



Transcript of “Robert Lee: Breathing for Performance, Focus, & Freediving - #185”

Bulletproof Radio podcast #185



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Dave: I'm Dave Asprey with Bulletproof Radio. Today's Cool Fact of the Day is that reading is all about carbon dioxide and it has very little to do with oxygen. Air has about 21% oxygen and the body only needs about 5%.

Today's guest spoke at the [Bulletproof Conference](#) and his name is Robert Lee. Robert's a research fellow in Law, Science, & Technology at Stanford and this is his first time coming on Bulletproof Radio. I invited him to speak at the [Bulletproof Conference](#) on his topic that you probably haven't heard of. It's the art of respiratory hacking. It's about breathing for focus and performance.

You've heard me talking about breathing exercises and doing things like pranayama or yogic breathing, but what Robert has done is look at the very, very edges of respiration including things like deep diving. He's looked at the whole spectrum that you can do for breathing and built around that some practices that can help you focus and perform better. This is an area where there just isn't enough information, so you're going to learn quite a lot about that.

Stress in your mind finds its way into your body and if you can discover how to relax your mind by just hacking your breathing, you can turn off that fight or flight response. That will clear the fog. You can focus on mental performance. This is not a typical Bulletproof Radio episode because we're just diving deep on that. Robert is a true biohacker in that he's done a lot of this because he's just interested in it. You're going to learn some cool stuff here.

Dave: Robert, thank you so much for being here with us today. Can you tell us what you're speaking about at the 2014 [Bulletproof Biohacking Conference](#)?



Robert Lee: I'm speaking about how to be mindful and aware of your breathing patterns. That's, for me, based upon my experience as a freediver and a freediving instructor.

Dave: Tell us how much control do we have over our breathing?

Robert Lee: Breathing is very interesting in that it's the only physiological function we have that's both autonomic and voluntary, meaning, digestion for instance is autonomic, so we don't have to think to digest our food. Whereas, let's say, doing a bicep curl is purely voluntary. We have to think actively to do it. Breathing is at the intersection of both. Normally we don't have to think about it, but we can easily stop it whenever we want or speed it up, so in that sense, it's a very interesting physiological function.

Dave: You are a freediver or you were. Can you tell us about that and how that actually made you aware of your breathing?

Robert Lee: Free diving is simply the sport of diving on breath-hold, so not using scuba equipment, just taking a deep breath and going down. Some people do it competitively, trying to set records for depth, for length of time they hold their breath in the pool. I do this for very much in the mode of somebody who's a scuba diver. In other words, I like to be under water, I like to look at the coral reef and the marine life. Freediving is just another way of doing that.

One great advantage of free diving, and obviously you don't have as much equipment, but one really great side benefit is dolphins and other marine mammals actually recognize you almost as one of their own, in other words, another air-breathing creature in the water. You can imagine scuba divers they find to be a little bit alien, but freedivers they actually welcome almost as one of their community now. Under U.S. Law, you're not allowed to approach marine mammals within 100 yards but if they swim up to you, there's really nothing you can do.

When we're training in Hawaii and teaching classes, often times we have pods of dolphins come and swimming around with us and they're very playful with us. I've even had baby dolphins, which are incredibly cute

because they're about four or five feet long, and they're swimming and squeaking and what have you. It's so quiet that you can hear a shrimp crackling on the reef, because freediving, you're holding your breath. It's utterly quiet. You can hear whales singing in the background if they happen to be nearby. That's one of the advantages or beauties of the sport.

Dave: At what depth did you need to be in order to have those interactions?

Robert Lee: Well, you don't necessarily have to be deep. A lot of marine life, including dolphins, come to the surface, so actually what I'm saying applies quite a bit to snorkeling, so I think people should spend a lot on snorkeling when they're in a beautiful place.

Dave: How long do you typically hold your breath?

Robert Lee: Well, I don't think there's a typical. I will, if I'm just casually going on a reef and swimming around and snorkeling, two, three minutes might be a typical time. I can do more, but I like to emphasize that for a person to, say, learn to dive to 15, 20 feet for 45 seconds, it's still very useful and can enhance the snorkeling experience, because if there's something down there, you can go ahead and look at it. It doesn't have to be an extreme or hardcore sport in that way at all.

Dave: In order to hold your breath for that length of time, there's, I'm sure, preparation you need to do in order to fill your lungs before you actually dive under water.

Robert Lee: It's mostly about relaxation, both before the dive and during the dive. We all have enough oxygen in our lungs and our bodies for several minutes. We just are not accustomed to doing that. As long as you relax, because if you don't relax, then you're stressed out, obviously you're burning more oxygen. If you can get the art of relaxing beforehand, and relaxing during it, your breath hold can go to several minutes.

One application of this I can mention is we teach big wave surfers the art of breath-hold. They may be surfing and all of a sudden get hit by a huge wave and get pushed down and may be down for a minute or more. What's

more, they've been exerting themselves and they may not have gotten a full breath because they crashed all of a sudden, they're wiped out all of a sudden. In that situation, you can imagine what you really need to do is learn to relax.

When we teach people, show them they can do three, four, five minute breath-holds in the pool, then mentally it's a lot easier for them to say, "Oh, yeah. It's no big deal. I'll just hold my breath for a little while. I maybe have a little bit of an urge to breathe, but I know there's plenty of oxygen there for me to last a while."

Dave: How much does breathing affect human emotion and cognitive function?

Robert Lee: Well, it not only affects it in quite a bit, it also is a tool for getting information about that, in the sense that because it is autonomic, you can look at someone's breathing and have a sense of what their emotional state is like. At the same time, you can tell them to be mindful of and to change their breathing pattern, and then also affect those things.

Dave: Heart rate variability is a popular hack amongst Bulletproof biohackers. What is heart rate variability and how does it affect performance?

Robert Lee: Well, I have to say I'm not an expert on heart rate variability as nearly as much as some of the people at this conference, including some of the vendors at this conference. In general, my understanding is that it's important for there to be a variation in your heart rate over the course of a minute. A low heart rate is generally associated with cardiovascular health and so is heart rate variability. In other words, your heart rate should not be just 60 all the time, it should in fact vary.

When I do the type of breathing exercises that I do before I freedive and that I'm going to show today at the [Bulletproof Conference](#), my heart rate may be around 70 at the inhalation, but as I exhale and the air comes out of my lungs and the pressure in my chest decreases, that heart rate will drop into the 40s. It'll go from the 40s up to 70 and then back down into the 40s and it will vary like that.

Dave: How did you discover the art of respiratory hacking?

Robert Lee: It really comes from my freediving experience. Now, there are obviously lots of very ancient arts that focus on breathing, such as pranayama, which literally means something like breath study or life force study or practice, and qi gong, kundalini. There's certainly a huge amount to be learned in those. Freediving is the kind of thing where we try to introduce people to the art of breathing in just a few days. It's a little more practical, menu-driven, do A, B, C, D. There's no doubt that you seriously get into freediving, a lot of people start studying those more ancient disciplines.

Dave: Sitting here talking about breathing, I'm very aware of the fact that I'm naturally a shallow breather. It's making me very uncomfortable sitting here talking about breathing because I'm aware of my breath right now. Can you talk a bit about people that are shallow breathers and what that might mean?

Robert Lee: Well, shallow breathing just means you're not really exchanging your oxygen and your carbon dioxide as much. It also doesn't give you a chance to one, induce that heart rate variability and also do an extended exhale. I know you're off-camera, but maybe we can do this a little bit together, what have you. When I do talks about this, I say the quick lesson is that a long relaxed exhalation is really important to mindful breathing. During that exhale, as I said, the pressure's going down in your chest. Your heart rate is dropping and it's easy to zone out and really relax doing that.

Now, letting the air out of your lungs, you can also control or meter by closing your teeth or your lips, pursing your lips and letting the air slowly escape, like closing the neck of a balloon. An inhale, you might take a couple seconds to do that, and if I say exhale for a good 8 or 10 or 12 seconds, that might be difficult to do unless you do what I just said, which is let it escape slowly through your teeth or your lips.

Dave: Is that merely an exercise or can you actually train yourself to breathe naturally a different way?

Dave: It's both. You do it as an exercise and then you tend to be able to invoke it when you need to. For instance, when you're reacting to a stressful event, I'm sure many of us have heard take a deep breath. Pause and take a deep breath. I would add to that, take several slow, deep breaths. If you're shallow breathing, you can't do what I just said in terms of taking a nice, long exhale to relax. In addition, it's a focus on that long exhalation, several deep, slow breaths with a nice, long exhalation where you can, like I said, maybe close your eyes and really just relax and let it out. The exhalation doesn't take any positive effort. You can just relax and let it out.

Dave: We've all heard the term fight or flight. How does our body and breathing react to a stressful event? Break it down for us.

Robert Lee: Imagine a stressful event, which in pre-modern times might have been encountering a mountain lion. In modern times, it might be some co-worker yelling at you. Now, in the mountain lion situation, you take off and you run and you discharge that energy that your body's built up. That's actually a healthy response. When we're in the office or any other modern life situations, you can't physically discharge the stress that's been brought out by that.

What happens when you encounter that stressful situation that your sympathetic nervous system is engaged, your heart rate and your respiration rate go up, and one additional observation that I have had about this physiology, is that you tend to take a quick inhale, your breath, and hold it for a moment. I think that literally may be due to the fact that you're trying to stay as quiet as possible. You saw the mountain lion, you're not sure if it saw you, so keep quiet for a second. If it starts charging you, know it's seen you, so then you have to take off and run. Those are the three things that happen when we have a stressful event.

Dave: What is your recommendation for a mindful response to a stressful event, whether it be seeing a mountain lion or encountering an angry friend or colleague?

Robert Lee: Take a deep breath, as they say, or take several slow, deep breaths and, like I said, take several slow, deep breaths and focus on a nice, long, relaxed exhalation.

Dave: So much of breathing is involuntary. What are the actual mechanisms of inhalation?

Robert Lee: Well, there are several different muscle groups involved in breathing. The main one is your diaphragm, which is the dome-shaped muscle at the bottom of your lungs which pull down and pull air into your lungs. If you watch anybody while they're sleeping, you'll see that that's really the only muscle they're engaging. It's the most efficient muscle to use to breath. We should naturally try to focus on that. When we get more tense, we tend to not to engage that as well and invoke other muscle groups, which we can also use, but the diaphragm is the main one we should focus on and be mindful of.

In addition, you have muscles between your ribs called the intercostal muscles which are literally the ribs you eat if you're having a barbecue. Those are the muscles. They can expand the ribcage as well, but the amount of air they can move is much smaller.

Finally, you can also expand your ribcage by raising your shoulder blades, which adds just a tiny bit little more air to your breathing. Freedivers actually have a couple more tricks to add even smaller amounts of air, but that's not relevant to mindful breathing practice.

Dave: Sometimes deep breathing is really uncomfortable. Is optimal inhalation supposed to feel good?

Robert Lee: Well, I teach maximal inhalation, which is in other words, taking the biggest possible breath you can, engaging all those muscle groups, your diaphragm, your chest and your shoulders. That's good for practice just to see how big a breath you can take. Obviously, for freedivers, where when you have that one breath to work with, we want to do that. That's really just an exercise so that you understand the mechanics of inhalation better. In general, mindful breathing doesn't go to that super full point. What it does is fully

engage the diaphragm to fill up your lungs and then adding your chest, what I would say is about half-way, in other words, slightly more than a normal inhalation.

Dave: We've taken a deep breath in, but now let's talk about the exhale. How important is the exhale of a breath?

Robert Lee: For mindful breathing, I'd say it's the key. If there's one thing you can take away from this, it's that doing a long exhale and, as I said, metering the amount of air coming out of your lungs through your teeth or your lips, will allow you to relax. Even if you ignore everything else, a long exhale should help you relax.

Dave: Should the length of our inhale and the length of our exhale actually be similar in time or are they different?

Robert Lee: There's all sorts of different breathing practices. I'm not going to speak universally, but given what I just said about the long exhalation as a mode of relaxation ... People have different practices and might decide that they only want to do a few breaths with that long exhalation like I said. In general, the way we teach it in terms of freediving is that long exhalation. Can you do a 10-second inhalation as well, sure you can, but that's, I think, one of those arts that's probably learned through one of these ancient practices that takes a while. In general, we teach it's a normal inhalation that takes a second or two and then that extended exhale.

Dave: For you, what is normal breathing for you?

Robert Lee: Interestingly, I'm not as good about mindful breathing as I should be, so I should practice what I preach. Certainly when I'm aware of it, I'll do it and my exhale will actually extend well beyond that 10 seconds oftentimes. Ten seconds is not ... That precise number is not important, but when I'm really trying to relax and particularly before a dive, that exhale for me may be 15, 20, even 30 seconds.

Dave: I'm sure you talk about breathing a lot. Some of our listeners right now might be having a similar reaction that I'm having of being really

uncomfortable, because I'm paying so much attention to my breathing. When you talk about it, do you have a similar reaction with it, being very hyper-aware of your breathing, and are you comfortable with that?

Robert Lee: Because it is both voluntary and autonomic, obviously it is the kind of thing that induces that kind of awareness. Like I said, I'm certainly not a naturally calm person, grace under pressure, ice water in your veins type of person. That's why I was attracted to this kind of practice, because it does allow me to do that when I focus. Like I said, I should probably be better about incorporating it into everyday life, although I certainly can do it when I'm diving.

Maybe even right now we can just take a few breaths like that way and see if it carries on for the next several minutes, so we'll skip for the moment the maximum inhalation. I described it a little bit and you can try that out. What we'll do what I said is the mindful comfortable inhalation. First you'll inhale with your diaphragm fully, and then you'll use your chest. I'll do it once, and then I'll have you try it. Diaphragm ... and chest ... and then I'll exhale. I feel like you're almost falling asleep during that phase, so I'll talk you through it, okay?

Dave: Okay.

Robert Lee: Go ahead and inhale with your diaphragm. Nice and full using that muscle down there, add in the chest a little bit so it's nice and full, but not uncomfortable and then let it out slowly through your lips ... two, three, four, five, six, seven, eight, nine, ten. Inhale again. Inhale with the diaphragm and the chest, and exhale ... two, three, four, five, six, seven, eight, nine, ten. Inhale again, diaphragm and chest, and exhale ... two, three, four, five, six, seven, eight, nine, ten. Okay, great. Do we feel good about continuing?

Dave: Yes, we do. It is interesting. I'm sure a lot of our listeners were doing it with me. When I started the exhale through my teeth, I felt a little dizzy, and then I felt myself calm down. It was really a wonderful experience and I hope everyone else is feeling that. How do our lungs age?

Robert Lee: You know, I'm certainly not an expert on that. I do know that for freedivers specifically, what's the great thing about the sport is that your ability diminishes very little with age. It's not weight bearing, you don't have to worry about dealing with heavy weights. The water is pretty forgiving. I imagine one day when I'm a lot older, if I'm going diving I may need friends to help me carry my equipment to the shore and help me get suited up and everything like that. Once I'm in the water, imagine a baby that has very little muscular development, but it's fairly still easy for them to move in the water. There are many freedivers who are very accomplished freedivers who are literally senior citizens.

Dave: Is holding your breath beneficial to your health or harmful?

Robert Lee: Well, certainly chronically it's not a good thing. Just like stress in the short term is a perfectly fine thing. It motivates us, it helps us get things done. If we're running away from a mountain lion, it's a very good thing, but we don't want to have it become a chronic thing where we have that stress of seeing a mountain lion be our baseline level throughout life. That's what causes problems such as cardiovascular problems and what have you.

Breath holding in many ways would be the same thing. In fact, people talk about apnea or email apnea. Sleep apnea is when you're having trouble breathing while you're sleeping. Some people have even talked about email apnea where they take a breath and they're typing their email and then they let it out. That's, I think, an example of chronic stress. In terms of a training modality, in other words, would doing a five minute breath hold three times a week be good for training? I think it very much could be. It certainly creates large oxygen debt and extreme aerobic stress, of course.

It also even more so induces metabolic acidosis, which is the kind of thing that happens whenever you engage in serious aerobic exercise. Freedivers are able to do that even to a greater extreme. In fact, one fact that might interest medical professionals is that we can all learn to voluntarily hold our breath until our oxygen saturation is around 50%, peripheral oxygen saturation. So if you put on a pulse oximeter, which is a cheap device you can buy at a drug store, a lot of doctors I tell that, think of it as

physiologically impossible until I show it to them. Like anything else, people can learn to do interesting things.

Anecdotally, I've heard one person say that he did nothing but breath holds for a month as exercise, literally nothing but breath holds lying in bed, and he lost six pounds. Could it be the new weight loss fad? Perhaps, I'm not sure simply because it's not an easy thing. In other words, the first one or two or even three minutes of a breath hold when you're trained are pretty easy, but that last minute where you're getting the strongest effects does take a lot of focus. I know some doctors who think it would be a very interesting training tool and hope to see it gather some momentum, but right now it's more just something that we need to do some studies about. I can just tell you anecdotally some of the things that I've seen.

Dave: So you brought up sleep apnea. Can some of these breathing exercises actually help?

Robert Lee: Well certainly I'm not an expert in sleep apnea, but to the degree that you can improve your breathing mechanics, and to the degree that you can become more relaxed and more mindful, I would think it would help. Now on the other hand, when we're sleeping we all tend to breathe fairly well. The stress goes down, we breathe with our diaphragm, so sleep apnea may be mostly a result of physiological issues such as a tongue rolling into the back of the throat or something like that, which I've heard about, that you may not really be able to fix through this sort of thing. I suppose it couldn't hurt to try.

Dave: What about people that have asthma?

Robert Lee: Asthma, certainly I can't talk about counter indications, in other words, whether holding your breath for a long time could induce certain issues. There's certainly, you can imagine at the end of a long time, you're under extreme stress and you're breathing really, really hard and that can cause some kind of bronchial spasm or something, for all I know. The mindful breathing part where you're inducing relaxation, what have you, I would imagine that would be helpful.

Dave: Why is holding your breath so uncomfortable?

Robert Lee: Well there's a few reasons. One is that we're simply not used to it, so in some seminars I will have people do a simple one minute breath hold just to see what it's like. The discomfort there is not from lack of oxygen, because we have plenty of oxygen to last well beyond a minute and you're barely tapping into your reserves at that point. The main reason is simply that you are not used to your chest not moving for a full minute. It's just uncomfortable. How many times have you done that in your life? Maybe a handful, like when you were a kid and you challenged some friends to a breath holding contest and you did that a few times in junior high school or what have you, but when's the last time you did it? Maybe never.

The initial training there is just getting used to that fact. In fact, when people take freediving seminars they often ask me, they say, "If I'm getting uncomfortable at the end, can I slowly let some air out?" and I say, "You know, you can do that, but that's kind of a beginner's trick," because, again, they're not used to that complete lack of movement. Very quickly divers stop with that trick because they realize they want to keep the air in and they're just used to that static state.

Once you get two minutes into a breath hold, then you'll start to get a stronger urge to breathe and that also doesn't come from lack of oxygen. It comes from the increase in carbon dioxide. The carbon dioxide waste product in our bodies is the proxy generally for low oxygen, because our carbon dioxide chemoreceptors are much simpler than oxygen chemoreceptors. They developed evolutionarily first and most organisms use carbon dioxide as a proxy or an inverse proxy for oxygen. They're saying, "Hey, your carbon dioxide is high," meaning your oxygen is probably low.

Dave: With the build up of carbon dioxide, is that a bad thing when you're holding your breath?

Robert Lee: In the short term it's not a bad thing. It's a stress. I like to talk about the stress in terms of you stress and distress. Running is stress. In fact, while you're running, you have a higher chance of having a heart attack than

while you are sitting on the couch, but nonetheless we do it because our bodies adapt to that stress well, and it's therefore a you stress. Breath holding in limited form and in the ways we have discussed, can be a form of you stress.

Dave: Can you give us a few real life scenarios about how we can apply mindful breathing?

Robert Lee: Well, sure. When I'm doing a freedive, typically I will do this type of breathing for up to eight minutes. In those situations, we're really trying to oxygenate ourselves fully and make sure we're lying wholly still, so literally we'll lie in the water still for eight minutes, breathe like this and then do the dive. That's a fairly long time, but you can do it for just a few minutes in any kind of situation.

Imagine you're playing golf and you're walking up to the putting green and getting ready to putt. Do this as you're walking up to the green and it should put you in a more focused state. By and large, when people are anticipating a performance, they get overly amped, overly hyped up about what they're going to do and that can detract from performance. This will help reset that to an appropriate level. Even one or two breaths can help.

For instance, imagine you're playing basketball and you just scored a basket to tie the game and you got fouled. You might need to take a few deep breaths to blow off some of that carbon dioxide, but then as you're walking to the free throw line, you can take one or two of these breaths and maybe we can visualize that right now.

Go ahead, close your eyes. Like I said, you just got fouled. You scored the basket to tie it. You have one free throw you're awarded to win the game. You take a few deep breaths to blow off some of that carbon dioxide. Now, inhale ... and exhale ... two, three, four, five, six, seven, eight, nine, ten ... and inhale and exhale. The referee bounces you the ball ... four, five, six, seven, eight, nine, ten. You take one more inhale, and you shoot the basketball. There you go.

That's a scenario in which you can apply that. In addition, mindful breathing as a steady state thing can definitely help focus and flow overall. It's a very important part of flow state and in fact, Steve Kotler talks about the respiratory component of flow state.

Dave: Is the [Bulletproof Biohacking Conference](#) important to you as a biohacker and to the work you do?

Robert Lee: It definitely is in the sense that I'm trying to help people improve their performance and their everyday life through this one modality of breathing. People here at the conference are attacking that from all different angles, so I hope this is one relatively straightforward easy tool that people can add to their kit.

Dave: Well, let's end with, what are your top three recommendations for kicking ass at life and being bulletproof?

Robert Lee: That doesn't necessarily have to do with breathing?

Dave: It can have to do with anything you want.

Robert Lee: Well, one we'll say is the breathing and which we've talked about for the past half hour or so. The other I would say is not caring what people think or not worrying how you'll be judged. Again, as Steve Jobs famously said, "We're all going to die pretty soon anyway, so what does it matter." Let's just go and ... Carpe diem, as they say. I don't know if that's two or three, but maybe we'll count that as three.

Dave: Let's count it as three.

Robert Lee: Okay.

Dave: Robert, thank you so much for being here with us today.

Robert Lee: Thank you for having me.

Dave: If you're looking for a way to know which foods are making you weak, check out the free app called Bulletproof Food Sense. It works by using the phone



camera in order to get a measurement of your heart rate, or you can just type in your heart rate if you know what it is from some other monitoring device. You do this before a meal and you do it after a meal a couple times.

Based on changes in your heart rate, the application can help you to identify which foods are causing an immune response in your body. Based on that, you can choose to avoid those foods and you'll find a huge boost in your performance just from not eating the foods that you have sensitivities to. You'll also find that you can lose weight much more easily when you're not eating foods that cause you to feel foggy and inflamed all the time. This app is free. It's called Bulletproof Food Sense and it's available on the iPhone Store.

You can also take a step further. Check out Bulletproof HRV Sense. That stands for heart rate variability sense. Bulletproof HRV Sense goes a step beyond Food Sense and it works with a wireless heart rate monitor that goes around your chest. You wear the heart rate monitor and it'll talk to your iPhone or your tablet and it'll show you your stress levels throughout the day. It'll help you know whether you're over trained, over stressed or even just help you know which meetings are causing the most stress in your nervous system, so you can learn to take control of that stress. This is an awesome app. Number one, Bulletproof Food Sense is free and number two, Bulletproof HRV Sense is a few dollars and it makes a huge difference in how you manage and control your stress.



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