[00:00:00] **Dr Mike T Nelson:** Welcome back to the Flex Diet Podcast. I'm your host, Dr. Mike T. Nelson. On this podcast, we talk about all things to increase strength, muscle performance, and improve your body composition, all without destroying your health within a flexible framework. Today on the podcast, we are doing a deep dive into all things I guess you could say respiratory, breathing, oxygen regulation CO2 regulation, and much more.

With Luke Way and Dr. Andrew Sellars of Isocapnic. I've been trying to figure out this, I guess you could say, breathing paradox for quite a while. I've been playing around with various breathing techniques for, man, probably well over almost two decades now, I think. I read Patrick McEwen's book when it first came out, did some early training through Z Health, did a deep dive into a lot of the Buteyko methods, and I've done a lot of RPR, Reflexive Performance Reset, which has helped a lot for breathing.

And in this podcast, we're talking about the device they have, which I just started using right now for respiratory training, but we also cover Why you should worry about how your breathing is. I know there's a big debate about breathing techniques. And at first, many years ago, I was quite skeptical. I'm like, ah, your brain will just figure out how you should breathe and don't worry about it.

But over time, I've come to realize that there are some specifics that do make a very big difference. And because breathing is so essential to get oxygen in and carbon dioxide out. You are most likely going to have a fair amount of compensations in it because your brain literally has to figure out a way to breathe.

Therefore, it is giving up efficiency in order to do it. So great podcast here. And if you really enjoy going super far down the rabbit hole on this, you will love the pillar four of the physiologic flexibility certification. I go in depth into oxygen and CO2 and in all honesty of the four pillars. This one took me the longest to do when I was creating it.

It was hard to try to explain all of respiratory physiology and make it practical. And not all the research necessarily agrees with each other either, but I'm super happy with how it turned out. And you can enroll in the physiologic flexibility certification. If you're looking to increase your recovery ability, become more anti fragile, just generally harder to kill.

The four pillars are temperature regulation, everything about cold water immersion, sauna, heat two is pH regulation, which we primarily focus on

different types of aerobic training, everything from zone two to true high intensity interval training, why it's important, how to do it. Pillar three is an expanded view of fuels via metabolic flexibility focusing on ketones and lactate.

And number four, like I mentioned, is oxygen and CO2 regulation, which comes down to breathing, which again, I think is super important and has a lot of leverage in it. So go to the link below here and it'll be open until Monday night, March 25th at midnight Pacific standard time, 2024. If you have any questions, you can find me and just ask.

Also another sponsor of the podcast is my favorite electrolyte to drink, which is LMNT, which is L M N T. They made salty water tastes pretty darn good. So tonight I'm drinking the raspberry one as of this recording and especially days where you're cutting out calories or doing some type of intermittent fasting, which I do recommend in the flex diet certification.

I found a game changer was adding electrolytes with more fluid during those times. Because, I don't know why it took me a while to figure this out. It took me up until, I didn't figure this out until four years ago. That, hey shocker, when you're not eating food, you're not consuming electrolytes, especially sodium.

And when you're just drinking a ton of water, your electrolyte balance can get a little hokey for a while. And again, it's nothing that you're probably going to have any serious issues with. But I found when I consume more electrolytes, especially sodium, I typically put one packet of LMNT in one liter of fluid, in my little thermos here, I feel a lot better.

And fasting for longer periods of time when needed was much easier. So check them out, go to the link below, which is www. drinklmnt. com forward slash Mike Nelson. That's www. drinklmnt.com/mikenelson. And then also, the guys at Isocapnic were nice enough to give us a code on their respiratory trainer.

You can check that out, all the information, the links and everything, and the code will be below. And I don't make any money off of this code. What I did with them is tried to give you the best discount that they could offer in lieu of me. Getting any money because it is a relatively new device. And as is this recording, like I said, I haven't had a whole lot of time to play around with it yet.

But I wanted to give you whatever we could get as the biggest discount. So you can play with it and give me your feedback on it. So that'll be down there below. So enjoy this episode, a deep dive into all things, breathing, respiratory, how it

monitors and can be programmed. For exercise and much more with Luke Way and Andrew Sellars of Isocapnic.

Hey, welcome back to the FlexDiet podcast.

I'm here today with Luke. How's it going? I'm well. How are you? Good. Good and remind me where you're

[00:06:20] **Luke Way:** located again. We're up in usually sunny Canada, but this time of year it's a little bit overcast, but we're in the Okanagan in B. C. So it's like the wine country of Canada.

[00:06:32] **Dr Mike T Nelson:** Oh, okay. Is that north of like in a Whistler, Blackcomb area, or is it south of Vancouver?

[00:06:38] **Luke Way:** Yeah, so, yeah we're about three hours inland of Vancouver.

[00:06:42] **Dr Mike T Nelson:** Oh, okay. Gotcha. Yeah. Yeah, that's my only reference point there. North

[00:06:46] **Luke Way:** of

[00:06:46] **Dr Mike T Nelson:** Spokane. Okay. Oh, okay. Yeah. Gotcha. You have good skiing and snowboarding in that area, correct?

[00:06:53] **Luke Way:** Yes. Yeah. I just heard back from the the ski hill earlier today saying that they they're opening up a new chair and there's going to be some sweet pow to go and capitalize on this weekend.

[00:07:05] **Dr Mike T Nelson:** Nice. I leave tomorrow actually early, super early in the morning for Banff, Canada. I've never been there before, so I'm pretty excited.

[00:07:12] **Luke Way:** All right. So now you're entering where I grew up. Banff is a few hours south of my hometown, which is Jasper, Alberta.

[00:07:20] **Dr Mike T Nelson:** Oh, okay. Interesting.

[00:07:23] **Luke Way:** Yeah, so Jasper and Banff are and the Simpsons Springfield and Shelbyville.

They're both like, they're both national park towns and of course in opposition in every way.

[00:07:35] **Dr Mike T Nelson:** Oh, interesting. Yeah I've heard Banff is beautiful, although I was a little bit nervous like two weeks ago when I looked at the temperature, and I already signed up and paid for the trip and gone with my sister.

She sends me a note, she's The high today is 23 below. I'm like, Fahrenheit or Celsius? She's Fahrenheit. I was like, Oh!

[00:07:53] **Luke Way:** It doesn't even matter when it's that cold. It's almost the same. Yeah.

[00:07:58] **Dr Mike T Nelson:** But it hasn't been that bad lately, so we should be okay.

[00:08:00] **Luke Way:** Yeah. No, Alberta tends to We're in a, we're in an interesting spot in BC where we get pretty mild temperatures big changes as you go up in altitude, of course.

But where we're at, it's typically around minus five Celsius, which is yeah 30 degrees ish. And, but in, in back home in Jasper, it gets real cold. Yeah. Minus 40 is pretty, pretty regular occurrence all winter.

[00:08:21] **Dr Mike T Nelson:** And what's the biggest ski hill near where you're at?

[00:08:24] **Luke Way:** Oh, there's two big ski hills near us.

One big white and the other one is Silver Star.

[00:08:29] **Dr Mike T Nelson:** Oh, okay. I've heard of Silver Star. I've heard it's supposed to be pretty amazing from what I've heard. Yeah.

[00:08:34] **Luke Way:** Yeah. Tons of vertical. Yeah. Great groomers. Awesome.

[00:08:37] **Dr Mike T Nelson:** Nice.

[00:08:38] **Luke Way:** Yep.

[00:08:39] **Dr Mike T Nelson:** Well, we'll talk about your product here as we transition. So thank you for the intro there.

Yeah, I guess I'd start off just tell us about the product and how you came up with it. And I think that'll give people a good visual background and we'll go into more specifics from there.

[00:08:56] **Luke Way:** Yeah. Awesome. So, the way I like to tell the story is like give a bit of an origin story. So, my background is in high performance endurance sport.

I coach athletes on the Olympic pathway and elite level triathlon, iron, half iron, that sort of thing. And our method of Coaching is really based around objective testing. And so we do a lot of physiologic testing a lot of test, train, retest to see how training has affected things that over the past 20 years has morphed into this assessment called the balance point assessment that.

Really takes physiologic assessment and turns it on its head. Instead of just getting a VO two max number or some sort of generic sort of benchmark, we're really exploring to understand what systems are strong, what systems are weaker, and then design training around that. You talk to a strength athlete, like they're like, well, of course, but for whatever reason in the endurance world, this is like novel information for a lot of people that they, Oh, you don't just do a 12 week program and hope to be your best iron man.

Also, like your body responds to stress and it responds to good stress and bad stress and just stress. And so if we can understand what systems are strong and when I'm talking about systems, I'm talking about, Like intrinsic systems like your cardiac system, your heart, your pulmonary system your lungs, your metabolic system, your circulatory system, your muscular skeletal system, neurologic system, psychological systems.

We try our best to objectively rank all of these different systems and then have a really clear roadmap on how we're going to train these athletes. So fast forward a few years, we, have been doing thousands of tests in the lab and, It's become quite clear that we're like talking a lot about respiratory training.

People have a really hard time training their respiratory systems because they become limited somewhere else on their way to becoming, respiratory trained. And so prior to any sort of focused respiratory training, what, we would typically do is okay, go out and do like hill repeats or do something like that's going to, Metabolically channel challenge you enough that it drives that co2

demand high enough that you have to breathe hard enough that it challenges your respiratory system Well, I liken that to being like a strength coach, you know looking at an athlete being like, oh, you have weak biceps Let's do some squats and hopefully by doing the squats your biceps are going to get stronger It's it's not really the best modality to Strengthen your biceps.

And so we started exploring different ways of training, the respiratory system with different tools from all over the place, inspiratory construction to expiratory construction to other isocapnic medical devices and better understand how we can. Focus the training on that respiratory system.

And there wasn't really anything that fit the bill. Most of the respiratory trainers we tried just flat out didn't work. Some of them, if they did work made you stronger at breathing. Or range of motion, and we can get into that a little bit later. And other ones were prohibitively expensive.

And so that was the necessity behind our invention. We needed something that's going to be effective that, effectively train the respiratory system in a way that allows you to be breathing hard for long enough that we cause training effect. And it needs to be accessible.

It needs to be at a price point that people can. Can afford, it's not a medical like tool. And so we we embarked on that journey a couple of years back, Andrew and I, and and here we are with the breathe way better device from ice cabinet. And so this thing is 150 USD. And it's really simple.

It's it's really just, a rebreather bag, the same bag that you'd find in an anesthesia OR. And then that's the secret sauce right there. This device here. It allows you to vent off just the perfect amount of of inhaled gases. And then as you breathe in from the bag, you breathe in just the perfect amount of fresh air.

And so it uses fluid dynamics to keep the gases mixed and and it allows you to breathe as hard and as fast as you could prescribe without having. Any issues with hyperventilation. So to peel back that on you in a little bit, your, respiratory is unique in that, yes, it has, musculature assigned to it, but that range of motion is a lot.

Different, more different than the rest of your system. Let's talk, we're talking about the bicep earlier. So let's focus on the bicep. I can rest my bicep at this range of motion. I'm extending my arm to straight, and then I can close it to a fully, contracted range of motion.

And I can also rest it in that position. Your lungs don't work that way. They only rest in the middle. It takes energy for us to extend. It takes energy for us to contract. And one of my favorite. Sayings in exercise physiology is the body will always do whatever's easiest. And so if we never train that range of motion, we never actually challenge your ability to fill your chest cavity with air and, push it all the way out, then your body's never going to want or need it.

And it's going to atrophy down and bias towards the center. And so you could be. Six foot five, tall, but only have the lung capacity of somebody who's five foot, nothing, because you've never challenged that. And you wonder why you're huffing and puffing as soon as you run up a flight of stairs.

And it's because of that your body does whatever's easiest. If it doesn't challenge that system, then it's going to, a bias to a smaller, easier range of motion, because that's what you've asked it to do. And so that's, yeah, what we've embarked on is allowing athletes to totally unleash their respiratory systems and train it specifically so they can, get stronger, more effectively.

[00:14:38] **Dr Mike T Nelson:** Nice. Yeah, I agree with that, like One of the principles I have, and it's not that I created it by any means, is just efficiency. Like the body is designed to do whatever is the most efficient, like it is seeking efficiency in almost everything. So if I do some hands on work on people, my thought is, okay, how can I get this new air quotes, better pattern to be more efficient.

And when you do that, it's crazy. You'll see breathing patterns shift, like all like literally like right in front of you. Yep. Once I figured out that was the quote unquote key, it's Oh, instead of feeling like you're always trying to force it and you're like, Oh, why doesn't it stay there?

It keeps coming back. It's if. If you can just figure out whatever the thing is you're doing to make that more efficient Then your physiology is automatically going to switch and it's going to want to stay there because that thing is more efficient too

[00:15:30] **Luke Way:** Yep. Yeah. Yeah, like as soon as you start like training yourself and you That switch changes in your head that your respiratory system is a controllable system.

It has a range of motion that is You know it can be conditioned like, yeah, once you wrap your head around that, your body doesn't want to look back. It wants to keep breathing deep because it's so much more efficient for your system. You

like, it's a buzzword right now in, in terms of the respiratory training world, which is, like the idea of a big, deep, slow breaths.

And, lots of books have come out recently talking about these things and talking a lot about like nasal breathing. and nasal breathing, helping people with that sinusoidal wave pattern of breathing deeply and slowly. And so we're, we're augmenting that with focusing on that, those respiratory muscles.

The rabbit hole goes deep when it comes to stability and lifting and power sports, right? Cause your diaphragm is integral to that core stability. It's wrapped around your spine. It is is important in being able to stabilize all of that stuff. And so if you don't have, good, respiratory development, good, diaphragmatic development, and chances are once that system goes into stress, the rest of the system starts to fall apart.

We see there's a lot in CrossFit.

[00:16:40] **Dr Mike T Nelson:** Yeah, I remember I used to pull up videos when I was teaching of back in the day when Rich Froning was just destroying everybody in CrossFit and people were like, Oh, but he's just a better athlete on something like, but I'm like, but watch him like he very rarely, whatever red line, but he could breathe completely independently of every movement that he did.

And I would show videos of them because the guy's out there shirtless working. It's easy to watch. And people are like, I don't know if that's important. I'm like, how can it not be important? Like you have to lift heavy stuff and you have to do it over and over. And if you can be more even efficient and hold those positions, you're using literally less energy per se for you as an individual than if you're not.

[00:17:24] **Luke Way:** 100%. 100%. There's two things I could touch on that. Like that metabolic efficiency of how much energy the the respiratory system uses. And this, I don't know. Other term that, that is an amazing term. It's called a Metaba reflex. And you've probably heard of it. It's the the shunting of resources away from the working muscles to save your vital organs.

And so it doesn't matter how strong your legs are and you're doing some, exercise, some modality. It really doesn't matter how strong that system is. If your respiratory system runs into problems while you're in the middle of competition or in the middle of training, that metaboreflex kicks in and it shunts resources away from those strong muscles and protects the brain.

The lungs, it keeps you alive in that way. And so, yeah, those big strong muscles then actually don't have the resources they need to succeed. And so the lungs, by proxy are are limiting the rest of the system, which is why conditioning that system is so important. And then, there's the research behind how much energy it takes to just breathe.

There's lots of literature out there that is, that shows that the amount of VO two calories, how many calories it requires for you to just breathe at submaximal intensities is like in the realm of like 10 to 12%. And some like some people are outliers and they it's even more and of course like everything is a spectrum There's some people that are really inefficient And some people are much more efficient that typically has more to do with the type of conditioning They've done as we get up towards more thresh threshold to you know Your ftp or above that second threshold that shifts like pretty grandiosely, partly because of that metabolic metabolic reflex where the respiratory system requires a heck of a lot more energy.

And so it really if we can improve on that on that efficiency of the respiratory system, that it doesn't require as much energy to ventilate as much, then that's more resources to either go towards power or the endurance of what's happening or recovery later. Ultimately it's, I like to think, I don't like to think it's the reality is that the, whatever exercise you're doing, it really starts and finishes with the breath.

We need to breathe that oxygen in the production of energy. That ATP energy produces CO2 and that needs to be ventilated off.

[00:19:46] **Dr Mike T Nelson:** Yeah, I'll come back to the efficiency of breathing too. And if we back up and look at a super high level view, would you agree that if we divide the body into three systems, we'd have kind of the muscle skeletal, we'll say the cardiac blood flow ish, and then we'll say respiratory.

Would you agree that if we try to piece out systems, that'd be obviously the neurology is running and there's a whole bunch of other stuff you can get to undo, but

[00:20:15] **Luke Way:** Three, those thoughts about that as arrangement for Yeah, those are three major systems for sure. And three food groups if you will of the assessments that we conduct.

And those are our three primary movers for sure.

[00:20:27] **Dr Mike T Nelson:** Yeah. My question related to that, and I've, we've had Evan Picon on the show before and he is got a whole, very cool system using devices and stuff, and I've taken some stuff from Daniel at Peno and a bunch of other places, but. How would you determine what is the limiter there?

So if we've got respiratory, we've got cardiac, we've got muscle skeletal, how would you know an athlete comes in, and you're like, okay, cool, how do you know which one of those would be a limiter? And the follow up question, which may be related, is, do you think those limiters change over time? Or even session to session?

What are your thoughts on that?

[00:21:06] **Luke Way:** Yeah. Okay. So, yeah, let me answer that first by talking about how we look at these different systems and how we would train these different systems. And so, what, it doesn't matter what system we're looking at. We try to focus on, all right, are we, if we're talking about the cardiac system, we're talking about the muscular system, are we looking at it through the lens of its functionality? Are we looking at it through the lens of its structure, right? The structure is like the building blocks there within, right? What physical building blocks do we have to work with? The function is like, how well do you use those blocks? And so the analogy that I like to use is, a seven foot two tall guy walks in the room and has big shoulders and long arms.

Can you say without a NBA star? The answer is, well, I don't know, because that guy has the structure that could be beneficial as an NBA star. But we have no idea if this person can walk or run or dribble or shoot or anything, train at all. And so that's the difference between that structural ability and that functional ability.

And so when we're Trying to break down the assessment with athletes of how to, properly train or focus on those limiters it's first. Okay. Like high level, what system, cardio or cardiac system, pulmonary system, muscular system, which one seems to be the shaky wheel first.

And first of all, the type of tests we do has a lot to do with determining that. For a CrossFit athlete doing an hour long assessment is probably not the right move because nothing they do is that long, right? They're very power based, like as, as far as I'm concerned, they're very power based sport.

Whereas like an Ironman athlete, a 15 to 20 minute long VO2 max test doesn't reveal anything. It really just shows how well they warm up, right? And if they can get warm enough to mobilize some, some cardiac system to drive their VO2 number up. So pairing the right test for the right athlete is the first step.

And then trying to tease out, those those limiters. And so we try to we use as much technology as we can get our hands on Moxie monitors, high level heart rate monitors water sensors, stride sensors core temperature sensors, VO two master all that sort of stuff to understand, exactly what's happening and when and how it, streams throughout a long, a long test.

And from there, we build an argument, right? As everything is in the body it's a, nothing is a, is a threshold. As much as we love to draw these lines in the sand, the body is it can go either way if you're close enough to where that threshold might be. And we've proven this again and again, but we can talk about that later.

So we try to build an argument. And so we use something like the Moxie to understand, okay, like the trend changed for your ability to oxygenate the muscle at this intensity. And that was followed up by, a noticeable change in coordination of you being able to run on the treadmill. Alright, so we have a couple of indications that there's some neuromuscular, muscular limitation that could be at play there.

We look at respiratory. Our respiratory looked, okay, no, the respiratory didn't fall apart for another couple of steps. Alright, so, we're clear that the first shaky wheel was that, muscular system. And then we, we build the argument from there.

[00:24:27] **Dr Mike T Nelson:** Got it. Yeah. And for people listening, the Moxie monitor, which I have them to shout out to Roger, who I've known for many years, it's a nearest device that shines a light into the muscle.

And it gives you an idea of what's called SMO2. It's just basically how locally. You're actually using oxygen, which can be actually super useful because there isn't too many other local measures. You can get Evan Picon has his device, which is a Knox device, which is similar. Yeah, if people are watching video, there's a Moxie monitor right there.

[00:24:55] **Dr Andrew Sellars:** Yeah,

[00:24:56] **Dr Mike T Nelson:** there you

[00:24:57] **Dr Andrew Sellars:** go.

[00:24:57] **Dr Mike T Nelson:** And then do you typically do, I know with Moxie, it's very common to, let's say someone's doing a bike test, right? Just to make it simple, you stick a Moxie monitor on their right quad, their left quad. Yeah. And then maybe they're left deltoid. So would you agree that you're looking at one you could look at then changes left to right if they maybe have any weird asymmetries again position makes a little difference.

Yeah, but do you then look at the legs then compared to what's going on in the quote unquote non working muscle to determine anything?

[00:25:29] **Luke Way:** Yeah, so, I don't know if you're familiar with Sean Seal out of Upside Strength. He's a actually a Canadian guy that moved over to Switzerland. But he has a great podcast and he actually turned me on to this idea of putting Oh,

[00:25:40] **Dr Mike T Nelson:** what's the name of the podcast?

[00:25:41] **Luke Way:** Upside Strength.

[00:25:43] **Dr Mike T Nelson:** Yeah, I've talked to him. I was on him years ago. Yeah. Super cool guy.

[00:25:47] **Luke Way:** Sean's great. We love Sean. Yeah. So, yeah, he turned me on to the idea of of putting it on a arm or a deltoid to get a a control, right? A control of the non working muscle. And in certain cases, it's a really useful tool because we'll see a pretty hard to decipher trend with the muscle oxygenation at the leg where.

At the deltoid we can actually see the shunting of blood really nicely. So you'll see basically a

[00:26:16] **Dr Mike T Nelson:** drop off like it's good and all of a sudden it's Like off the cliff it goes

[00:26:19] **Luke Way:** exactly right and so it's very it makes it much again another Check mark in that argument that we're trying to create, you know Never relying on one thing to be like, yes, this is exactly why because of this one data point That's all we'll know We need to build an argument that, that supports that everything is pointing in this direction.

And if it's not all pointing in that direction, that, that's an interesting conversation to have. It's okay to be a little bit unsure and to explore deeper. And that's what I feel like is a little bit broken sometimes with physiologic testing is the idea that you get one and done and that's all the results you need.

And that's just not the way it works. One and done gives you enough information to ask more intelligent questions. And so then we can devise, a session, I work with a one of the best CrossFitters in the world. And that's exactly what we do. We build a test protocol that's going to be relevant for what he's working on right now.

We build an argument about what systems need to be trained. And then I design a workout essentially that we can. Put all the sensors back on and see, Oh yeah. Okay. Perfect. We nailed it. Or Nope. Like he's doing fine when I thought he'd be falling apart. So great. Then I'm quite happy at being wrong because then I know that's not the right avenue to go down and we get to look somewhere else.

[00:27:40] **Dr Mike T Nelson:** Yeah. I think that's a nice. Thing about following of using technology or using moxie during training or different mythologies is that you get data to see if your testing was on the right path or not. Cause that's happened to me a few times where I've gotten burned, where I've done some testing and I'm like, yeah, I think this is it, especially early on where I was probably a little too,

[00:27:59] **Dr Andrew Sellars:** I

[00:28:00] **Dr Mike T Nelson:** went through a period where I did not use any protocols at all.

Then they got super heavy into the protocols. Now I've just tossed a lot of them out the window, to be perfectly honest. But when you follow up with the testing, then like you said, that gives you a way to determine, Oh, cool. We were right. Or oops, I don't know. We've done this workout twice. Now I thought we're going to get this result.

We got this result both times. That's what I was asking about testing because I've seen a couple of weird things where You know after the testing I'm like, ah, I'm pretty sure this is you know, a cardiac limit Here's the thing we need to do when we started doing that It was very apparent that wasn't true on a handful of times.

I got to retest some people now like a week later It was like something else was a little bit different. Yeah, no, so I think without the follow up in the actual training of some markers, it's easy to do testing. And I think you can potentially be off base for 12 weeks without knowing what's going on.

[00:28:59] **Luke Way:** Yeah. It's very easy to be convinced of your own brilliance and, it takes, true ingenuity to, to be able to step back from that and be like, okay let's try to prove this wrong and prove it wrong right away. And that's what working with Andrew is, has really been nice because I just, I can hang my ego at the door and I know that I'm not the smartest person in the room and we can just explore and learn every single time we have any athlete on the table, we get to figure out what's going on.

And it's a fun exploratory puzzle.

[00:29:31] **Dr Mike T Nelson:** Yeah. And we'll get back to the respiratory system, but to follow up on the If you have a deltoid muscle where it just goes off a cliff, do you think that's an indication of a cardiac limit? So the thought being, maybe the cardiac system can't distribute enough blood volume to the working muscles, so therefore it's trying to cheat and steal muscle away from the deltoid to try to get it to the more of the working muscles?

[00:29:59] **Luke Way:** Yeah. Yeah. So I would be looking at THB as well. So THB is a marker, right? Yeah. Yeah. So total hemoglobin. And if we see like a systemic drop in total hemoglobin and we actually see that blood flow drop at the leg, at the arm and like that, to me leads more towards a cardiac limitation.

Now it could also be if it changes the other direction, it could be a respiratory limitation, right? Because you have a vasodilation of the system where it increased CO2 that you can't keep up with causes a systemic vasodilation response. Yeah, exactly. So we can tease that out in, in that way.

I always try to like, yeah, look at it in terms of an argument and having it just drop at the shoulder is A good indication, but what happened to the HRB, right? Did HRB also change trend at that same moment? What happened to the VO2? Cause that's a good indication of of cardiac output and how well did that have any sort of trend changes there too?

And so trying to build an argument that okay, oh yeah, all these like stars are aligning in this one pattern. And so it makes sense that this is a a cardiac limitation. But then like we just talked about, right? Then, all right, so if it is a structural cardiac limitation, Let's put a backpack on them, give them, five extra

kilograms and go and do a two hour hike, once a week and on top of the rest of your training.

And we'll come back in, six weeks. And if we nailed it, then we should see these things disappeared. That low, like trudging along with extra weight should be enough cardiac demand at a high stroke volume that we should see that system get better.

[00:31:42] **Dr Mike T Nelson:** So as a theory there, you're basically trying to Increase the amount of blood flow back to the heart.

If you can get any sort of that, my little Eric quotes here, diastolic stretching you're literally just trying to get as much blood flow through that cardiac system as you can without pushing it into higher workloads. And then you're going to expand that in the time domain. So you're just going to do a lot of volume of that low to moderate.

Zone two ish type stuff.

[00:32:10] **Luke Way:** Yeah, and so, so, the reason why I like the idea of loading on a pack, with extra weight and hiking hills in particular is because The reason why that's really great for cardiac structure and strength is one, the intensity is low enough that your heart can stretch itself out, right?

It can, it has enough time to actually go through a full compression cycle. Now, if you start increasing the intensity too fast, then again, our body does whatever's easiest. And typically what your heart will do is get smaller and faster. And so we're not, no longer stretching the the organ anymore.

It's just beating really fast and out of control. And so we want to keep that intensity low enough that the heart is stretching itself out. Now, adding the extra weight creates a little bit more demand metabolically on the system. But what I like about it is that it creates muscle tone, or you have a long muscle tone.

And that muscle tone actually creates tension among the circulatory system. Makes it harder for your heart to push blood down through the system and actually get venous return. And so, because of that, the heart gets totally isolated and it's if it is the limer, it's gonna really struggle with that.

And so we can generally what in my experience, what typically happens if we do this type of workout with somebody with a clear respiratory limitation or not cardiac limitation is that they'll come back from it and be like, yeah, I need to, I

need a nap now. Like they're not as exhausted as say an interval set, but the type of exhaustion is like I need to sleep.

Really interesting.

[00:33:51] **Dr Mike T Nelson:** So that would be a little bit different than doing it on a bike because on a bike you would have more. Constant blood flow, but you have a little bit of the contract relaxed because of the cycling position, and you're more unloaded, I guess you could say.

[00:34:05] **Luke Way:** You can do it on the bike and I have successfully done it on the bike as well.

But you just need to go with a lower cadence. So 50, 60 RPM. So long enough contraction time that you have a couple of heartbeats per contraction. So it's having to push through that. That tension.

[00:34:22] **Dr Mike T Nelson:** Do you think there's a role for, I got this from my buddy Cal Deets about, I was talking to him.

I asked him the other day, I said, Hey, if your athletes are healthy and you've got six weeks and your only goal is to say for the sake of argument is you want to drop their resting heart rate as fast as possible. What would you do? And I knew what his answer was, but before talking to him or knowing him, I would have thought, ah, it's going to be a rubbic trans to me, GPP.

And his answer was Supra Max heavy isometrics with breath holds. And I was like, what are you, the first time I heard this, I was like, okay, man, you're out of your tree. I don't know about this. But then he started showing me like all these athletes that he was doing that with. And the argument is that you're so far on the other extreme because you're contracting so hard under tension that it appears to do something I think related to vessel dilation Yeah, it just allows the system air quotes here to open up and like he's had athletes dropped from you know resting heart rates of 45 to 37 like Some pretty crazy stuff.

I don't know what your thoughts are on that. Like I'm also intrigued and also scared at the same time.

[00:35:42] **Luke Way:** Yeah. As long as they're not passing out or anything like that, but right. Yeah.

[00:35:45] **Dr Mike T Nelson:** It's all safe. They're in a safety squat rack and they're safe instructions. And these are all very experienced athletes on top of it.

So,

[00:35:51] **Luke Way:** yeah, exactly. So yeah I'm wondering. So with the breath hold under super max load, how long is the contraction?

[00:36:02] **Dr Mike T Nelson:** Usually he's doing either an isometric or a long eccentric. So isometrics are six to 10 seconds, somewhere in there.

[00:36:10] **Luke Way:** Yeah. Yeah. Interesting.

[00:36:12] **Dr Mike T Nelson:** Yeah. And I was asking him like, well, what do you think the mechanism is?

And he's bro, there's so much tension. You just blow those blood vessels open.

[00:36:20] **Luke Way:** Yeah, yeah, there'd be a strong argument around the pressures that your diaphragm is inflicting on your heart.

[00:36:28] **Dr Andrew Sellars:** Yeah.

[00:36:28] **Luke Way:** Right? So when you're contracting that hard and your diaphragm is holding an eccentric an isometric the amount of pressure that your heart would have, would be under would totally mess with like it's rhythm in, in, in a fine way.

I can't imagine it would be massively detrimental unless you had a, some sort of cardiac, event. But yeah, that would, that sort of makes sense of me. I want to explore it a little bit. It's an interesting idea for sure.

[00:36:57] **Dr Mike T Nelson:** Yeah. So I'm in the process. Once I'm stopped traveling so much, I'm going to try it on myself.

And I've tried just a couple of short runs and it is weird. Like the next day, like my resting heart rate will drop two, three, four beats. My HRV will go up. So it's interesting. So, yeah.

[00:37:14] **Luke Way:** Yeah. That, and the fact that you're, quoting that it's a day or two of change and not just like an instantaneous, like the next five minutes, that thing.

[00:37:23] **Dr Mike T Nelson:** Yeah. That's the first question I asked him. I'm like, So do you think these are like permanent changes? Are we just seeing some, like acute change? And he's no. So he'll do an aerobic GPP block for six to eight weeks. And then it is advanced athletes. They may do eccentrics and then go into a set of heavy.

Isometric with a 120 percent of max, that kind of stuff, and then they'll go into more of their speed and power stuff. The thought being you're getting the aerobic system online, you're getting the soft tissue, you get the ability to decelerate and hold tissue and you get these nice cardiovascular adaptations and then you transfer that into kind of the rest of your program.

So

[00:37:59] **Luke Way:** yeah. Nice. Andrew, you're you're on mute, but welcome.

[00:38:04] **Dr Andrew Sellars:** I'm really sorry I'm late, guys. Thank you. No, no worries. It's great to it's nice to meet you.

[00:38:09] **Dr Mike T Nelson:** Yeah, very nice to meet you. Thank you so much for being here. I appreciate it. It's my pleasure. Yeah, we're just jamming away here about different limiters and systems.

[00:38:19] **Luke Way:** Yeah, so I've briefed him on on our BPA protocol sort of thing and how we look at structural versus functional and the whole spiel about about respiratory training.

[00:38:30] **Dr Andrew Sellars:** Excellent. Well, then you've done all the work. That's perfect. What do you need me? What do you need me for?

[00:38:40] **Dr Mike T Nelson:** And then what are some things that would tell people who are listening that they have an actual respiratory limit?

And then we'll get into how would you change it?

[00:38:49] **Luke Way:** Yeah. So. That, that can manifest itself in a couple of different ways the easiest way for us to understand respiratory limitation,

without any in depth testing is is like spirometry, that's really quite easy to do. Explain that for

[00:39:06] **Dr Mike T Nelson:** the listeners who may not be familiar with it.

[00:39:09] **Luke Way:** So spirometry is the the simple test that can be done at most GP offices where you just take one ideal exhalation breath and it measures how big your lung volume is or how big your, ventilatory capacity would be. And it looks at your strength over the first second.

So the numbers that we're interested in looking at are what's called your FEV1 or your force exhalation volume over one second and your force vital capacity or how big the total breath was. And when we combine those two numbers, the FEV1 tells us how powerful your lungs are in relationship to how big they were.

And so, if you're below 50 percent in the first second, then that's not a really good thing that is a pretty typical COPD sort of scenario, whereas most athletes are going to sit somewhere between 65, 75, somewhere in there, and then a well trained set of lungs can get all the way up towards 90, 95 if they're very powerful.

And so with those numbers alone, we can tell a lot with their respiratory system. To get a little bit more in depth. We employ tools like the VO two master to understand how their actual ability to breathe while doing a different modality, whether it's, the echo bike or biking or running or

[00:40:29] **Dr Mike T Nelson:** like a metabolic heart then.

So you're measuring all the air going in and out and everything.

[00:40:33] **Luke Way:** Yeah, but almost more importantly than the VO two number is the mechanics of how you're doing it, right? The, so ventilation is your liters per minute. Your title volume is how many liters per breath. And then your respiratory frequency or your breath rate is a, how many breaths per minute.

So breath rate times title volume equals ventilation. And so you can meet that ventilation number by breathing deeper or breathing faster. And. That in itself reveals how your body compensates at different intensities. What typically happens with an untrained or unconditioned respiratory system is that it's controlled and somewhat linear and how it is affected by the change in intensity to a certain point, we'll call that a balance point or a threshold.

And at that point, Typically happens with the untrained is their tidal volumes drop usually pretty dramatically and they compensate with a respiratory frequency. And so they breathe really fast and they pant to try to keep up. And unfortunately that really cascades things out fast because it, There's a whole series of mechanisms that are going on here, but probably the easiest one to describe is the idea of dead space.

Everybody has dead space between their mouth and their lungs in the form of your trachea and your bronchioles and bronchial tubes, and that's just plumbing to get air to and from your lungs. It doesn't, Permeate gases at all.

[00:42:08] **Dr Mike T Nelson:** Yeah. So places where you're just transporting air, you're not doing any air exchange or anything like that.

You're not getting any oxygen in, not getting rid of any CO2. It's just going by.

[00:42:17] **Luke Way:** Yeah, now Andrew's better at the math, so he might chime in with the actual math, but from what I understand that the typical plumbing involved, the dead space is about 200 to 250 milliliters of volume that you have to move around.

Now, the more times you move that per minute is the more dead air you breathe every minute. So the bigger your breaths are, the less dead space you're re breathing every single minute, if that makes sense.

[00:42:43] **Dr Andrew Sellars:** Yeah, the really simple math is if you're breathing 20 breaths a minute and your dead space is 200 mils, then you're breathing about four liters of dead space.

So it's four liters of air you're moving that isn't actually involved with any air exchange or gas exchange. If you double that to 40 liters or 40 breaths per minute, you're doubling that to eight liters. And if you're breathing It's a minute you're breathing 12 liters of air that is not actually involved in the air exchange.

So it's wasted movement. So if you can shift from breathing 60 breaths a minute at one liter per breath, which is 60 liters per minute, and you breathe 30 liters per minute. 30 breaths per minute and you're able to cut that in half. You're cutting your dead space in half. But you're also expanding the amount of total air you're moving just by taking bigger volumes, breathing half as often.

And that's always, for us, that's always the goal, is to be as efficient with your breathing mechanics as possible. And for most people that are unused to this, it's slowing down their breathing and taking bigger breaths.

[00:43:47] **Dr Mike T Nelson:** Yeah, which if anyone's ever, that's one of the reasons I do a fair amount of nasal breathing with athletes at somewhat of a cadence at even sometimes higher workloads, because if you do enough max tests, one, you get bored.

So you just look for other stuff and watch all the numbers in the metabolic heart go by. But it's amazing how many people in the do testing just either watch the metabolic cart only or only look at the athlete. Like you should, in my opinion, you should be looking at both, right?

[00:44:13] **Dr Andrew Sellars:** Yeah.

[00:44:14] **Dr Mike T Nelson:** And you can do it long enough.

You can see changes in the athlete where they just become inefficient. Like you don't even need to look at your respiratory rate. You can see what's going on and usually I'll then have them train below that threshold and I'm like, just cadence. It might be nasal in mouth out, it might be certain breathing.

And it's weird because they're like This feels utterly horrible. And if you could just get them right on that edge, but then when they go back to do a max test, usually what I found is it transferred, right? You find that like you're talking about efficiency, that inefficiency spot, you kind of work that, and then when you put them back into it, they can coordinate thorough. Is that similar to what you guys are doing?

[00:44:59] **Dr Andrew Sellars:** Absolutely. You've nailed it. Is that if you can help people understand and control their breathing, it will lead to improved performance. And that's exactly what you're noticing is that the initial response is. I can't control my breathing.

My breathing always just does what it does. And it is really uncomfortable for a lot of people to adjust that into a controlled breathing pattern. But once they have control of their breathing pattern, they can actually improve their performance because they're controlling one of the aspects that is.

allowing for improved efficiency just with learning how to breathe properly. And your idea of breathing through the nose is brilliant because it does, it slows

breathing down, humidifies the air, makes it a slower passage of air. There is some limitation through the nose compared to the mouth, not much, but a little bit, but it does slow things down and it just allows for a better diaphragmatic recruitment.

And so you'll have better breathing mechanics, breathing through the nose. And so the longer people are able to breathe through their nose, even into that sort of higher intensity workload, the better off they're going to be in the long run because they're breathing more efficiently and absolutely. If they're breathing through the nose, they won't be breathing 60 breaths a minute.

They can't, it just, it automatically slows them down. And probably the biggest effect from people breathing through the nose is them slowing their breathing, downing. And reducing the dead space that they're moving and being more efficient with their diaphragm. And that's exactly part of the process of respiratory training is breathing properly.

And that's incorporating your diaphragm as the major muscle for moving air and not relying on the intercostals and the accessory muscles of the neck.

[00:46:37] **Dr Mike T Nelson:** So if you're looking at a metabolic heart, then are you looking at the respiratory rate and you're just comparing that to the volumes, right?

And you're looking for the place where they just like the respiratory rate. Starts going up, your volumes start crashing down.

[00:46:50] **Dr Andrew Sellars:** Yeah, absolutely. So the a scientific literature on ventilatory thresholds with VT1 and VT2 are really based on ventilation changes. But again, if you're having access to a metabolic heart and you're looking at the numbers, then the ventilation is made up of respiratory frequency and tidal volumes.

So every time you see a respiratory frequency go up, you'll almost always see the tidal volumes go down. And so The balance of that leads to the ventilation. So the delay in the ventilation changes happen. Originally from the respiratory frequency. So it doesn't matter which one of those you look at, you need to look at all three of them, the frequency, the volume, and the total ventilation, and they will all play into each other and they all lean on each other.

So when you're looking at them closely, it's really obvious to see pattern changes. And so, the identification of ventilatory thresholds is really easy if

you're looking at all three of those numbers, because one of them will change first, it's usually the respiratory frequency will change first, and then you'll recognize an immediate shift of tidal volumes, and that will lead to a shift in ventilation, and that tends to be your first ventilation threshold that is identified, is that rapid increase in breathing when you go from ventilator.

Very easy exercise or walking pace to an easy jog base. And that's typically where that ventilation threshold happened. The first threshold happens and the second threshold happens not. unusually right around a balance point of your metabolic system. So when you start to shift towards higher sugar burning and consequently a higher lactate production is that's the second threshold.

And you're doing that to blow off the CO2 that's being produced from the increased acidity that comes from the burning of more sugars. And It's not a lactic acidosis, it's just a sugar breakdown that causes a higher CO2 release because of the acid that's being produced in the glycolysis.

[00:48:44] **Dr Mike T Nelson:** So would you say that if we get uber technical for a while in the weeds and then we'll back up, the VT2 generally corresponds with your RER getting close to one or going even above one?

[00:48:56] **Dr Andrew Sellars:** Yeah, I have a huge, I have a long standing issue with with using RERs. You're generally correct. The RERs are just a really bad, based on really bad science to just from, it's taking a really simple concept of how much oxygen is being produced from the breakdown of sugars and how much CO2 is being produced from the breakdown of fats and sugars and using two really simple equations.

To create a ratio with how much carbon dioxide you're producing versus how much oxygen you're taking in, but that it's a, it's an unfortunately a really oversimplification, which is why the RER can go above one because it is the human body is way more complex than just those two reactions and just those two equations.

So you can trick an RER just by slowing down your breathing. So if you run at the same intensity and cut your breathing in half, your RER will change. And so by definition, that doesn't make any sense. If you're running the same speed, just changing your breathing, doesn't change whether you're burning fats or sugars, but the numbers change.

And so, in general, I would say yes. In a, in an untrained athlete, an RER would represent probably close to VT2. I w I would think that those two overlap a lot.

I haven't actually used a metabolic cart for looking at that. Very well, but with the new advent of more and more people having access to CO2 measuring devices, then we'll be able to look at that a little bit more easily in a bigger populations.

That's the other problem is a lot of those research has done on really small populations. So, it's difficult to know with the current data because they're done on small sample sizes, but we're hoping to collect more and more data as as time goes on.

[00:50:36] **Dr Mike T Nelson:** No, that'd be cool. My, my research was a metabolic flexibility, looking at changes in RER to determine metabolic flexibility or not.

And I agree. So,

[00:50:47] **Dr Andrew Sellars:** so that gets actually a really good point about the differences. So the way you use RER makes a lot more sense because you're looking for what individuals happen to changes at different intensities. So by testing and retesting people, you'll have a much better use of the RER as opposed to using it as a single variable.

point. And this is the same problem as you were talking about using VO2 and only looking at VO2 and not looking at the incredible amount of data of what happens with respiratory frequency and tidal volumes of ventilation to improve efficiencies. So if you're using RER as a single point, which I would say has a number of problems with it, as opposed to using it as watching the shift occur in an individual and watching how different interventions change that shift.

And over time, how diet can change that and how exercise training and everything else can change. That those dynamics that you're recognizing as a dynamic situation. Every time an athlete walks on a treadmill, it runs on a treadmill and you move away from just using it as a single point, but looking at it as the trend in every athlete and how that trend can change over time.

And I think that's the right way to use RER as opposed to using it as a single point, like a VO2 max.

[00:51:58] **Dr Mike T Nelson:** Yeah. And I would, for illustrative purposes, I would put people on a treadmill, not turn it on. Yeah. Get a baseline. And then I would tell him just stand there and hyperventilate. You can do this with Moxie to stick a Moxie on, some of the muscles.

And if you really start hyperventilating, you're like, Oh my God, what's changing? And I'm not doing any more or less work. I'm like, yeah, cause you're provoking the system, right? You're in artificially in this case, inducing a change. But that change has ramifications. And people are like, Oh my God, like their heads explode.

But I'm like you have to understand that because if you're not watching the athlete and they start hyperventilating early, well, that's a good data you should want what's going on. And two, how does that affect the rest of the things that you're actually trying to measure? So that's like my pet peeve with some of the testing, but not rabbit holes.

[00:52:45] **Dr Andrew Sellars:** No, that's not a rabbit hole because that talks about CO2 balance. Right. And if you hyperventilate, if you over breathe for whatever intensity you're doing, or if you're over breathing at rest, it's really easy to see some of those changes. Really easy to demonstrate those changes. But the same thing happens if you over breathe at a walking pace or over breathe At a threshold pace, the same problem will happen is that you blow off your CO2, and when you blow off your CO2, it has profound effects on the peripheral vasculature.

It causes vasoconstriction of the muscles, so you can't get as much blood flow to the muscles. You can't get enough oxygen to the muscles. It also has a deleterious effect to the heart, because blowing out so, Higher levels of CO2 have a benefit to the heart. It causes stronger cardiac contractions.

It causes increased cardiovascular output. So having over breathing has a reverse effect on that actually inhibits the heart from doing high functioning work. So again, slow breathing, lower intensity breathing. And nasal breathing has a benefit to the heart and benefit to the peripheral vascular system to allow for better functioning of the overall system.

And I love the fact that you've done that at rest because it shows what over breathing does. It's really easy to see for your athletes like, Oh my God, if I over breathe at rest, it makes me feel awful. And this is the bad things that happen. The same, you can explain to them, then the same thing happens when you over breathe.

At every other intensity, so if you identify that they're over breathing at their 10k running pace They're still over breathing and if you can slow them down, it will have a better effect So I love that. I don't think that's the wheeze. I think that's the meat of this whole thing the

[00:54:19] **Luke Way:** good stuff

[00:54:21] **Dr Mike T Nelson:** Yeah and related to that and over breathing So some of the stuff I you know, I work part time for rapid health And so I do a lot of analysis of sleep using aura but the one thing that I wish I would have started doing like four years ago that I got from Dr.

Andy Galpin and Dan Garner and Brian McKenzie and some of those guys. The first time I heard this, I was like, cause in the past, I was always trying to resolve in my head, some of the, like the Bottega work and the thought of, Patrick McEwen stuff that we're all constantly over breathing and I read the book twice.

I just couldn't wrap my head around it. And then my blinding flash, the obvious was a year and a half ago when I realized, Oh. Aura has a respiratory rate at night, so when you're sleeping, assuming you don't have sleep apnea or anything else, your system is unloaded, you're at rest, you're not doing any exercise, so you get to see that float, like where does your system gravitate to when it's unloaded, and you start seeing more people, we'd see people come through with like respiratory rates of 17 and a half, 18, 16, and I'm like, oh my god.

And then you start looking at all the other stuff they've got going on. And it turns out that's a pretty damn good predictor that you've got some wheels that are not going so well. Yeah.

[00:55:40] **Dr Andrew Sellars:** I, yeah, it's I think over breathing is a, is now coming into the mainstream as an understanding of a symptom of a bigger, of other problems.

And there, yeah, so it touches on so many different things because it's poor functioning physiologically, but it also has psychological effects. It has yeah, the cardiovascular effects and the peripheral effects are simple chemistry, but the psychological effects of what happens when you breathe too fast and the shifting brain chemistry is is fascinating as well.

The stress responses that happen as a result of that, that are all, there's just nothing good about breathing really fast.

[00:56:18] **Dr Mike T Nelson:** And you talk to these people and a lot of times they tell you they have ADHD type symptoms, it's Oh, squirrel, like they have a

hard time sleeping at night. They feel like they're just, cranked up like all the time.

And. And so what some of the stuff we would do, I don't know if you guys would agree with this is Do lower to moderate intensity but have them do a slow breath cadence to try to Reset some of those co2 sensors in the brain the brainstem to accommodate these little bit paradoxically higher levels of co2 so that hopefully over time the respiratory rate will try to walk back down Would you agree with that approach or what would you do?

[00:56:58] **Luke Way:** Absolutely. So you talked about it earlier Like regulating people's breathing patterns with nasal breathing and in low intensity, efforts and we've you know, done this for many years, especially with runners. It's quite easy with runners because you can tie their breathing to a running cadence and they're running.

Oh yeah. It's typically quite stable. And so we can rely on that sort of metronome. And early on with people that have an issue with, Their respiratory systems typically will have a hard time holding even like a two and two pattern and two pattern means taking two steps to breathe in and two steps to breathe out.

So left, right would be two steps. And and so, yeah, just challenging these folks to Yeah, to breathe a little bit deeper, a little bit slower, switching to a three and three pattern or four and four pattern. Like I just finished talking to a guy at the lab, right before this podcast helping him understand that, yeah, he, his job over the next six weeks is to, breathe, six and six to eight and eight.

On his zone two works and we know that he can, he has the lung capacity to do it from his spirometry before the test. But during the test, just could not breathe deep, deeper than, 40 percent of what he's got. And that's actually a good indicator of of of a well developed, respiratory function is that ability to hold 70 percent of your, your total tidal volume, or really your FEV1 is your ability to hold 70 percent while you're running, while you're biking, while you're, So you would

[00:58:25] **Dr Mike T Nelson:** have a, you would test the spirometry at baseline, right?

So you'd look at the two numbers you talked about, and then you would have them get on say a bike or run. Bike will probably be easier at zone two and then test them while they're doing zone two, is that correct?

[00:58:39] **Luke Way:** Yeah, so we can do that. What more typically happens is we'll do a VO two max style test and and determine, these parameters and then send them out in the world and go and practice running at the same intensity or at a prescribed zone two that's found with the numbers and Instead of just allowing your breathing to go unchecked and you just react as a stressor you take control of it and you take 5, steps per breath, and And it, yeah, it profoundly changes their heart rate profile at the, like how relaxed they are, their endurance. And once you get good enough at this, marathoners are successfully able to do all of their pacing based off of their breathing because now their actual pace is tied to their ability to produce CO2.

Which is like how much ATP you're producing. So if you absolutely know that your sub threshold you can hold four and four breathing pattern, then yeah, you can go out and confidently know that you can run as fast as you can while holding four and fours until it's time to roll the dice and you sprint to the finish and then you would go two and twos to the finish.

But it just allows people to take a little bit more ownership of their breathing and train it as it would be a range of motion and and turn it into a strength.

[01:00:01] **Dr Mike T Nelson:** Do you find that lowers the cost of the training session? So what I've noticed, and I don't have, I'd say Enough data to say this with a ton of confidence, but what I've noticed After people get a little bit better and used to like a breath cadence Their hrv score is for the same amount of volume output the next day Don't seem to drop nearly as much and sometimes over time the baseline starts to go up faster I don't know if you guys have noticed that or what you've seen.

[01:00:29] **Luke Way:** Yeah. Well, I mean as you probably know Breathing rate and hrv are very tightly You know, tied together because of that. Yeah. So, that, that can result in, in, in weird HRV numbers. But let's assume you're

[01:00:44] **Dr Mike T Nelson:** using a paste breathing when you're doing the HRV. So we'll take that out of the equation.

[01:00:48] **Luke Way:** Yeah. So the way I would try to answer that question would be, trying to be clear about what the objective of the training session is. If the training session is clearly defined as zone to work with the secondary focus on developing your respiratory tidal volume at, under zone two load then yeah, then if you nailed it, you're going to be slightly more.

More tired. I have a longer recovery cycle because you absolutely nailed your limiters in that. If you were to cater to your strengths during that session, then it might actually allow you to recover a little bit quicker because you didn't actually train the systems that need training.

But I think Andrew had something to interject.

[01:01:32] **Dr Andrew Sellars:** Yeah. I was going to say something really similar. Just, if you. We've seen this a lot because we do a lot of respiratory training and we've done it over for a lot of athletes. If you push someone's respiratory system in training and they're not used to being pushed, they will be really fatigued the next day.

And they won't feel like their respiratory system is fatigued, they'll just feel a total body fatigue. And their heart rate variability will invariably be lower, When they're tired. So this has gone so far as we've worked with some mid range or semi elite athletes and who were good athletes, but they had a crappy respiratory system and we pushed them so hard with the respiratory training that they needed to take three or four days off of all training just to recover from the breathing training they did.

So it's not unusual to see. Numbers that illustrate fatigue after you've trained someone that feels like a really easy workout, a zone two workout for an hour, for a decent athlete, they should feel totally recovered at the end of that. But if you layer on top of that, some really challenging respiratory work that's new for them, it's like they're doing a whole new sport.

And so although the intensity is low, the challenge to the respiratory system fatigues them enough that it actually now has. effects on other systems. And the cardiac system has, is one of the system that gets affected and it's having to overcome the weak respiratory system. And what will happen is they'll be the next day.

They'll be feeling like they're short of breath, just walking to the grocery store or getting out of bed in the morning man, I'm just shattered. And if you put them on a bike and try and test them again, the next day they'll be like, I can't. And you're like, that's how bad your respiratory system is.

We just did. zone two challenge with a little bit slower breathing, we incorporated your diaphragm so tired that you can't function. So take the day off, come back, we'll test again, another again, and we'll just, we'll look at it until the recovery and using heart rate variability is a great way to look at that.

And if you're seeing the numbers are surprisingly low, or not having recovered, that's probably your respiratory systems finally got some training.

[01:03:38] **Dr Mike T Nelson:** Yeah, I see this weird, almost I should rephrase it like a biphasic response, exactly what you guys are saying. I'll ask the athlete and I'll say, Hey, how was your, just 30 minute zone two session with your cadence?

And if they're like, It was super easy. I'm like, you're doing it wrong. Usually they're like, I hated it. This sucks. What are you having me do? This is stupid. And then you look at their HRV the next day. They're like, you're an idiot. My HRV is lower. What are you doing to me? This is zone two stuff.

[01:04:05] **Dr Andrew Sellars:** We're training you. This is my favorite quote from

[01:04:07] **Dr Mike T Nelson:** one of my

[01:04:08] **Dr Andrew Sellars:** mentors is training doesn't make you better. Training makes you worse. And recovery makes you better. So when they're worse, the next day is because they finally trained all the other stuff they did that, that they recovered from the same day.

It wasn't training. The training was now you've shown that you're actually training now recover, we'll test you again. Another day. Yeah. And that's, yeah. That's really I've seen their

[01:04:31] **Dr Mike T Nelson:** baseline get better after a few weeks of doing it though. So like chronically, once it starts getting easier, I have seen their baseline go up, but I agree, like

[01:04:39] **Dr Andrew Sellars:** it needs to, it's a weird

[01:04:40] **Dr Mike T Nelson:** stressor.

Yeah.

[01:04:41] **Dr Andrew Sellars:** And if it doesn't, then you're overturning them, right? And this is, and that's the benefit of having that based on data is. Your expectation is for it to get better over time, not day to day, but week to week, month to month and over the years. And that's what our philosophy has always been, is that we're looking for long term improvements.

So that we can deal with the day to day fluctuations by explaining to people, training is going to make you worse. And once you recover, you will be better than you were before, but you need to recover each day and you need to recover each system appropriately. And if you're really fatigued from what seemed like a really easy workout, You need to understand what the training effect was.

And if you've added breathing on top of what you were doing before, that was really easy, it's probably the breathing and yeah.

[01:05:26] **Luke Way:** Yeah. I was going to talk about just buy in from the athlete, because if. if it's very clear, and we talked about this earlier, it's very clear what the objective of the training session is, that it is challenging the respiratory system in this way, then everybody should be quite happy that you nailed that to a cross.

And now, you're totally fatigued and you need days off. But if the expectation of the athlete is, well, normally zone two work, I can do, 20 hours of that a week. And now I can only do six. It's that hurts their ego, that hurts their expectation of what they wanted to get done. And so it's just about truly committing to the idea of what actually needs to be trained.

And educating the athlete in a way that allows them to understand that yeah we're putting our thumb on something really important. And sometimes that makes sense, sometimes that doesn't, right? We had our hands on one of the best triathletes, Ironman triathletes in the world this past year.

And and we identified like some major things that were low hanging fruit for this person. And the type of training that we might have given this person, if they if they were just an age grouper, would have been probably a lot more aggressive because they have the wherewithal and the leeway to to take a few weeks easier.

Of what they're normally used to doing but this person being at the pinnacle of the sport It's we don't really need to turn the dials that much We just need to see a small change and that small change yielded big results, which was fantastic for everyone

[01:06:59] **Dr Mike T Nelson:** Awesome. And so how does your device play into this?

My thought is It looks like it's just a way of putting the respiratory system under load, and you can explain more about how you would use it. And the follow up

question is, what do you look at for efficiency before adding load? Because one of my pet peeves, and I'm not saying you guys do this at all, that's why I'm asking, is the thought of just, Training your respiratory system without looking at the efficiency.

So I think of it as like squatting. It's okay, if your squat pattern is horrible, do I want to shove like several hundred pounds on you as a newbie? That sounds like a horrible idea. Maybe you should look at efficiency first, how does that play in, and then how do you add training on top of it?

[01:07:44] **Luke Way:** Totally. Okay, cool. So, respiratory system has that effective range of motion and it biases towards the center because of under training or under conditioning. And so if we were to just add load, add constriction, add weight to our respiratory system, then the literature is pretty clear on this, that you in the best case scenario, you become stronger at breathing that poor range of motion.

Right. And what we want to do is just what you just said is teach the technique of actually accessing greater range, which is why our tool, it actually doesn't focus on that constriction, doesn't add that load. The load comes in the way of volumes that you're moving. And so the device itself is not constriction.

We have modules that you can purchase that add constriction later when you're ready for it. But for most people it's like doing metabolic testing on swimmers. It's well, Are you that good of a swimmer that your metabolic system is holding you back? Rob, like I have one of the best swimmers in the world that I work with daily, and he still is primarily limited by technique.

And so if we can just improve your ability to breathe well, that has massive implications down the road, way more than you having, artificial asthma.

[01:09:01] **Dr Andrew Sellars:** So I'll add to that is all. Yeah, please. All of our programs focus on proper breathing technique first. And so there's an education involved with every program and teaching people proper breathing techniques before they start training those techniques.

So that. Stage one is learned to breathe and then the next part is learned to train your breathing and then the next ones learn to incorporate your that trained breathing pattern into your sports and then there's learning to race with it. And so, it always goes back to learning to breathe and it is a fundamental aspect of how do you engage your diaphragm how do you learn how to use that what

positions are easiest to unload the other muscles and actually feel your diaphragm moving and are you moving it properly before you start.

challenging it in all the different ways that we can challenge the breath, the respiratory system by increasing volumes and increasing respiratory frequencies and things like that. The focus has to be on proper breathing technique first.

[01:09:59] **Dr Mike T Nelson:** So would you go with more of a volume based approach before intensity?

It sounds like them because the volume would, And use that excursion into a full range of motion to promote better breathing techniques and then air quotes, add the muscular activation on it.

[01:10:17] **Luke Way:** Yeah. So like to walk you through like the onboarding process of starting something like an isokapnic respiratory training program the very first like start here type program is like literally let's just assume you don't know how to breathe.

And so one hand on your chest. That's a pretty good

[01:10:34] **Dr Mike T Nelson:** assumption for most people, unfortunately. It 100 percent is. And people are like,

[01:10:37] **Luke Way:** well, no, like I know how to breathe, but I just, I can't tell you how many people come into the lab and they literally breathe backwards.

[01:10:44] **Dr Andrew Sellars:** They,

[01:10:45] **Luke Way:** their chest moves up and their belly moves in when they breathe in and it should be, almost the opposite of that.

And so, we start out with the very first thing and your listeners can follow along, but one hand on your chest, one hand on your belly. And as you breathe in, I want you to just keep your upper hand, in the same spot. And as you breathe in, your bottom hand should push out. Right, filling your belly with air.

And then as you breathe out, you're going to squeeze that belly button towards your spine. And that's the movement that we start with. Once you learn how to coordinate that well, then it turns into a 360 breathing pattern where it starts from the belly and it builds up into the chest from there, but it doesn't It like our

diaphragm is by far the biggest mover here and we need that thing to function well and for whatever reason we could speculate on why but for whatever reason people forget how to use their diaphragm properly.

You look at my two year old kid here and he does almost exclusive diaphragmatic breathing. At some point between that age and puberty, we forget how to breathe and we start breathing chesty and really pulling the belly in the whole time. So absolutely. We start with that with that technique.

And then, if without any further data, then we move into volumes and we then move into more of a coordination and power. But in the perfect scenario we, check to see. Is, is this person breathing with good volumes for how tall they are? And so then we can focus on that specifically for them if that's their limitation.

For some other people, it might be a function. Every time they get above 35 breaths per minute, they fail. Right. They fall apart. It's okay, perfect. Let's like teach you how to breathe well and have endurance behind 35 to 45 breaths per minute. And so the, what you can do when you're not worried about hyperventilating with your respiratory system really unbridles everything that you could get creative with how you train that system.

Yeah, we can do everything from like altitude training to pre altitude conditioning to CO2 tolerance training that we're doing with hockey players. It's really remarkable what what practitioners are doing all over the world with this.

[01:13:03] **Dr Mike T Nelson:** Yeah. And explain that a little bit more, cause I think people might've missed that about, you said, breath training without hyperventilating.

So, someone who's listening might just think. Well, I don't like 35 breaths per minute, man. That sounds like hyperventilating. What's going on?

[01:13:17] **Luke Way:** It's really easy to to demonstrate for everybody because if everybody listening to this, don't take more than this, but let's say take five deep breaths fast, right?

So if you actually do that, you'll notice that after about the third or fourth breath, you'll start to feel a little bit woozy, we'll say.

[01:13:34] **Dr Mike T Nelson:** Yeah, it's the Wim Hof breathing type thing, or two mode breathing and all the different techniques there.

[01:13:39] **Luke Way:** They say go as deep of an experience as you want to experience, which is just the blowing off of CO2.

You're vasoconstricting your system and that causes your brain to change its blood flow, namely getting less blood. Yeah. If you do that. Enough. Your brain then deems you as no longer responsible for the piloting of this human. And it puts you out of commission for a little while. Or seeing

[01:14:04] **Dr Mike T Nelson:** really weird shit.

[01:14:06] **Luke Way:** Possibly. I may have tried this.

[01:14:08] **Dr Mike T Nelson:** Don't do it in water. Start laying down. Yeah.

[01:14:11] **Luke Way:** So, so yeah, what our device allows you to do is hold on to enough CO2 that it is no longer the limiter on challenging that system. You can breathe as hard and as fast as you, you can prescribe. And that's the best way that I can describe it because Again, for some people, two minutes of breathing weight training is plenty is all they need.

And, I have a five time world champion that does this for 30 minutes a day. So it really just depends on the person and what their focus is and what they're trying to do.

[01:14:45] **Dr Andrew Sellars:** Yeah, so that whole balance of CO2 is what, when he talks about hyperventilating. So, the definition of hyperventilating is breathing too much.

And if you're at rest, it only takes four or five breaths to breathe too much, if you make them forceful breaths. So, to not breathe too much, you have to have enough CO2 in your system. And so, if you re breathe some of that CO2, and it is a little bit like a glorified paper bag. If you breathe into a paper bag and you re breathe some of that CO2, you can breathe for a lot longer, a lot deeper.

before you reach an uncomfortable situation. And our device is made so that you can breathe indefinitely as deep and fast the breath as you want. And it's a unique system because it doesn't matter whether you're breathing deep and fast or slow and really slow, Or shallow, it will balance your CO2 so that you're always stay the same.

Just because of the way it's designed is to allow enough fresh air in and enough CO2 out that it keeps you in balance and that's why it's called ISO cap neck is it

maintains the carbon dioxide balance and you can breathe as if you're running a marathon and you can breathe on it for three hours and do your marathon breathing for three hours and still be sitting on the couch and not feeling dizzy or out of sorts and your CO2 would still be the same.

And you can do the same thing. You can do it as a hundred meters sprint training and just breathe as if you're going to breathe for a 100 or 200 or 400 track workout.

[01:16:08] **Dr Mike T Nelson:** Yeah,

[01:16:09] **Dr Andrew Sellars:** so you can simulate any of the breathing techniques and not be out of balance.

[01:16:13] **Luke Way:** Yeah, the entry point for a lot of people with our device is is it's a really effective warm up people generally struggle with finding a good effective warm up routine, you know from technical warm ups so they get movement patterns correct before they start competition or training to to a proper, like a metabolic warmup but respiratory being so prone to the shrinkage of the it being relaxed between sessions.

So, a good example, like an extreme example that's easy to wrap your head around is something like XCO mountain biker. That's, going to race for one hour. So it's really like a pretty all out effort in terms of mountain biking. And so when the start line gun goes off, they need to be.

Full gas, like as hard as they can off the line. And without something like our device, you have to be on the trainer, push yourself hard enough that you drive metabolic load. So you push your respiratory system. So it warms up so that when the start gun goes you're primed and ready to go.

With our device that. That 45 minute to an hour long warmup gets a lot more simple. You do, five to seven minutes of the breathing you need to do to get off the line fast. So you stretch out that system, you gain the volume you need to succeed. And then you do the technical warmup. You need to pedal well.

And so you hop on the bike and you do 10, 15 minutes, maybe of high cadence work and a couple of little accelerations, but not enough to make you tired. So you're actually starting fresher with a system that's truly primed. No,

[01:17:51] **Dr Mike T Nelson:** I like that. That's super cool. And I think what's different, like you mentioned too, is that you're.

You're not altering CO2. So you're not challenging the body from that standpoint. It would be a way of more isolating the aerobic structures per se, because, and I've tried, I won't name their names, but I've tried some other devices that restrict airflow and. Yeah, some of them are useful, some of them are not, but the issue I had with pretty much all of them, unless you get into the super fancy ones, some of them may start with an S that costs thousands of dollars, but we won't say their name, but I just couldn't get myself to spend money on, to be perfectly honest.

But the other restriction devices the same thing like I would work Okay, I'm gonna try to breathe at 20 breaths per minute or 30 breaths per minute and after a couple of minutes I'm just like whoo. I'm loopy. I'm like what the hell's going on. This is I can't do this for

[01:18:44] **Dr Andrew Sellars:** That is the limitation of those devices is they are straight They really are strength devices that you can't use for more than a few breaths And so one of the reasons we're going to be adding resistance to our device in the future is there is some benefit to increasing inspiratory muscle strength and there's some benefit to strengthening the diaphragm.

But if you can only do it for two or three breaths, it isn't really that valuable. There are some sports that you might only need two or three breaths to get you through the sport. But most of the athletes that we deal with are dealing with, they're either endurance athletes or they're athletes involved with CrossFit or other sports where it's more than a few seconds of exercise.

And if it's more than a few seconds, you need a diaphragm that's going to continue to work with strength for the full duration of the event. And so it didn't make sense for us to have a device that, that only did. A few breaths of strengthening or a sick or a single max breath that it's almost useless to have a single max breath and not be able to keep breathing afterwards at similar volumes.

So we knew that we know that you can train that and we've shown that. And so, yeah, the interesting thing about the CO2 is that at, in the basic level of our device and using it, you can balance CO2 really well. It is not hard to conceive of how to add CO2 tolerance to it.

[01:19:58] **Dr Mike T Nelson:** That was my next

[01:20:00] **Dr Andrew Sellars:** question.

By doing, by creating a tiny bit of CO2 extra than what you would at rest. And so doing a very small amount of exercise adds small amounts of CO2 to the work that you're doing or doing it after doing exercise. So if you run a 400 meters and then breathe on the breathway, you have CO2 left over from the 400 meter running around the track.

So this is one of our, one of the great workers that Luke runs with some of the high performance athletes. So I'll do repeat four hundreds or eight hundreds. breathing on a on our device in between the intervals or the same thing in the water they'll some hundred meters and then they'll breathe with breathe way they have a higher co2 and it actually It teaches CO2 tolerance because they're bringing CO2 out of the water.

They're breathing into the device, which is recirculating the CO2, but it's teaching them to tolerate a higher CO2 while they're using the device. And then they go back into the swim session and they can do that repeatedly over and over again. And it doesn't take very long for CO2 tolerance to develop.

You'll see athletes who, the first time they do it, they, they physically can't tolerate the acidity that comes with a high CO2 and it doesn't. Yeah, it doesn't last long. There's an

[01:21:14] **Luke Way:** anxiety response too, right? Oh yeah, you're like, yeah, when you try to keep your head in the game when you have high CO2s, this is why like we work with a lot of major league baseball player pitchers.

Just cause when they're under that much stress to keep their head focused and in the game, they need to be actually pretty like CO2, like conditioned. And yeah, that's what we found over the past couple of years.

[01:21:35] **Dr Mike T Nelson:** No, that's super cool because I could never, God, I spent probably years trying to wrap my head around what is CO2 tolerance?

Because on one hand, I think there's something there and you haven't a practical experience. You're like, Oh, it's gotta be something here. But. There's no agreed upon terminology. Everyone has their own definition. Even talk to some hardcore researchers like, Dempsey from Wisconsin, who's done just tons of stuff on respiratory training and we're gotten more things than I'll ever learn in my life.

And he's I'm not really sure what it is. I don't know. What are you talking about? And I'm like, Oh my God. And yeah,

[01:22:07] **Dr Andrew Sellars:** he's a, that's fascinating. Dempsey is really the originator. And. Of some of the original research that oh, yeah to doing this and he was doing this research in the 90s, right And so it's 30 years and people keep saying, well, this is, I don't believe in this new technology.

This is not new. This is 30 years old. This is a device that answers the question for research that was done 30 years ago. And I love the fact that he's, that he admits that there's still answers that he can't explain. And that is the real, the beauty of the complexity of the human body is we know that certain training works.

And we're only just starting to understand why certain training works. And this whole idea of of high intensity interval training, which is, has profound benefits for certain athletes and for certain groups and for certain sports. One of the benefits that has been unrecognized is that when you do high intensity training, you are developing a ton of CO2 and having to blow it off really hard.

And so I'm fairly convinced that one of the benefits for about a third of the people who do high intensity training is the benefit that they take on it from the respiratory training from it. And regardless of what they did for the high intensity, they were benefiting because of the breathing that had to happen to support that in those intervals.

And yeah, it just hasn't been looked at because we've never had access to inexpensive metabolic carts so that you could test everybody at the same time and see their changes over time. But for sure, those athletes have changes to the respiratory patterns after that kind of intervention that requires a bunch of high high intensity training.

There will be changes to their breathing patterns that happen if they do it enough and if they focus on their breathing. And some people just. Most top athletes are good breathers. And the question is, did they become good breathers because they were good athletes or are they good athletes because they were good breathers?

And this is again, the benefits of yoga other musical endeavors like singing or wind instruments or playing the saxophone when they were in high school. All these things lend to better breath control, better diaphragmatic understanding, better control of their systems and they become good athletes.

And is it just a coincidence that they. They did yoga when they were younger or they played a musical instrument, or they were taught to sing when they were a youth. Like all those things play into the benefit of breathing properly.

[01:24:30] **Dr Mike T Nelson:** Yeah, that's great. As we wrap up here, you guys might know the answer to this, like I, you ever read a study where you swear you read a study and then you can't find the damn study and you wonder if you just made the whole thing up?

That's happened to me a fair amount. One of the studies that I might have completely made up that I can't find, and again, it's Russian literature, so who knows, that the Russians supposedly, when they were training athletes, when they were younger, They had them do swimming and the thought process was they made them exhale out underneath water.

The thought process was, or the story goes, that the, because they're going through different growth changes then, the theory was they could increase the size of their ribcage because they were pressurizing it. By blowing out underwater, but they told him it was just swimming training, right?

[01:25:21] **Dr Andrew Sellars:** So the funny part of that is because my background that my background was as a swim coach for years Oh, okay And so when we started testing people With metabolic cards.

I had a lot of I had a lot of swimmers who were starting trials I was at the sort of forefront of triathlon training in western canada So I had the first wave of people that did triathlons were swimmers You who could run and we're trying to learn how to ride a bike. So they were awful on the bike, but they were really great swimmers.

And some of them were decent runners, but when you start testing them on the bike, you realize they're just crappy because they spent all their time in the water and they never rode a bike as a kid. And so the next wave of people were people who realized that the bike was so long and most of these triathlons that they could make up for a crappy swim.

If they were really good cyclists.

[01:26:04] **Dr Mike T Nelson:** Right.

[01:26:05] **Dr Andrew Sellars:** So we started testing all of our swimmers on a bike and what became really obvious is they were really good at breathing in

and really crappy at breathing out. So the theory with the Russians, I think, is probably reversed, that the actual benefit, they may have thought that it was a benefit about trying to breathe against the water, but it's actually really easy, there's no resistance to breathing into the water.

But there is resistance to breathing, there is a resistance to breathing in, Because you're limited by time when you swim by how fast you have to breathe in. Oh yeah. The pressure of the water too. When you're running, you have four steps to breathe in and four steps to breathe out. Or six and six, or you can do it as long or as short as you want.

When you're swimming, you have one stroke to breathe in. And then you can, then you have to hold your breath for as long as you want to keep your face in the water for, but it's typically a one to four breathing pattern is one breath in and four seconds out. So they'd be, so most of the swimmers we've tested had.

very good inspiratory muscle strength and power and really bad expiratory exhalation. Cause they never, they actually rarely breathe out forcefully. They would let the air out. Sometimes forcefully inhale the last little bit. When they got on the bike, we realized that they actually had pretty strong diaphragms, but they were never used to taking full breaths in because they were limited by the duration.

So they could breathe short in. Shortened powerfully in, but they couldn't actually get a full, slow controlled breath in. And so we taught them volume training. They respond really well. They're breathing training because they, if you just give them some more volume, they actually bent, they can benefit in the water as well because it keeps their lungs a little bit together, more buoyant, there's lots of benefits to breathing training for swimmers.

And just understanding the diaphragmatic pattern. And if you teach, and if you actually do. Coordination training with them, they breathe much bigger volumes when they're in the water. And they not remarkably, they, they get remarkably better with their technique because they're actually breathing more controlled and their core strength is better and all the other things that go along with good breathing patterns.

[01:28:12] **Dr Mike T Nelson:** So would their FEV, FEV1 be pretty bad then in terms of their ability to get a lot of air out within one second? Yeah, there's a

[01:28:19] **Dr Andrew Sellars:** lot big, there's a big range, but typically they had good tidal, they had good volumes. But not good expiratory pressure. So,

yeah, their FEV1s weren't as good as you would think they would be from the level of swimmers that they were.

[01:28:33] **Dr Mike T Nelson:** Got it. Before the last question, any other things about the device you want to explain that we didn't hit on or anything that we missed that is useful for the listeners to know?

[01:28:44] **Luke Way:** Yeah. You know, it's a long rabbit hole. I think we touched on the major things that, number one, the respiratory system is very trainable.

And there is now a device out there that is accessible with not only, a device that's effective but. With, the app and the know how that tells you what to do. You don't need to be an expert to to get into this. It's all been laid out between Dr. Sellars and I we've built the programs and we're working with the best practitioners around the world.

Like guys like Sean that are building programs for people to access within our app.

[01:29:18] **Dr Andrew Sellars:** Yeah, and I would only add to that it's that we are creating a system to allow people to interact with us if they need to, and to have answers that are readily and easily available online and through the app so that there, there's a very basic program that just starts people out who've never thought about their breathing before and so we're trying to eliminate The hurdles to overcome is it's not rocket science to learn how to breathe properly.

It just takes a little bit of practice and then it doesn't take, it's not a huge step to be able to start training after that. And it's fairly easy to monitor and it's safe. You're breathing every day. Anyway, we're just adding different levels to it and different levels of understanding and different challenges to it, to an R a system that you're already using every day.

[01:30:04] **Dr Mike T Nelson:** Awesome. Last question. If you were to sum up and give four takeaways for even just breathing or the device or anything that people listening that you feel like they really should concept or something they should do, what would they be? And I'll give Dr. Sellars, you get two and then Luke, you get two.

How's that? Okay.

[01:30:29] **Dr Andrew Sellars:** So my two would be leaning back on some of the things that you mentioned earlier, that nasal breathing is great. And the reasons for that is it slows it down and it incorporates the diet tends to recruit the diaphragm more. And so there's lots of benefits to nasal breathing, but the biggest ones for me is it slows down and helps you breathe properly.

So breathing properly is essential. The second part, I would say, from my perspective, is the value of understanding carbon dioxide and its effect on the human body and the effect on a number of different systems, including the heart and the brain and the peripheral vascular system. And really, a lot of the training that we do is around moving CO2 into areas that allow for better performance.

So if you can control your breathing, then you can control your CO2. And if you're breathing with good patterns on top of that, then that's, those are the two things for me is breathing properly with your diaphragm using through nasal breathing is great. And the second is controlling your CO2 for benefiting performance and and general health.

[01:31:33] **Dr Mike T Nelson:** Yeah, I'll just add real quick to that, that CO2 is, I was even taught that it's, it's a waste product. So I like using by products better and like what you were saying, I think people miss a lot of times that, Oh, I got to get rid of as much CO2 as possible. And that's not true. There's a time and a place you want CO2, you probably even want it locally.

It's not a bad thing. It's part of how the system works and hopefully all this stuff about CO2 is this horrible evil guy with. Lactic acid being right behind him causing muscle soreness, like all those myths. Hopefully we'll die soon. So

[01:32:05] **Dr Andrew Sellars:** I really think he should have renamed the book. It shouldn't have been called the oxygen advantage It really should have been called the co2 advantage.

It just didn't it didn't have as good a ring to it. I think it's the only reason he didn't use it.

[01:32:15] **Dr Mike T Nelson:** Yeah Certain people online saying if you just hyperventilate, you'll oxygenate your brain better and they have stuff backwards doesn't help. So,

[01:32:23] **Luke Way:** yeah, exactly. Yeah, you can't go beyond 99 or 100 percent saturation.

Yeah, so those are

[01:32:29] **Dr Andrew Sellars:** the two things I would do. And that's what I would hope that your guests and your visitors would would get out of this is at least a glimpse into that as an understanding.

[01:32:38] **Luke Way:** Yeah, I love the dramatic way of the folks at Peak Flow talk about CO2 and how, it's been called the waste product and it's been called a byproduct, but I like going off the deep end sometimes and they call it the most important hormone the body has.

It really, it regulates so many things. Oh, it totally does. Our body is so tied, our health is so tied to CO2. So yes, it is produced. If we have too much of it, it can be detrimental. If we have too little of it, it can also be detrimental. And so it's a very important molecule for us. But that's not my two that was one of Andrew's.

So bonus, my two , my, my two are helping people understand that their respiratory system, their lungs are like an upside down. oak tree and we breathe into that oak tree and if we breathe shallow, we only breathe into those leaves at the bottom of the tree that are most absorbing of the off gases and pollution of our everyday lives.

If we can teach ourselves to breathe deeper and fuller and with better technique, we get to those leaves that are more alveoli rich and more capillary dense at the bottom of our lungs so we can get better gas exchange and our system is just overall more efficient. And the other one was, like I'll say it.

I've said it a couple times and I'll say it again is just how trainable this system is. And I think that resonates for me because I was taught in university that your heart and your lungs are god given and they are like what you got is what you got. And that's one of the reasons why I went under the wing of Dr.

Sellars is he clearly showed me that is false. This system is So trainable so incredibly trainable and the more you understand about the range of motion patterns and how we bias the center The more you realize just how trainable it is and just how much You know meet people are leaving on the table in terms of training There's so much more people can find out of themselves if they can wrap their heads around How trainable this respiratory system is for them?

[01:34:47] **Dr Mike T Nelson:** Yeah, I feel like the more we learn about stuff the more Every day I just realized the body is much more plastic than when we realized me and that it's moldable, changeable. It wasn't what, how many

decades ago we thought like your neurons don't even change, like the amount of neurons you have and that's it.

Like you can't learn new skills. And yeah, it seems every time we look, we're finding. Geez, I was just reading stuff the other day about, turnover in soft tissue. I'm like, Oh, it used to be like nine months. And now they're saying some areas are faster than the turnover of muscle tissue.

I'm like, Oh my God, but yeah, like you said, I think that's a good thing because people realize if you give the body the correct stimulus and a better stimulus, you have a huge potential to make changes. You're not this static thing. That's never going to change. You're, yeah. Constantly changing.

So what input and what stimulus are you giving it and you can change it then?

[01:35:39] **Luke Way:** Yeah. I guess to add to that, reiterating the idea of the body will always do whatever's easiest. And so if you don't condition, it's going to atrophy down. If you do condition, the easiest thing for it to do is to continue to feed that tissue and to continue to build volume and to build strength.

And ultimately that's what we want is our body to be conditioned for longevity, for health and ultimately performance in life and sport.

[01:36:05] **Dr Mike T Nelson:** Awesome. So tell us where they can find the device. Where is your website? Best place for more education, everything you guys got going on.

[01:36:13] **Luke Way:** Yeah. So everything is on our website.

You can find it at isocapnic. com or if that's a hard one to spell you can go to breathewaybetter. com all goes to the same place. And check us out on socials. We have isocapnic on on most every platform out there. So, check us out. We try to post, like I said, as much information as we can remove barriers.

So people are understanding just how valuable this is.

[01:36:36] **Dr Mike T Nelson:** Yeah. And one of the things I actually liked about your guys is that it was actually accurate. There's a lot of people in the breath training space and there's a lot of people who do really good stuff. And there's some people's stuff that I just can't read because it's either so overly simplified, it's almost wrong or it's like literally wrong.

So kudos to you guys for putting out like good information because they're not easy concepts to, for people to wrap their head around right away. There's a definitely a lot of unlearning that needs to go on. So kudos for doing that.

[01:37:07] **Luke Way:** Thank you very much. Yeah, we work hard.

[01:37:10] **Dr Andrew Sellars:** That means a lot to us.

I appreciate that feedback that it is good to hear that. We do try and base everything that we're doing on good science and a good understanding of anatomy and physiology. And it's important that people like you recognize that we're doing that well. So that's great feedback.

[01:37:26] **Dr Mike T Nelson:** Awesome. Well, thank you guys very much.

I really appreciate it.

[01:37:30] **Dr Mike T Nelson:** Thank you so much for listening to the podcast. Huge thanks to Luke Way and Dr. Andrew Sellars for coming on the podcast and spending all of their time that we could yammer on about respiratory training and the effects of breathing. I thought this was a really fascinating episode. And in my deep dives into breathing, I haven't found a ton of people who have practical application of it and were also correct on the physiology.

And I was surprised that these guys actually hit it really well on both of them. So that was great. So kudos to them. If you're interested in learning more about this, you can check it out. It's the fourth pillar of the Physiologic Flexibility Certification. We'll have the link down below. It is open now as of this recording through Monday, March 25th at midnight, 2024.

Go to the link below and you'll be able to get all that information. If you're listening to this outside of that time, you can get on the wait list for the next one at physiologicflexibility. com is where the wait list is located. Check out Isocapnic if you're looking for a more inexpensive way to do respiratory training.

We've got a discount code below to save you 15%. I do not make any money off that. So I don't have any disclosures in that area. And then one of the other sponsors, which I do have a disclosure for, cause I do make a little bit of money off of it, is LMNT. Go to drinklement. com forward slash Mike Nelson.

This is by far my favorite electrolyte drink that I've been literally using daily for, And going on almost like three and a half years now. So check them out. Thank you so much for listening. Really appreciate it. If you enjoyed this episode, give us whatever stars you feel are appropriate. If you have time to leave us a short review, it goes a long way to helping with the distribution of the podcast.

Thank you so much. Really appreciate it. And we will talk to all of you next week.

Well, they say all good things come to an end. What's that got to do with this show?

[01:39:40] **Nancy:** This podcast is for informational purposes only. The podcast is not intended as a substitute for professional medical advice, diagnosis, or treatment. You should not use the information on the podcast for diagnosing or treating a health problem or disease or prescribing any medication or other treatment.

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