tighteners are the tabs on the side.

Dave: I see it. I got it.

Dan: It's a magnetic clasp in the front. There you go.

Dave: I'm sure I haven't been wearing it right. I've worn it a couple of times, but I haven't had a chance to look at the data yet. I see the clasps. They're in the back there.

Dan: Dave, one of the other items, before we leave the mattress issue, is that as patients who are used to sleeping on their back, begin to sleep more on their side, it is important to select the sort of pillows that allow them to not end up with neck or shoulder pain as a result of the different amount of time that they are sleeping in the different position. There are different pillows that are out there, that are more orthopedically designed to help, for example, to elevate the head so that you're not reaching over and crushing the shoulder during the night when sleeping on the side. I think the issue that you raise is a very important one with position therapy so that you don't end up with other side effects. It's like you're treating the sleep apnea, but all the sudden have poor sleep quality because you now have shoulder and neck pain.

Dave: Dan, thank you for bringing that up. This is something I've been wanting someone to ask about this and I hadn't thought of asking you guys. I've been working on the optimal pillow arrangement for sleeping in order to basically give me better rest. One of the things I identified, I'm a pretty muscular guy. I don't work out very much, but just the practices I do have put me that way, and I wasn't a small guy to start with. When I lay on my side, the distance between the edge of my shoulder and my head is much bigger than the average person. If you listen to this podcast and do this stuff and you work out, you're probably like that too. When I go to a hotel I'm like, "You call that a pillow? I need two or two and a half of those to hold my head up so it's straight with my body." Is that what you





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recommend people do to get the alignment of the head so it's at a 90 degree body to the body while you're on a pillow?

Dan: That will help support the head and allow the shoulders to now be crushed so much. You're kind of doing a combination of trying to keep the spine aligned, if you would, that would be straight across. That's the vision of what we're talking about.

Dave: That's part of it. Now, if you're laying, let's say on your right side, your left arm is flopping up here somewhere. You can put it on top of your head. You can put it down. What do you do with the top arm for optimal sleep?

Phillip: Keep it out of your nose.

Dave: Darn, I had that wrong.

Phillip: Put it wherever it's comfortable.

Dave: What I settled on, and I'm not saying this is optimal, but this is just what worked for me, is I took two pillows and put them inside a single pillow case. I have a high density pillow. When I'm laying, say on my right side, my left arm has a pillow under it that holds the left arm up so it's more naturally positioned than the shoulder girdle, versus letting it collapse across the front of my body or trying to line it up on the top of my body. I have a history of some rotator cuff injuries from playing soccer when I was a 300 pound guy.

When you weigh 300 pounds, soccer might wreck your body, that whole starting and stopping thing. I certainly noticed an improvement in how I felt in the morning just when I did this. I feel like a primadonna because here's the two pillows that hold my head up and here's the two pillows that hold my arm up. By the way, let's put one between the knees to help with the pelvis alignment. Maybe it isn't the sexiest position to sleep in, but I tell you, when I prop myself up with the right pillows in the right places, the sleep efficiency goes up. You can see it in the data. You guys would expect that result or am I just a delicate flower here?



Phillip: Well princess.

Dan: Did you find the pea?

Phillip: You may be a bit of a delicate flower.

Dave: I can own up to that. I'm also sometimes just curious about things. Now everyone knows. I tend to sleep, lately anyway, on a very thin foam hard pad that's more like a board, but I have pillows that keep my body in precise alignment that makes me feel best in the morning, and I'm not afraid to say it.

Dan: Dave, have you attempted to sleep prone before, on your stomach?

Dave: I have but my neck always hurts. With the bite guard that I use, I can sleep on my back and I don't, at least my sound sensors don't pick up that I'm snoring a lot, unless I did something nutritionally that I shouldn't do. If I did have dairy or some things like that, I'll have more mucous, which also can affect things. I find that one of the biggest things for snoring, if I was say to eat a piece of cheese, which really I don't do, because I don't handle cheese that well. If I did something like that, or even if I have some kefir, grass fed fermented milk, I do get a little bit more mucous from that and then I snore. If I'm lying on my back and I've eaten well, I don't snore. If I lie on my face I guess it doesn't work. What's your take on sleeping prone? Is this a good idea to experiment with to see if it works for you?

Dan: Well everybody is different. What I can say is I probably sleep ... When I'm on the road I have to sleep laterally. When I'm at home I sleep almost exclusively on my stomach. I'm working gravity in the opposite direction. If I'm sleeping on my stomach then gravity is helping to bring it forward.

Dave: Because you have a small dental arch of course.

Dan: It does require a different type of a pillow than is effective when you're on your side. When you're on your side you need more pillows to try and

support the neck to keep from crushing the shoulders. When you're on your stomach you need it very, very flat. Actually, when I fly to Europe, I actually grab one of the [loofons 40:53] of pillows that I use because anytime that I'm sleeping on my stomach and it causes my head to be too high, then I end up with back pain.

Dave: Interesting.

Dan: It requires a good firm bed. If I'm on the road and I'm sleeping in a very soft bed, can't sleep on my stomach at all.

Dave: You know who else is a stomach sleeper I think, is Tim Farris. He wrote about experimenting with sleep positioning as well. I think his final position was face-down. I think this is a variable that I had never thought to think about in my life until maybe the last 5 or 6 years. Getting it right, has resulted in a lot less musculoskeletal pain for me and better quality sleep. I'm really intrigued at the idea of using the Night Shift sensor. I would encourage you guys, and I know because of my experience with Basis, there's a fine line between regulatory compliance and is it a consumer device or is it a medical device?

To the extent that you can enable people to get an alert without any claims, I think a lot of people would like to just get sleep quality data just like they did from the [inaudible 42:02] and everything else. To the extent that there's a medical grade version and there's a consumer grade version, I think people might want a little thing they could put on kind of like a necklace, and then when they wake up in the morning, they know something about their environment that they didn't know before. It's a relatively painless way to monitor sleep with a potentially large upside.

Dan: It's a great idea. Because we are a medical device company and we get inspected every couple of years by the FDA, we have to be a little bit more careful on the products we bring to market. There's always that grey area between, "Is it a medical device? Are you making medical claims?" Or are you walking the tightrope. We really have to be, because of the other products that we have, have to be very, very careful on that. You're correct



that if we were to pull out the feedback to get them off of their back, and it was simply an Actograph and a microphone, that that could be a consumer version of a product, but with the large number of patients, you have undiagnosed sleep apnea.

In our study of the Night Shift that was used for our FDA data, it's now in the medical literature, but we found that 70% of patients starting with an apnea hypopnea, that is, they stopped breathing twice an hour all the way up to 60 times per hour, 70% of the people out there are predominantly positional, in that the severity of their sleep apnea is at least twice as severe when they're on their back, as compared to when they're not on their back. There's a large number of people out there who could use this as an alternative therapy. They talk in terms of 20 to 30 million people in the United States that remain undiagnosed with sleep apnea right now.

Dave: This is a big thing. I would encourage people who are listening to check this out and pay attention. If you're not feeling awesome during the day, what you did the night before could be really the problem there. We haven't finalized this, but I'm really hoping that you guys will be out for the Bulletproof conference that's coming up in LA September 26<sup>th</sup> through 28<sup>th</sup>. [Bulletproofconference.com](http://Bulletproofconference.com) is where the info is. Last year you guys sent Chris Burke who gave a really good talk about some sleep stuff.

I'm really hoping that we see you guys again to give a lecture to the audience and potentially allow them to play with some of the stuff you have that doesn't require a prescription, or at least that they can experience, touch and feel, and get a sense for what's possible using these embedded sensors and biofeedback. This kind of technology really is going to change the world. If you're doing something that you don't know you're doing, and you can use a piece of technology to instruct yourself about it, I think there is very little downside and there's great value in doing that to help only 20 or 30 million people who could probably use this kind of help.

Phillip: Thanks.

Dan: We will definitely be there in LA, Dave.

Dave: Cool. We'll get you guys in on the agenda for the conference. I'm really excited. The first biohacking conference was about 18 months ago. We put that on San Francisco. This one is going to be amazing because we're going to be hearing from experts like you, and we're going to actually have the tech there so people can do upgrades and not just learn something, but they can experience something including things from the flow genome project where they're using some of the medical centers you guys have manufactured, in order to track what happens what audience members when they go into a flow state using some of the other technology that we'll have on hand. It's going to be one great big biofeedback party, let me tell you.

Before we go, because we're running out of time, there is a question that I've asked every guest on the show, and one that's pretty important. Since there's two of you, I guess we get six answers. In fact, we'll do two answers each because we're in a bit of a time crunch to make sure that we get the show done on time. Normally I say, "What are your top three pieces of advice for people who want to perform better?" It doesn't have to be from your career, but in your life's experience, the top things that are most important. Phillip, I'd love to hear from you first. You've had an impressive career. You've learned a lot of things. What are the two most important things you've learned in your entire life?

Phillip: I would suggest that one of the most important things is to allow yourself adequate time to sleep. Sleep is critically important for well being and that it is not something that you can adjust your need for. You have a certain need for sleep, and if you don't get it, you're going to pay the price and it's not going to be pretty. The second thing is that your sleeping surfaces and all the rest are important and those sorts of things you can find out pretty much for yourself. Sometimes with the help of technology. If you have a question about an experiment with it, find out what's best for you. You're an advocate of that, as I would be as well. Those are two things, both bound up with sleep. Just remember, sleeping less is not a victory of any kind. Sleeping more is.



## Bulletproof Toolbox Podcast #129, Dr. Phillip Westbrook and Dan Levendowski

- Dave: We'll settle on sleeping better is certainly a goal. Thank you, Phillip, I really appreciate that. Dan, you've had some extra time to think here. Share some of your wisdom. What do you think?
- Dan: Well, the one thing that I would recommend is that there is a reluctance, by men in particular, to go see or find out if they have sleep apnea. The studies have shown that if you have severe undiagnosed sleep apnea, you're going to probably die 5 years earlier than you would otherwise need to. Late in life, it's going to be really ugly between strokes, heart disease, cardiovascular disease. Just because you're not overweight doesn't mean you don't have sleep apnea. I would recommend to everybody to consider the implications as we try and biohack this, that you can do all of the nutritional things, and everything else, but if you have the underlying sleep disorder, you're just dabbling around the edges.
- Dave: To reiterate that one, yeah. It's not about just getting 5 more years of not dying. It's what happens in the 15 or so years before you die that's really going to suck. You've got to nail it, and nail it before it happens. If you wait, and I say this as an anti-aging nonprofit leader guy, it's much harder to fix yourself when you're 80 than it was to not break yourself when you're 30. Amen on that one.
- Phillip: Tell me about it.
- Dave: You look like you're doing all right, Phillip. All right, Dan, you've got one more. What's your other big piece of wisdom that you've learned about all of life and performing well? It doesn't have to be sleep, but it can be.
- Dan: Stay intellectually curious.
- Dave: Stay curious.
- Dan: Look at tools. Figure out how to understand, how the pieces fit together for you.



- Dave: Love it. Thank you both so much for being guests on the show. Can you give me a URL so that when people listen to this, they can go to your website? Certainly we'll put this on the show notes on the site as well. Just tell people where they can get a hold of you and remind them of what they should ask their doctor for, to get a device that can help them figure out what's going on with their sleep.
- Dan: Information about the Night Shift is at [www.nightshifttherapy.com](http://www.nightshifttherapy.com). There is also a lot of literature on the Advanced Brain Monitoring.com site that they could print out and take to their physician. The Advanced Brain Monitoring site is a little bit more tailored for clinicians to gather information about our technology. The Night Shift therapy is a little bit more designed for the users to learn how the technology could help them.
- Dave: Dan and Phillip from Advanced Brain Monitoring, thank you both for being on the show today. Have an awesome day.
- Phillip: Thank you.
- Dan: Thanks, Dave.

## Featured

[Advanced Brain Monitoring](#)

## Resources

[Nightshift Sleep Positioner](#) (tailored for clinicians)  
[www.nightshifttherapy.com](http://www.nightshifttherapy.com) (designed for patients)  
[Apnea Guard Trial Oral Appliance](#)  
[Sleep Profiler Cross-Validation Study](#)

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[Sleep Hacking Part 2: Reboot Your Sleep, Fall Asleep Fast, and Add 20 More Years](#)  
[Podcast #28 Monitoring Your Brain with Chris Berka](#)  
[Sleep Apnea Risk Assessment Questionnaire](#)



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