[00:00:00] **Dr Mike T Nelson:** Hey, what's going on? It's Dr. Mike Nelson here back with the flex diet podcast on this podcast. We talk about all things to improve your body composition via more muscle strength and the less fat all done in a flexible framework without destroying your health in the process today on the podcast, we've got Dr.

Phil Batterson, and we talk primarily about aerobic adaptations, Like most podcasts here, we go the whole range from the business of setting up a podcast, the business of fitness, the influence of social media, what does the research actually say about supplements, especially the difference between mice studies versus actual human studies, and we also get into just overall training in general.

I also give a case study of. A lifter who we dropped his 2k time on the concept to roar from 714 to 703. The kind of what we did for that. And yeah, just a wide range. Like Dr. Phil's background is mostly on the aerobic side. So we stayed more around that area. And if you're listening to this and you're wondering why would meat heads even bother doing aerobic stuff.

The quick primer is that your aerobic metabolism allows you to create energy at lower levels of intensity. So as you're just sitting listening to this podcast, it's primarily your aerobic metabolism using oxygen to create the cellular energy ATP. The bigger your aerobic engine is, the more efficient and the faster you can do that.

So that's your recovery time, whether this is between. sets. So one set to the next set one training day to the next training day, or even beyond that, what I've noticed is that a better aerobic system, your recovery times are significantly better. I've also noticed that your body's ability to handle stressors is also significantly better.

So probably starting about eight years ago, I read them all my M three one on one training. And we put in a fair amount of aerobic assessments, even though I only work with a handful of strict aerobic athletes per se. The reason for this was a lot of people had impaired recovery. Energy levels were low.

Sometimes they'd have sleep disturbances. And while having a bigger aerobic base isn't going to fix all your issues. What I found was many times it fixes a significant portion of them. Even if your goal is just a better body composition or You have significant goals, even as extreme as strong man or powerlifting.

The aerobic system plays a huge role in those sports, even though it is not necessarily the thing that you are being tested on the day of competition, obviously with more Metcon based stuff like high rocks and CrossFit plays a huge supplementary role. So we talk all about that. And I just wanted to give you that background.

As to why this is important in case you're listening and going Hey, I'm not an aerobic athlete. I'm not running marathons or anything like that. And then stay tuned to the end in the flex for, I simplified it this week down to just one question of what is a good VO two max, the average meathead listening should try to get to.

Cause at some point, if you spend too much time doing it, become a little bit too specialized and that kind of flat part of the curve might be beneficial if you're a aerobic or endurance athlete. But if you're just lifting stuff, at some point you want to spend more time lifting stuff. But if your aerobic system is really underdeveloped, I've noticed that this is a huge rate limiter for a lot of people that they don't realize.

So Phil gives us his breakdown of what he feels like is the best kind of perfect quote on quote. number to hit for that. So if you want that flex for it, you can go to the link below, go to MikeTNelson. com forward slash flex for FLEX, the number four, and you will get that one plus all of the other ones in the past, if you're on the newsletter already, then you will automatically get it.

And that link will also subscribe you to the daily insider newsletter where I try to make these things at least. infotainment, a little bit entertaining and provide you with some good solid information, all free, delivered directly to your inbox. And if for some reason you don't like it, you can unsubscribe at any point.

If you're looking for an alternative energy source that is not a stimulant check out my friends at Tecton Life. So Tecton is a ready to drink ketone ester beverage. So ketone esters are a way that you can increase your level of ketones. In a few minutes without necessarily having to do a ketogenic diet Lately, I'm recording this as we're finishing our last couple days here in South Padre, Texas so I've been doing a little bit more kiteboarding and The last two days I got a fair amount of kiteboarding in I went to lift yesterday But I didn't get to the gym until a little bit later than what I had planned So I didn't want a lot of caffeine beforehand.

So I had some Tecton since my sleep was short the previous two nights and it definitely helped. I felt like I was able to get through my session quite well and

was still able to sleep that day. So I've had a bunch of caffeine at that point, trying to get to sleep that night becomes extremely difficult.

So check them out at the link below. You can use the code, drmike, D R M I K E to save 20%. I know they recently reduced the price also. And conflict of interest, I am a scientific advisor over at Tecton and I am an ambassador there so I am biased towards their product. And that is it for the intros.

Enjoy this episode with Phil all about supplements, podcasts, business, and the development of the aerobic system.

[00:06:34] **Dr Phil Batterson:** Yeah. So I actually, I've had Luke way and Andrew Sellers on my podcast a couple of times and

[00:06:40] **Dr Mike T Nelson:** yeah they're

[00:06:41] **Dr Phil Batterson:** super nice guys. Andrew. Andrew's always been somebody I've always had really good conversations with. I met him through VO2 master. So I've worked as like a physiology consultant for them for forever.

So I met him and we met in Kona and I'm pretty sure from the date, like from the time we met, the time we left, we didn't start, stop talking about like physiology and training and stuff like that. So it was just like, it was awesome. Yeah.

[00:07:08] **Dr Mike T Nelson:** Yeah, they actually reached out to me on Instagram of all places and I was like, eh, I don't know.

Like people reach out to me. Like sometimes you get some good people, but a lot of times it's just I don't know what you're talking about or whatever. And yeah, they were actually pretty cool. So I said, ah, just, come on the podcast. And I thought, well, worst case, we don't want to use it.

And I sent him a couple of research studies. I'm like, Hey, you want to talk about this or that? They're like, Oh yeah, that sounds cool. And I'm like, Oh, okay. That didn't scare him away. So, yeah, we had a good. I think like an hour

and 45 minute chat or something like that. And yeah, they were actually really good.

[00:07:43] **Dr Phil Batterson:** Yeah. Yeah. They it's it's fun because they, I think they have a good mixture of the applied side of things, plus a good, understanding of the underlying physiology. And one of the things that Luke was telling me is he was like, well, it's like breath training may not be for everybody.

And, it's I like when people admit that, that their solution isn't going to solve, like world hunger, right. It's well, well, maybe it's going to work for some people, but, for other people, it won't. And I was like, okay, I re I really respect that.

[00:08:13] **Dr Mike T Nelson:** Yeah.

Yeah. And that was. Yeah, because similar to you, I'm always hesitant of people who have products, which is ironic for me to say, since I have products and stuff, right? And everyone needs to make a living. I'm not against that at all, but when it only becomes about the product and it does everything for everyone, yeah, that, yeah,

[00:08:38] **Dr Phil Batterson:** I remember hearing some podcast episodes from.

A little while ago that were just like, they would get somebody on who's just and this is going to solve all your problems. And it's going to do this, and this. I'm just like, move you away, write that off. It's probably not going to do all that, so let's be a little bit more realistic about stuff here.

[00:08:58] **Dr Mike T Nelson:** Yeah. And I, you're probably similar. Like I get, we'll say interesting emails from some people who like you promote something you actually use. They don't like it. And then I've even like with new products, even with these guys, I think I did it too. I've done with Ian Mitchell from wizard science. I'm like, I don't even want a percentage of.

Affiliate. I'm not even an affiliate for your company. Just, can you give people a discount and they can try it and then they can report back to me if it really moves the needle or not, and I figure that's a way that some people can get something a little bit cheaper. I'm out of the loop.

Cause with newer stuff, it's. I don't have enough experience with it to say, yeah, you're an eight, but even then people are like, Oh, you're just a shill for the company. And you had this guy on and dude, I didn't make any money. It costs me a shitload of money to just do the episode, to produce it, to pay someone, to get the episode out my time, whatever I didn't make a single dime off of it, but anyway,

[00:09:54] **Dr Phil Batterson:** I know, I think people have this they come to this conclusion that it's like, Oh, you have a podcast, you must be making a lot of money.

And I started mine like, I don't know, four months ago, it's like, it's all just been sweat equity and me investing in, like doing the podcast. Cause I love doing it and I get to talk to people and I'm not quite as big as you yet. So it's and who knows if I ever will be, but it's like.

I haven't had people being like, Oh, you're, you've sold out like other things like that. Quite. Yeah. I'm sure the comments will come at some point. Cause that's just the nature of it. People get upset with, anything you do, no matter what you do, even if it's the best thing in the world.

So

[00:10:30] **Dr Mike T Nelson:** yeah. I at least if they're going to insult me, like at least be creative or provide something useful. Like I sent out a thing for element the other day and some guy unsubscribed and all he said is you're an idiot. And just sent that to me. I'm Mike. That's not even one, it's not that creative and two, it's not useful.

So yeah, it's that's not

[00:10:49] **Dr Phil Batterson:** going to help me be better in the long run, like you could have said, it's send me a study that says, Oh, hi, like higher sodium or electrolyte beverages don't help increase hydration or something like that, right? No, it's, there's no winning.

My my fiance is a dog trainer and she'll, she'll post stuff. And then people like talk about vitriol, like immediately, like I'm not in the diet. I'm like the diet realm of things. So like when I recommend like workouts and other things, like people are just like, eh, I'm not going to do that.

If I was in diet or dog training, I can't even imagine. I think those two would be like the biggest things that would just get you the most like flack just from anybody.

[00:11:26] **Dr Mike T Nelson:** Yeah. Nutrition is the weirdest one. It's like everyone. It's almost like more of a religion, which again, I'm Catholic or, it's somewhat religious.

So I don't have anything against that per se, but they want to pretend like it's a science, but they don't want to discuss the science. They just want to say why everything is this diet is the greatest thing. And it cures cancer to fat loss to everything. And. Therefore, everyone should do it and there's no discussion of context.

And so, I put out stuff about ketogenic diet, post concussion, TBI, consult for Tecton. I do some stuff in the ketone space, but I don't say everyone needs to do a ketogenic diet to lose weight. And yeah, you're probably going to lose top end speed and power if that matters to you. So then I get people who, Equally hate me from both sides who don't think I promoted enough or that I am promoting it.

And I was talking about a discussion, based off a TBI and concussion and yeah, it's that's interesting. Yeah,

[00:12:26] **Dr Phil Batterson:** Think when something becomes like Art of somebody then that is then like a nuanced discussion of whether it's good or not goes out the window because you're immediate no matter what you say, you're immediately attacking like them as a person and then no good conversation can come of it and it's just really hard because you're like, well, here's what the data says.

And here's what the research says. And it's not best for everybody. And like my favorite thing when I meet people is if they answer stuff with, it depends, I'm like, okay, we can have a good question or a good conversation here. If it's just nope, this is the correct answer for this and this, then it's I don't know if we're going to agree on a lot of things and it's not going to get us anywhere.

[00:13:05] **Dr Mike T Nelson:** Yeah. Or if they send you questions and their Instagram handle is like Keto Carl. It's whatever diet thing they do is part of their name. It's I don't know. Yep.

[00:13:17] **Dr Phil Batterson:** Yep. Exactly. I know. I, and immediately when you said that, I'm like, huh, I wonder if I have biases like that. And I probably absolutely do.

Like I, I'm a muscle physiologist by trade, so I have a lot of. I put a lot of my bias into skeletal muscle mitochondria and skeletal muscle in general. And I'm sure other portions of the body are very important for the regulation of exercise and other things like that. But my bias is definitely towards that.

I also like to think that if somebody presented me with good data, that was like, yeah, skeletal muscle mitochondria aren't that important. I'd be like, okay, I'll consider it. But here's the other data that I have to back it up. Right.

[00:13:55] **Dr Mike T Nelson:** Yeah. But at least you know what your biases are. That's what I ended up doing.

Metabolic flexibility, one, because that's what all my research was in. And two, from a marketing standpoint, it allows me to market my little air quotes, one thing. Even though it ironically covers like the whole spectrum of feel, usage and context and everything else,

[00:14:16] **Dr Phil Batterson:** but

[00:14:16] **Dr Mike T Nelson:** at least I can try to simplify the message down to the one thing that people want to hear.

And hopefully that's enough to get them in and have them appreciate context. But yeah.

[00:14:27] **Dr Phil Batterson:** Yeah,

[00:14:28] **Dr Mike T Nelson:** I don't know. That's also why I don't do a lot of 10 second reels and if I get one more 17 year old that emails me about how he wants to do my marketing and I need to do 15 second reels and do dancing monkey videos or whatever.

I'm like Okay. One, I don't think people are going to read my newsletter. If they do that too, they're sure as hell not going to buy a 28 hours certification. So

[00:14:50] **Dr Phil Batterson:** if their attention span is not seven to 15 seconds, 28 hours is not, you're not going to survive there. Guys

[00:14:59] **Dr Mike T Nelson:** like not going to happen. Yeah, I control your metrics are amazing.

I'm like, but if it doesn't transfer, it doesn't matter, right? It's like kettlebell swings might be great, but if you want to increase your deadlift If it didn't transfer, it doesn't matter. Maybe it does. Maybe it doesn't, but yeah,

[00:15:15] **Dr Phil Batterson:** no I a hundred percent agree. I struggle. I don't struggle with this, but it's it's it's hard to capture people's attention.

Right. And that's what social media is trying to do. But at the same time, you want to get the people in that are actually going to be potential community members and customers and clients and other things like that. It's I would rather have 5, 000 followers that I have now and, have 10 percent of that rather than a hundred thousand followers and 0.

005 percent of that. Right. I don't know if the, I hope the numbers like, matched up there, but you get what I'm saying is There's so many Instagram accounts. I was listening to a podcast. Have you ever heard of mind pump?

[00:15:54] **Dr Mike T Nelson:** Oh yeah. Yeah. I met those guys long time ago. Yeah.

Yeah.

[00:15:58] **Dr Phil Batterson:** Yeah. So, so I was listening to theirs and they were like, yeah, we were trying to like, come up with marketing things. And in the beginning they paid like a bunch of model, like fitness models to push their stuff. And they were like, Not even a tick on the needle of them moving. And they had, 4 million, it was like 4 million followers and stuff.

And I was just like, all right, that's a very valuable lesson here because. If you know who you're trying to market to, then you wouldn't go to the fitness models because you know that's there's a different reason why people are there, right? It's not for the, all the science and the information.

[00:16:35] **Dr Mike T Nelson:** Yeah, I call some of those like kind of vanity metrics. It looks good and yeah I still use them to weed people out or whatever. But in the fitness industry, I know some people who are very, I'll say air quotes popular online and I don't make much money or the running joke between some of my other friends is You find out later that they're oh, their spouse is a high paying job with health insurance Oh, so they can just be this wackadoo online

that they don't have to make any money It doesn't matter but people see what they do and they get a lot of followers they go Oh, they must be crushing it and then you Find out later, like they're not doing that well.

[00:17:10] **Dr Phil Batterson:** Yeah, that's that's like my next thing is trying to figure out how to turn this passion project that is like critical oxygen into, more of like lifestyle, actually making enough money to support myself because I have to have, a halftime job, in order to support that, but that's totally fine.

I like I really enjoy what I'm doing and I'm hoping that people see that. As well, because I'm a believer of if you put out good kind of good things into the world, you'll eventually get good things back. So I'm hoping that's the case. And, it's just it's a slow process.

Everyone's like everyone sees everybody or what is the quote? It's oh yeah, that person is a 10 night or a 10 year overnight success. And they never see, like the the actual hard work and everything that actually goes into it, where it's yeah, in order for say, Mike, to get a course up and running and, have all of this content and all that sort of stuff, like that takes so much time and effort.

So that's like my next steps. I'm slowly easing my way towards there. Cause I think I'm getting enough people who keep asking me about it. Then I'm like, I need to do that at some point.

[00:18:18] **Dr Mike T Nelson:** Yeah. I would just do a. Moderately priced product and just put it out there. I would pre sell it and say, Hey, I need at least 10 people or whatever your minimum is.

Once I get that, here's what you'll get. I did that with a FlexDiet cert the first time. And I had the luxury of having a newsletter list. So I initially didn't want to do it. I had another product that was complete utter failure because no one understood it. And I remember having a meeting, I paid Ryan Lee for some consulting for a two day thing.

And he's well, you should just do a certification for fitness people. And I was like, I don't want to be one of those douchebags out there, like promoting a certification and everyone has a certification and there's, there's no rhyme or reason to it. There's no, anyone can put one out and he's he's well, but you're the douchebag who actually put the time and effort into studying it and actually has legitimate information.

[00:19:11] **Dr Phil Batterson:** It was like,

[00:19:11] **Dr Mike T Nelson:** trainers will buy certification. This kind of changed a little bit now, but. And I was like, Oh shit, maybe he's right. If it, if that's what it takes for me to sell a certification, to get people better information and help my income, then okay, yeah, I'm all right with that. And then I just pre sold it.

I said, Hey, I need at least 10 people. I think I sold the first copies for. 230 each, I think, and I got 32 people. Now the list price is a thousand, which I don't really have any sales or anything on. Yeah. But it was enough to get started. And I said, okay, Hey, you're going to have, two new modules every week until everything is done.

So I gave myself a schedule and then also because I pre sold it, I had enough people. Now I'm on the hook to deliver it, so now I had a constraint. I was like, shit, I've been, thinking about this thing for a year and a half formally looking at the research for 13 years. Now I have to get it out by this particular time, which was super useful.

No, I like that because

[00:20:11] **Dr Phil Batterson:** I have a tendency to not get anything done until there's like a deadline, two days beforehand, I'm like, yeah. Yeah, I'll get it done at some point. And, but then as soon as I put deadlines on myself that's why I have a really strict Instagram posting regimen.

Cause I'm just like, if I didn't have that, then I wouldn't ever get anything done. So it just helps me keep things, but I, it's like, get people to buy it, have people give the promise of two modules a week or do something like that. I've also heard people doing like more live classes.

So it's you meet with people once a week on zoom and you'd say, okay, well, it's going to be a 10 week course. And we're going to have, these are the topics that we're going to hit. And then you can sell it a little bit more because you're like, well, it's my time.

Right. And I'm going to be in person. But then what you do is you take those recordings, you take those slides, you take that information, and then you convert it into like more of the offline course or online course, but not in person. Right.

[00:21:11] **Dr Mike T Nelson:** Yeah, I did that with my buddy Adam Glass when we did the Grip Course.

We just said it was, what did we do, four or five live recordings? And we had just the outline, we had everything done, and said, okay, it's going to start on this day. If you want to be in the live, you can ask, questions at the end and then the pre recording is going to be a product and all they did is just add, some technique videos and a few other videos we filmed on the back end.

And it ended up turning out pretty good. Like I'll probably do a couple more horses that way. Cause one, it's a lot faster and two, I think there's something about. Having to be live that it's more entertaining. That's one of the hardest things when I just create modules by myself is it took me years to create a module, just talking into my computer that sounds air quotes, live, where if it's too easy to become very monotone and almost too rehearsed, my thing was.

When I did them, I would go through, I'd practice, I'd have all the slides done, I'd go through them multiple times, and then when I recorded it, unless I went over my time frame, That was it. I would only do one recording. Didn't always work. The carbohydrate lecture took me five fricking times to get it down to an hour and 15 minutes because I kept going over, otherwise I would spend, otherwise if I had to try to fix every single thing, one would not probably, it would sound more professional, but I don't think it would be as useful.

And two, I would never get anything done. I would just be retaking stuff all

[00:22:39] **Dr Phil Batterson:** the time. Retaking or editing. And so that's what I found is like. When I first started recording YouTube videos, I would go through, I'd cut out all the ums and the so's and other things like that. And it was just like on a 20 minute video, I was pausing every 10 seconds.

And it just took me way, way too long. So finally I got to the point where I'm just like, well, we'll record a podcast. I love the podcast format because it is an, it's like a flowing or it should be a flowing conversation. And then people get an idea of what your actual tempo of talking is and how you talk and how you react to things and all of that.

And I think they, I think people like that. Cause they get to know you a little bit more, right? As opposed to if everything is just clipped and perfect and all of that, it's it's not quite as genuine.

[00:23:24] **Dr Mike T Nelson:** Yeah. I equate it to, especially nowadays, like, why do people still pay for live recordings of music?

Like I get it going to a show as an experience, but why would you ever want a CD or an MP3 of a live recording? It's not going to be as good as a studio. It's going to sound a little bit different. You're not watching it. It's not a video portion. And I think it's because you want the variability. You want that fine scale variability.

You want a little bit of the imperfections. You want to hear, Ooh, they did that little part a little bit different. Or I like how they did that or the audience reactions. And. I think that's what makes it interesting. Like even with some pop songs, I'm not a big pop music fan, but when the vocal style is just overproduced, it just doesn't sound as good and technically it's better, but there's something about it that just doesn't seem real.

It just seems fake. And I think it turns people off. Yeah, that's

[00:24:20] **Dr Phil Batterson:** actually that's a really good point because with this so so I'm going into what I'm calling my second season Of my podcast. Oh nice. Yeah, I was like it's I made the decision that every 50 episodes or so I'll just I'll start a new season and then you know implement like maybe a new introduction or new music or do other things and just tweak it and make it a little Better each time.

So there's less pressure on me to be like, let's just revamp the whole thing, a hundred episodes in, and then it doesn't work. And then, so on and so forth, but I've been playing with the idea of using there's Adobe AI audio editor and. It's incredible what it can do, take like horrible audio, you click them.

Then it just sounds like perfect studio, audio recording and stuff. But I think to some extent, right. What people say and what their biggest negative comment is towards that is that if you overdo it, it just sounds like AI and it just sounds way too, overproduced and over perfect in a sense.

[00:25:19] **Dr Mike T Nelson:** Yeah, we use some software. I can send you a link called Descript, which is amazing. And you can pull out filler words, you can run studio sounds, the same thing MPR uses. And sometimes I've noticed if the studio, if the quality isn't real good, the studio sound will make it sound better, but sounds super fake.

So sometimes I don't use it because it almost then sounds like this way. Overproduced, right? You almost, I try not to take like out every single filler word because then it just sounds too heavily edited and too processed. So I try, again, I have somebody who does this, but not really editing much of anything

because I want it to feel like an actual conversation, like we're just meeting in person and just actually having a real conversation.

[00:26:07] **Dr Phil Batterson:** Yeah, absolutely. That's great. I try not to edit as much as I possibly can. There's obviously, times where you have to, where you have to like, certain portions. Cause somebody is well, I had a thought and now it's gone and you're like, okay, well, I'll just cut that out.

Or I was talking to a guy the other day and we were on zoom and it just froze for five seconds. And then it came back and, then we just started over. I was like, ah, we can cut that out. So, yeah.

[00:26:32] **Dr Mike T Nelson:** Cool. Yeah, so we're talking about aerobic stuff and you're good for what's your, do you have a hard stop just so I know?

No,

[00:26:40] **Dr Phil Batterson:** no hard stop. I actually, if not sure how long this is actually real quick and then we can pick it up. Yeah. Yeah. Sounds good. All right, cool. I'll be right back. Yeah.

[00:28:18] **Dr Mike T Nelson:** All right. I'm back. All right. Sounds good. I'll do a short pause here. So you're good for about an hour or so. Is that right?

[00:28:26] **Dr Phil Batterson:** Yeah. Hour and a half, whatever, wherever we, come to a good stop. Okay,

[00:28:31] **Dr Mike T Nelson:** cool. Awesome. And I'll get a little intro here before, so I don't have to worry about any of that stuff.

So yeah, sounds good. All right. Hey, welcome back to the Flux Diet Podcast here today with Bill. How's it going, man?

[00:28:45] **Dr Phil Batterson:** Good. Thanks for having me on Mike. I've been I think I've been following you on Instagram for a really long time. And we've had some good back and forth and conversations and stuff.

So I'm really happy to be on the podcast. And actually I will start with. I was teaching exercise physiology during my PhD. And one of the things that we talked about when we started to talk about pathophysiologies and stuff was. The, like you were on a, the metabolic flexibility and you were on some podcast and that was always a link that we were sending to people.

So that was like my first introduction to Mike T. Nelson was me showing people, like the, a podcast episode that you were on. So this is pretty crazy.

[00:29:25] **Dr Mike T Nelson:** Oh, very cool. And yeah, I think I originally heard about you from. What was it? So I'm blanking on it. It was a resilient athlete or Oh yeah.

[00:29:36] **Dr Phil Batterson:** Resilience HPC. Yes. Yes. Yeah.

[00:29:39] **Dr Mike T Nelson:** Yeah.

[00:29:39] **Dr Phil Batterson:** Yeah. Yeah. So, so him and I started a podcast called oxidative potential. Yes. That's what it was. Okay. Yep. So, and he, so he was the co host and I was like, or, and I was the continuing guest host essentially. So I would come on and then we would have, people like yourselves and then myself, and then we would bounce back and forth. So that was like my first foray into podcasting. And then I decided after I got my PhD that I really wanted to start a new one. So, I'm out here trying to do my best to practice and, get on more people's podcasts and talk about, things like aerobic development.

I think that's the topic that you wanted to discuss today and all of that. So I'm really happy to be here.

[00:30:17] **Dr Mike T Nelson:** Totally. And is the oxidative potential still going? I feel bad. I am not updated on podcasts and I know you have your own podcast. So I was guessing that they just transitioned to yours.

Yeah.

[00:30:28] **Dr Phil Batterson:** Yeah. So, so we both Matt and I got super, super busy with stuff and we had to stop recording. But yeah, my, my new podcast, critical oxygen podcast is a continuation of what that feel was and all of that. So, I've taken that under my wings. And we were talking offline.

I've been doing like all the editing and, all of that sort of stuff and always trying to make the podcast better, which I'm sure you can appreciate.

[00:30:52] **Dr Mike T Nelson:** Oh yeah. It's a never ending process, and like we're talking off air that. It's not something that I make any money off of, and part of that is on purpose because I chose not to monetize it per se, not that I would potentially turn down some huge sponsor that actually fit, but for years I've had this idea of What if you just sat down and had a conversation with

people and other people got to hear it, because I remember getting some, before even podcasting was a thing, like some audio recordings of interviews of just obscure people and, Russian researchers and stuff that had been translated and all this weird stuff that You're just like, Oh my God.

I wonder if anyone has heard this before. Now it seems like everybody has a podcast and it's, which is good. There's more information than ever before, but it also becomes easy for everything to be saturated. And. Yeah, I think you have to enjoy the podcast. And so when I started the first three episodes were very formal.

And then I realized, eh, I just got bored with it. I was, I didn't like it. And then I'm like, what am I trying to do? Am I trying to be like Joe Rogan or Tim Ferriss? Am I really going to try to Make money off of this and monetize it. And I'm like,

[00:32:12] **Dr Phil Batterson:** ah,

[00:32:13] **Dr Mike T Nelson:** I don't really have to, why don't you just sit down and have a conversation with people I want to talk to?

And we just happened to record them. It's oh, this is a lot more fun.

[00:32:21] **Dr Phil Batterson:** Yeah, I 100 percent agree. That is a. I imagine, it's I have a tagline for my podcast, but I imagine it's going to shift in more of based on, the information that I'm getting from guests, my what is most interesting to me in different points of my life.

So it'll be fun to ride that wave of where do we go in terms of human development and athletic endurance, potential in performance and stuff. So, yeah, I, I 100 percent agree. I tell people all the time is if. If all the audio for every podcast episode that I ever recorded got lost, I'd be really sad just because it is a lot of, I, I still get to have all of these amazing conversations with amazing people who have totally different outlooks on, similar say physiological adaptations or, ways to train.

And it's It allows me to scratch the itch of wanting to grow and get better at what I do and help more people maximize whatever it is they're trying to do.

[00:33:18] **Dr Mike T Nelson:** Yeah, and mine is probably broadly under human performance, but it also allows me enough freedom to talk to people

about psychedelics and ayahuasca, to we'll talk about aerobic development, to hardcore muscle physiologists.

We just had a preventive cardiologist on the other day. It's nice because it allows me to go into different areas and something Tim Ferriss said once I thought was super helpful is that not every podcast is for everyone, but over the course of, you podcast, there will be enough episodes that people will enjoy it.

And I think it's too early on, I was too hyper focused on trying to make sure that every episode was exactly what every person wanted. And I think when you do that, you can lose people along the way. So having the freedom to have people who are like, wow, I really loved that one episode. Eh, another one wasn't released for me, but oh, the next one was great.

I'd much rather have that than everyone be like, ah, it was okay again.

[00:34:18] **Dr Phil Batterson:** Yeah. Yeah. Just just another okay episode, you're like, ah, darn it. No, I want, I like, I w I want people to be like, oh my gosh, I never thought about it that way or holy crap. Like this you brought on somebody who, has a totally different background than you.

And now I implemented that and it's changed the way that I think about, endurance performance. Right. And I think. One of the biggest things that I try to focus on is how do we take all the research in the science that's being made by a bunch of amazing people? And how do we trans? That into better coaching practices, better athletic defense, other things like that.

Because I do think that there is a little bit of a challenge, right, in that translation, like my PhD was partially on translational science and translational metabolism. So we looked a lot at mice and how their mitochondria developed in terms of dietary and exercise interventions.

But then most of the time when we would go into humans and try to do clinical studies in humans. That stuff wouldn't translate. So you're like, okay, well, we need to find things and we need to communicate how these things can then be translated from research in this case to true endurance performance, because it is different.

You're not going to have somebody right. Who's oh, well, I read this VO two max paper. And we did, they did four VO two max workouts a week or five VO two max workouts a week. So I just did that for eight weeks. That's not realistic. Right. And it's a good segue right into the aerobic development, but yeah, it's a,

so, so I'm always trying to, temper that in, in, in take it through the lens of how can we most adequately apply it to get the most out of somebody who, whatever their goal is.

[00:35:58] **Dr Mike T Nelson:** Yeah, and sometimes there's very species specific effects too, like for in the supplement world, I think of CLA, which is a supplement or a special fatty acid that's been sold as a dietary supplement for quite a while. I did a couple of book chapters on it for one of the ISSN books. The research on it in rats or mice is freaking amazing.

It is extremely anabolic. Especially for a supplement, it promotes fat loss, muscle gain, performance, but the human studies are like, eh, like at best, like just nothing to really write home about, which is crazy because every once in a while, every couple of years, it'll show up as a supplement again, and people will show all this amazing research.

And they forget to tell you that, oh yeah, this was in mice. Oh, and then when we actually tried to replicate this in humans, we didn't see that same effect. It was just like, ah.

[00:36:51] **Dr Phil Batterson:** Well, that's I saw something similar to this at the International Biochemistry of Exercise Conference a couple years ago, where a guy was talking all about, like the effects of intermittent fasting.

A lot of that, a lot of those like benefits were developed in mice and rats, rat models. And then what he was, this, he was an expert in intermittent fasting and he was like, yeah, there's hardly any research in humans that actually shows that there's any benefit other than, creating more of a calorie set for people and that's why they lose weight.

And it's just amazing how those sorts of things snowball and gain so much popularity even though, it's well, it doesn't really translate as well as we once thought it would. Yeah.

[00:37:32] **Dr Mike T Nelson:** Yeah. Yeah, and even my other pet peeve with that is the chronobiology in mice is that they seem to be Apparently very sensitive to light and dark cycles And that people will take that research and translate it directly into humans and i'm like I don't and that's the hard part right because if You know look at all the Longevity stuff on earthworms, all the way up.

And as you start scaling up from an earthworm, it's yeah, this is amazing. They're like, 60 percent longevity increase in humans.

[00:38:01] **Dr Phil Batterson:** It just,

[00:38:03] **Dr Mike T Nelson:** it seems like as you, you scale up a lot of stuff. Isn't as beneficial as possible. And I don't know what your opinion is, but my bias is that humans are probably the most adaptable creatures on the face of the earth.

Like we can regulate body temperature real well. We can go in different environments. We're probably not the best at any one particular thing, but we're probably the best at a wide variety of stuff. And that just, that adaptability and that ability to get back to homeostasis ruins the effect of a whole bunch of other things.

[00:38:35] **Dr Phil Batterson:** Yeah. It makes the perturbations and homeostasis a lot less that, so we're correcting a lot easier as opposed to another thing that comes to mind is like most mouse studies are done in non thermoneutral environments for mice. When you start to do, say, like exercise training studies and other things like that in a truly thermoneutral environment for these mice, The effects of exercise actually go almost completely go away.

[00:39:01] **Dr Mike T Nelson:** Oh,

[00:39:01] **Dr Phil Batterson:** interesting. Yeah. Which is really wild because then you're like, Oh my gosh, all of this research that we were looking at in mice that was done at room temperature. actually was causing enough of a cold stress that it was changing the mouse's skeletal muscle biology and their mitochondria enough so that it looked more like an exercise effect rather than, like the cold being the actual effect.

So, so that's, it's just another, it's just another thing that's well, that was really surprising to me when I learned that during my PhD, because we still, when I was doing all my mouse studies, it's still, it's a little warmer than room temperature, but it's not thermo neutral for mice.

And I can't remember the exact temperatures that are required for that thuma thermo neutrality, but that is absolutely a stress that those mice are being exposed to every single day. And when you get 24 hours a day of cold stress you're going to adapt or you're, something bad's going to happen.

Right. So it's, it's like all of that stuff when you start to look under the hood, it's just really interesting. But I like the idea of humans are extremely adaptable. However, we're only adaptable if we're putting ourselves out there and allowing those stresses to come.

Correct. You were saying another, like I was listening to your podcast a while ago and you were like, oh yeah, it's like you got to do it with, you got to do it with temperature and the way you introduce temperature like cold, for example, is like you can't just go from never doing a cold plunge to doing 31 degrees in the cold plunge because that's going to be an over application of that stress.

So you need to have a 60 degrees then. 58 degrees and then maybe extend the time a little bit and all this other stuff. So like I just started doing ice baths a little bit more often and immediately thought of exactly what you had said is okay, I gotta regulate the amount of exposure.

So I don't overdo it immediately. Because then, then you're just spinning your wheels and you're over inflating the stress response as opposed to slowly adapting to it.

[00:40:58] **Dr Mike T Nelson:** Yeah, it goes back to in the course I have in physiologic flexibility. It's D and D, right? So dose and duration are your primary two things you're going to play with.

And I've got, I've had, I don't know how many consults now with people that are like, yeah, my training was going great. And all of a sudden everything went horrible and look at my HRV scores are dog crap and I can't figure out what's going on. And then. The first couple times this happened, I'm like, Ah, what's your nutrition, your sleep, your blood work, blah, blah, blah.

And eventually, with one person, I'm like, Okay what, you did something different. There's something going on here. You've got some sickness we're not picking up. Did you do anything different? Eventually, she's Oh, well, about two weeks ago, I started doing cold plunges and Wim Hof breathing.

And I'm like, Oh, yeah, that'll definitely do it. She's like really? I thought this was recovery. I'm like, well, what cold plunge were you doing? She's well, it was like 41 degrees for three to five minutes. I'm like, how did it feel? She's fucking horrible. It was I couldn't stand it. I was shivering by the end of it And i'm like, what'd you do before she's oh, you know I did 15 minutes of wim hof breathing and i'm like, oh my god And you go back, you look at her HRV, just

like right off a cliff, like right around that point, she's Oh my God, I never realized that.

And I'm like, yeah, if you're not accustomed to it, even when you are accustomed to it, like those are. Massive stressors. They'd be like, Hey, let's go to the gym and just double your volume this week. We've never done that before, but Hey, what the hell, what could go wrong?

[00:42:20] **Dr Phil Batterson:** Yeah. Yep. That's why I whenever I'm trying to introduce stress or have an athlete that we're trying to introduce, more exercise stress or whatever, I always err on the side of caution.

I think a lot of us, especially people who are seeking out, like a coach or a physiological coach. Consultation we want to do the most to get the best bang for our buck, but I'm like, Nope, let's pull it back. We're trying to do the least amount to gain the most amount of adaptation. Like that's always what your aim should be, because then you have that padding of not falling off that cliff, like you were saying, and it's, yeah, it is one of those things where it's like, it's tricky because we can't really we can quantify, like your, our exposure.

And how much, like at what temperature and the intensity of it. But it's still hard for us to see how our bodies are actually responding to things. Cause I think we, we get a little disconnected from like actually how our bodies are feeling and other things like that. We just look at our watches.

We're like, yep, my, my watch says I should train today. I should probably train. It's no, well, my lower back hurts and my hip hurts and like other things like that. I was like, no, you probably shouldn't train. You got to listen to your body, but you're listening to your technology because somehow that's more intelligent than.

Your innate physiology and what it's telling you.

[00:43:35] **Dr Mike T Nelson:** Yeah. That's why I get still very interesting emails from people because obviously I've done stuff on heart rate variability for years. And it's either now it's like one of two camps. It's Oh, so you're just doing HRV to tell people not to train ever.

Or it's Oh, well, don't you ever tell them to listen to their body? You're just, outsourcing their body to technology. And I'm like, well, No, I'm actually using heart rate variability to get them to be informed about their own body. It's usually high level athletes just ignore it and they run into all sorts of issues.

People on the other end of the spectrum, it's normally their lifestyle that's their main stressor and At some point, if you haven't gone to the gym for two weeks, like it's probably not a recovery issue per se. It's, you just need some stimulus to get going, right? Because if you could have fixed all your other issues, you probably would have fixed them by now.

This is not an acute thing. This is a lifestyle. And so you have to pick your poisons on either end and having some metric, that's not how you feel. That gives you insight into how you actually responded to what you did, I think is extremely useful. So I use it as a way to teach people and athletes, like, where their physiologic status is because most people left to their own devices are pretty horrible at figuring it out.

[00:44:59] **Dr Phil Batterson:** Yeah I 100 percent agree. I think There is a, there's a triathlon out of Norway and what he said is that monitoring things like internal variables, heart rate, muscle oxygen, HRV, other things like that is a great way to recalibrate that listening to your body feel. And some people are like, left to their own devices would go one way.

Other people would just ignore everything because that's I was like athletes and type a individuals. That's what we're taught. Right. Right. It's ah. It's well, things are really hard today. It's ah, just suck it up. It's fine. You'll be all right.

It's well, if you do enough of those days in a row of like overtraining or overstressing your life, you're eventually going to, go on a downward trajectory. And that's where things. I think mental health and chronic diseases and other things like that start to pop up.

And then it's, 20, 30, 40 years down the road and you're like, Oh boy, I gotta turn this. I gotta turn the Titanic rather than, in the beginning you're just like, Turn in your dingy turn in a dingy, right? It's it's easier to steer that than the Titanic.

[00:45:55] **Dr Mike T Nelson:** Yeah, and It's very nonlinear too, which is hard for human brains to wrap themselves around myself included.

And I did a frigging, minor in mathematics and engineering for my master's and even I have a hard time with it and like after my PhD, like I was completely destroyed for probably a year and a half, and it was just because of the massive stress of, trying to do it, taking caffeine power naps in the back of your car at 9am and it was all self induced and I knew what I was.

But part of my brain was like, once I graduate and I'm done, eh, I'll sleep a couple of weeks. I'll be fine. And then after sleeping 11 hours a night for, three months, I'm like, Oh, I still feel like dog shit. This isn't good.

[00:46:39] **Dr Phil Batterson:** Yeah. Yeah. I think that's something that people, don't talk about.

As much right is how long does it take to, to come out of that sort of stuff? I did the same thing, right? It's like working really hard during the PhD. It's all self inflicted. You know, it's you got it, you got to do the grind. You got to put your head down. You got to do it.

It, one of the challenges is when you come out of that, it's like really hard to know how long is it going to take for you to resurface. And I'm the same way. I still have I used to be super into like mountain running and all of this sort of stuff. And I'm slowly getting that itch back, but it is very like touch or go.

Like some days I'm just like, yeah, I don't want to do anything. It's like the apathy of burnout. And then other days I'm like, okay. It's I'm feeling pretty good. Let's go and do this. But then it's well, don't overapply the stress. Right. Because you were still trying to get that flexibility back of being able to go from one to the other.

So yeah, I can totally commiserate with you on that one. It's I'm still coming back up.

[00:47:40] **Dr Mike T Nelson:** Yeah. And related to our topic today of aerobic training for meat heads. I think if I were to go back and do it again, I probably would have forced myself to do more moderate intensity aerobic stuff at a higher frequency, but very short duration.

I think I, at the time, I still thought that, well, if I just do some weight training enough to get by, I literally didn't probably do much of any cardiovascular stuff until I was finished. And I think that allowed me to dig such a big hole. And the hole was so big, and my aerobic system was complete dog shit at the same time.

And on the other side, I just thought, well, if I just sleep and go back to some normal life, it'll be fine. And I think I could have shortened my curve back to normal, which I did eventually figure out six months into it. I did a VO2 max test. I did a 2k on the rower, which is from my buddy, Dr. Kenth J.

And it was absolutely abysmal. I want to say it was like nine and a half minutes or something just horrible. And I was like, Oh shit. And at the time I thought, Oh, it's just because I'm over trained, overreached, overturning syndrome, whatever word you want to throw in. And then in hindsight, It was just because I didn't do really any of it for seven years.

And as you age, it just, it's just my buddy, Carla Norris said, it's like imagining you're in a warehouse that has a hundred lights. And every day one light goes out. He's like a hundred days later, you're sitting in the dark, but you don't realize how damn dark it is in the warehouse. And I'm like, Oh shit, that's right.

Cause it's a slow decline. And it's very. Sneaky over time.

[00:49:22] **Dr Phil Batterson:** Yeah, that's you see those graphs that are like, Oh, if you start, if you have a high VO two max when you're young, this is their trajectory, but then the trajectory is always like the same. It seems and unfortunately though, I think our lifestyle factors and other things like that really do affect like what that trajectory is. If you're not sleeping enough, if you're overstressing yourself, if you're, on the flip side of things, if you're exercising consistently, if you're doing like, if you're staying strong, if you're staying mobile, then, you're going to flatten that curve out a lot more than, the people who like, I have a lot of friends who are like, Oh, well, I did my undergrad degree.

Now I'm going to go off and I'm going to work and I'm going to work, behind a desk. For 80 hours a week, as long as I can. And it's you see them like pictures of them from college to like now. And you're like, dude, like we're really still not that old. You're, you're decline is just incredibly fast.

And that's something that is extremely concerning to me. Cause I'm finally starting to, I think, feel a little bit of the effects of. That neglect that I did during the last, four to six years of my master's and my PhD. And it's oh, well I have, chronic back pain and chronic hip stuff.

And I can't deal with Introducing more stress, at least right now. So I'm trying to make myself like a more resilient individual by introducing the stresses here and there and tried and trying to flex it, right? You've got to flex that muscle in order to get better at it, but I'm trying to start, small with small doses of the, of those to adapt.

And then. Maintain, because I was able to actually maintain, my cardiovascular fitness quite well during my PhD, which is great. I think that's at least helping

and to some extent. So, so I'm trying to keep that up, but also I'm trying to like, I was telling somebody I'm trying to rebuild like the foundation of, like proper movement patterns, making sure I'm strong enough to do the movements that I want to.

And just even just like walking 10, 000 steps on the treadmill this morning, like my feet were sore and my ankles are going to be sore tomorrow. It's Oh dude, I used to walk 25, 000 steps every single day, during my PhD. And then once I got done, I stopped doing that. And it's okay, we got to start doing that again.

Right. So working my way back up.

[00:51:37] **Dr Mike T Nelson:** Yeah, I agree. I, during my PhD, if you were to write a program on how to kill all your aerobic gains and destroy as many mitochondria as possible, pretty much what I did, like calories were probably too low during certain periods and too high during other periods were very haphazard.

And sleep was an utter. Nightmares, like four to six hours a night weekends, maybe a little bit more, way too much caffeine, not enough micro nutrients, shitty breathing patterns, ridiculous amounts of stress. It's yeah, don't do that.

[00:52:12] **Dr Phil Batterson:** No, if you, yeah, you need to write a book. That's just don't do this.

Don't follow what I did instead. This is what you need

[00:52:19] **Dr Mike T Nelson:** to do. But even having said that, I've always been fascinated by how resilient human beings are. Like, even despite doing that, which again, I would not recommend anybody do this, my blood work was a disaster. The only thing that didn't change is my lipids didn't get super crazy.

At one point my testosterone was 220, I think. Wow. And it was, it stayed there. It stayed below 300 for three and a half years, so all my other measurements went in the toilet. But amazingly, I was still upright. I was still, but most people would consider pretty functional. I was paying a ridiculously high cost for it.

. And I always think of even just like nutrition. If you look at what the average American eats, doesn't get a lot of exercise, is overweight. The fact that they're still walking around and can exist for decades more? It's fascinating. If I put sugar in the gas tank of my car, I may not make it around the block.

[00:53:15] **Dr Phil Batterson:** And

[00:53:16] **Dr Mike T Nelson:** these people are existing on Twinkies, ho, and fried chicken. For years, that's just amazing.

[00:53:24] **Dr Phil Batterson:** No, I know that was it's like my dad was saying like, Oh, well, like we were talking about diabetes and stuff like that, because that was part of my dissertation was looking at metabolic issues that arise with high fat diet and other things like that in terms of animals and how you can reverse that with exercise.

So we were talking, He was like, well, type two diabetes used to be called adult onset diabetes. And I was like I had heard that before, but I was like, yeah, that's super interesting because now it seems like we're accelerating, the prevalence of the chronic diseases and other things like that.

Yet, like you said, people are still walking around where we were arguably in like probably the least healthy from a chronic disease perspective that we've ever been. And yet, people are still living to 60, 70, 80 years old. And it's amazing what the human body can withstand in a non optimal state.

And, on the flip side of things, though, the good thing, the good news is you can reverse that sort of stuff, right. With proper diet. And it depends on how long you've been following that path. It takes longer to get out of, if you have, a little bit of overweight or obesity, then.

With proper diet and exercise, you can start to reverse that and you can start to reduce the risk of cardiovascular disease like VO2 max, right? That's like super, super popular topic now. You hear it on Peter Tia all the time. It's and I get a lot of people who come to me and they're just like, yep, I got to train my VO2 max because that is and it is the single best predictor of all cause mortality, right?

The higher your VO2 max is, the lower your risk of all cause mortality. And it's okay, you gotta treat your heart, right? And, so, so the good news is that's also highly trainable. It's and I think there was like a, there was a graph that I used to use that it's like, as long as you're outside of the bottom 25%, you're going to reduce your risk of cardiovascular based disease and risk factors, like almost exponentially.

So it's just get out of that bottom 25%. It's not a, that's it's simple, but it's not easy, right? So I think I, and everybody who's listening to this podcast, I don't think would be or have that issue, but maybe, somebody who might have that

issue. So you can nicely say, to them, well, you can still change it until the day you die.

You can still change your body and you can still control the environment that you put it in. That's that's positive for me. Cause I'm like, okay, that means I have an internal locus of control. I can control some things. Yeah. Some things you can't, but at least from a cardiovascular perspective, you can definitely control how healthy your heart is.

[00:55:58] **Dr Mike T Nelson:** Yeah. And that's something that unfortunately took me. Too many years to evaluate on people. I think the first time I did a VO two max assessment on someone was maybe six or seven years ago now. Okay. And in hindsight, I was like, man, I should have done this. Like when I started in 2004, I was like, how the hell did I admit, and I got, beat senseless with it, doing a PhD in exercise fizz, because most of the data.

Was still cardiovascular to this and that and this lab and this famous guy and treadmills and metabolic hearts and God knows how many hundreds of metabolic heart studies I did, I still somehow Missed it. And when I started doing it on people, my assumption was, eh, most of these people can't be that bad, and I would see a couple of people that were horrible.

Like one, one woman I worked with, she was super busy, wanted to get into training and her complaint was just, man, I just don't have any energy. Her sleep. Wasn't a bad nutrition was okay. It wasn't the best, but it wasn't horrible. And we did a VO2max test with her VO2max by calculation was technically negative, which again, can't happen.

So she was so bad, she was so far off the end of the spectrum that the equation actually broke down and spit out a negative number, and I was like, oh shit. And it took, about eight months for her to get back to 50 percent of the, just general population. But she lost 30 pounds during that time was easier for to keep the weight off.

Her energy was like through the roof and yeah, we did some other changes. Obviously we did weight training, we did better nutrition and sleep and everything else. But I was surprised that one, there are some people who are that bad, and she had been to other physicians, functional med docs, like all sorts of people who can't figure out like what's going wrong with her.

She just so

[00:57:45] **Dr Phil Batterson:** detrained.

[00:57:46] **Dr Mike T Nelson:** She's just so detrained, and she didn't, it wasn't her fault. She didn't know any better. Right. And she had come to me three years earlier, I probably wouldn't have figured it out either. , and just getting back to 50% of the general population. The general population is not super trained either, so she still wasn't very high at the end, but from where she started. Yeah, it was, she was in another universe at that point.

[00:58:08] **Dr Phil Batterson:** Yeah. It's re it's really interesting when you start to look at like if you look at European studies versus American studies, if you see VO two maxes from like European studies, they're like, yeah, we got 30 people off the street, in Copenhagen, Denmark, and they're untrained individuals and their VO two maxes are like 40 to 50.

You're like, wait a minute. I did an entire study of, sedentary individuals during my PhD. And I don't think we had one person over 40. Yeah, we might have had yeah, maybe 45. Cause there was a guy who was like, I think he was like, like former cyclist who was just getting back into it.

He wasn't doing any formal training, so he still qualified, but it was just like, and then on the flip side of things, we had people well under 20 and I'm just like, How are you even doing things of activities of everyday living with a VO2 max like that's actually that low because that when your VO2 max becomes the limiter in terms of what activities you can do, you're not going to have a fun time.

[00:59:06] **Dr Mike T Nelson:** No, your life sucks.

[00:59:07] **Dr Phil Batterson:** Yeah, it's I was like, Oh my gosh. So yeah, it was really an eye opener because again, like I live in the, in the sports performance world where it's like, Oh, well, if your VO two max isn't above 60, get out of here and then you start actually looking at the general population and you're just like, Okay.

Well, let's think about this. It's projected that 70 percent of the population is supposed to have overweight or obesity, probably now, honestly, but I think it was projected for 2025 or something like that. And then on top of that, the amount of sedentary time that everybody is doing. So, normal all the way up in terms of BMI is, and I know BMI isn't a perfect metric, but it's just a way of kind of categorizing.

Then you start to see, you're like, Oh my gosh. So, so we have a, we have an overeating issue. And we have a non exercising issue. And it's like I went back to the Midwest, that's where I'm from. And it's been like, six year, four, six years before going back. And I was just like, wow, I live in a different universe at my university and the people I associate with, because every single person I see.

It could probably stand to do a little bit more exercise here. And it was just very concerning because it, that trajectory is really scary because it's just going to like, there's got to be a critical mass in terms of, like people, whatever, whenever you see like those decline curves, like we're talking about, there's always like a sharp drop off at some point, whether it's with, yeah, with the muscle mass, right.

With sarcopenia or it's like, The point at which you start to then, have runaway insulin resistance, and then you start to have issues with type two diabetes and other things like that. So it's just like the, unfortunately, the general population, we could all like, I think just in general, we could all use a little bit more, like low level aerobic training, but it's not a priority because there's so many other things going on, right?

[01:00:56] **Dr Mike T Nelson:** Yeah. And that's, and I get it if you're, A general population person, it's confusing as hell because even the government recommendations don't agree. Like the IOM doesn't agree with ACSM. It doesn't agree with the, who, like these big organizations can't even agree. And I can't even remember which one came out and basically said that, Oh yeah.

Well, that I think it was the IOM recommendation is accurate, but it's so unrealistic for most people that we just changed it. I'm like, okay, so you just lie to people now? That's your solution. I'm like, that's not good either. Cause you're just going to add confusion to the whole thing. And then you have people who are well intentioned who maybe hit that metric.

They don't see the improvement that they were promised. They're like, screw you. I'm not doing any of this because I put the time and effort in and I didn't get the result that you promised me, or I didn't even get close to it. So I get why it's very difficult.

[01:01:55] **Dr Phil Batterson:** Yeah. Yeah. And going back to your your testing and everything like that, it is I think physiological testing is still very limited in terms of.

People's ability to go do it. It's not like you walk into the doctor and you get a blood test. It's you need to have specialized equipment. That's fairly expensive. You need to have somebody who actually knows what the heck they're doing. But the good news is that more technologies are coming out that are portable, can sync with your phone, Bluetooth enabled, other things like that.

So maybe, with more and more practitioners recognizing the importance of things like cardiovascular health. In an ideal world, right? Your yearly checkup, you do a little bit of a VO2 max test or a stress test or something along those lines just to see do you need to start exercising more because you're on this bad trajectory that if you don't, then, you're not going to you're putting yourself at a much, much higher risk of issues.

Soon and later down the line.

[01:02:51] **Dr Mike T Nelson:** Yeah, what are your thoughts about I have my own biased opinion on this that if we wave a magic wand and let's say every physician's office now has A metabolic heart has equipment to accurately test your VO2 max, let's say, and let's say it's done via some type of max test, who cares what it is, but it's a max test.

Do you think that would solve our issues or do you think it would be a temporary solution? Because once people realize how utterly despicably horrible a max test is, they'd never do it again.

[01:03:26] **Dr Phil Batterson:** I've been thinking about this quite a bit lately. It's it's tough because what I think physiological testing is really good at is making us aware of how or what is going on within our body.

It's the same thing with like blood tests. Like you wouldn't know that you had dysregulated. Insulin or sugar, unless you got a blood test, right? Because it's generally benign. Same thing. You wouldn't know if you had poor cardiovascular health, unless you had a heart attack, high blood pressure, something along those lines.

So I think there's ways of, doing like the I can't even remember what, like the clinical tests are, but it's you just walk on a treadmill and then you VO two max is based on that

[01:04:07] **Dr Mike T Nelson:** type testing of some form.

[01:04:08] **Dr Phil Batterson:** Yeah. So, so even if it was that and it let people become more aware of.

It's okay, well, it's like here's the numbers. 'cause that's what I really think they would be useful for is like pointing out the numbers and being able to explain, well, here's where you are. You're in the bottom 25%. That means you're at actually a 20% greater. I don't know the actual numbers, you're at a much greater risk of other things.

Here are some things that you can do and. It, we got to start to get away. Well, the recommendations are good, but I think from an individual perspective, you can't just be like, yeah, you got to do a, 150 minutes of moderate to vigorous activity per week. It's that's too ambiguous. What do you want to do?

We need to give like. Go garden, pick something that you like to do, like park a little bit further away so you can walk, don't take the scooter, when you're shopping, do other things like that, that are a little bit more easy things that you can change within your life rather than being like, okay, now you have to go to the gym one hour a day and you're not, it's I've never even thought about going to the gym.

That's that's some people's mindset. So I think it would bring awareness doing the maximal test. Yes. They're right. They are maximal and everybody fails them. And that is something that I have to tell to my, elite level traffic and they're like, no, I'm going to beat the test.

I was like, no, you're not because I'm just going to keep making it harder until you lose. Right. So, so it's going in and it's figuring out, it's well, we don't actually have to bring people all the way to max. We can get them part of the way there be like, okay, well, you're out of that bottom 25 percent and then go from there.

This is a lot on the wellness side of things on the. Like the performance side of things via two max is absolutely important, but it's not the end all be all. So then it gets a little bit more confusing because then you have to have somebody who actually knows, okay, well, these are the variables we're going to look at and here are decrements in these variables, and this is what we wanted to do to push you forward.

Right? I can't, you can't just go do and feed VO two max stuff all the time and just be like, now I'm going to go run an ultra marathon because it's not specific enough. Right.

[01:06:12] **Dr Mike T Nelson:** Yeah. My bias in that area is I think. If we could have the future set up, and I know Penoe has a solution for this and side note, I'm an affiliate for them.

I know VO2 Master is working on some stuff. So with Penoe, you can, buy their equipment and they actually have a whole team of exercise physiologists now that'll help read it. We'll talk to the client. So they're trying to make it accessible for people who are not exercise physiologists, who aren't goons like us that sit around and go, yeah, give me the raw export.

And I want to look at all these numbers and make my own excel graphs and all this stuff, just because we're into it. So that's nice. And I think if you want to do a max test, you want to do some of their protocols. Great. More adoptability of that. Amazing. However, I think for To hit the most amount of people possible.

It has to be some type of accurate sub max test. Again, I'm biased cause that's what I was trying to do with my PhD was looking at a sub max test at, 30 or 60 percent of VT or metabolic flexibility. We showed the gauge RNR is repeatable, but no one has since. Done a test to show if it actually does show what we think it shows.

Again, what is the gauge R& R? Just as repeatable. So we brought people in, we had them do a max test and we said, okay, get on the, we used the treadmill, 30 percent of ET for, I think, 15 minutes, 60 percent of ET for another 15 minutes. And what we did is we looked at, so if you've done enough metabolic testing, The thing that always blew me away is that, okay, during parts of it where you're at steady state, and even if you're doing just a long, a longer test at steady state for whatever reason, you get bored, right?

And you're watching all the numbers and you're watching the person to make sure they don't fall off the treadmill and all that kind of stuff. But you'll see the RER, so the respiratory exchange ratio, the marker of fats to carbohydrate usage, it'll move around a little bit in some people, and other people it doesn't move at all.

I'm like, well, wait a minute. What the hell is that? This is steady state exercise. There's no other inputs to the system. Is it a machine thing? Is the machine like not that accurate? Maybe, although most of the data would say it is pretty damn accurate. You check the respiratory rate, you cross check everything else.

And our conclusion was that some people, just like you have heart rate variability, you've got fine scale variability in your heart rate, you have fine

scale variability in your breathing, you have fine scale variability in sway, like Every system we've looked at has fine scale variability as a state of health.

So our argument was, RER probably does too. That if it's oscillating around this number at steady state, that's a marker of metabolic flexibility, metabolic health. You can do sample entropy, you can do a variability analysis, you can actually quantify it. And when we did the GAGE RNR study, so we had different operators of the machine, we brought people back over multiple times, same person, same conditions, and We got the same result.

So what that tells us is, at least the test is stable enough that you're going to get a similar outcome under similar circumstances. What we don't know is that really truly a marker for metabolic flexibility. And so when I graduated, you always think like your PhD is going to change the world or whatever.

I'm like, ah, someone else is going to read this and they're going to, go test it. And well, it's been eight years later. No, nobody's done it. And they might disagree, but I haven't done it either. But the whole point is I think having some accurate sub max testing, I think is the only way to get around it for mass acceptance.

Even then some days on my cynical days I have doubts because like you mentioned blood work. Shit, like the amount of clients I have who come in who are into health stuff already, especially dudes Hey, man, when's the last time you had any blood work through your doc? Five years ago, right? And so it's hey, we should probably look at these things.

So yeah, I don't even know if that will Solve the issue.

[01:09:58] **Dr Phil Batterson:** No I, yeah, I know. It's a, it's tough because I think it's a, it's a cultural shift, right? That needs to happen that we need to be more accepting of, like wanting to do exercise and having communities that then build that exercise and not having to work eight 12 hours a day, because.

When you have, when you work 12 hours a day, Then your other, few hours, you're not gonna go do something you don't enjoy. No. So that's another thing, right. That, that also plays into it. And like with the blood work stuff, I've tried multiple times to go into my doctor and be like, Hey, can I get some blood work just so I can, track it over time and do things like that.

And they're like, no, you're a healthy, you're healthy young man. Yeah, you're fine. You're young. Get outta here. I'm like, no I wanna get the baseline data so

I know Yeah. If I'm falling off the cliff. Right. So it, it's. I do that there are, like blood testing companies and stuff out there now, but it's still, it's barrier to entry is the expense of it.

Right. Cause if you're going to do I don't want to call any individual company out, but it's if you want to do a premium one, it's like a thousand dollars and you're like, okay, well I can afford to do that once a year, maybe, but in an ideal world, you'd probably be doing it every once a quarter or once every half a year or something just to see, okay, now I know something got messed up.

I need to start tracking this and then it might be good to get do like seasonal changes as well and like other things like that. So yeah, it's a big conundrum, especially in the public health field. And I don't know what a good solution to that is, but think the more we start to develop technology and the less that people actually have to rely on.

Us as experts to administer a test and interpret those values and other things like that, the more accepting it's going to be. And this is something I've been thinking about a lot, because I work really closely with a few companies in the technology side of things in terms of endurance performance and all that.

I'm like, look, we need to get to a place where Somebody, like either a coach or an athlete tells us what sort of workout they want to do for the day. And then it's just dictated for them. They don't have to make any decisions on it. Take away that decision fatigue because that's a barrier to entry.

How long to do it, how intensely to do it. We need to try to get, a way of figuring that out where that's like a little bit more optimal. And again, that's like pie in the sky dreams right now. But hopefully to some extent, right. Somebody will take your study and they'll be like, Oh, well, let's look at the variability in those oscillations of RER.

How does that relate to health? Right. Because who knows, maybe that is, like the first the first canary in the coal mine, thing to bad metabolic health is an inability to switch even when you're breathing in and breathing out. Right. Right. Cause I, there's probably fluctuations in, in, say carbohydrate oxidation and fat oxidation, even from a breath to breath or a contraction to contraction sort of movement sort of pattern, right?

[01:12:54] **Dr Mike T Nelson:** Yeah. And I think the solution in the meantime is that's where coaches, personal trainers, people come in because it took me a while to realize that people are basically hiring me and they're hiring you to give

them a plan at first. And it took me years, even sometimes now I still struggle with this to be.

Giving them a plan that I think is their best one to start and then trying to iterate on that over time with their feedback, where I tried getting all their feedback and doing everything upfront. And it was, they're Yeah, it was too confusing. It was too hard. It was too ambiguous and compliance was dog crap.

But if you just dictate to them in year three, exactly what they're doing, you don't ask them how they're doing. You're not looking at heart rate variability. You're not doing an MRAP test. You're not doing any output testing. We, you're probably leaving a lot of, gains with an S or Z on the table.

Because you're missing their sensations and how they feel about it. Somebody Dan Garner refers to it as at first, he's I'm just going to dictate the program to you because unfortunately I know more about training than you do right now. And then he's and over time, you're going to know more about your training than I am.

So I want more of your input into the process, because you have all the data, you have all the experience and, trying to ferret that out is something I still feel like I'm always. Trying to figure out still.

[01:14:22] **Dr Phil Batterson:** Yeah, no I really liked that approach. That's something I any athlete who comes to me, I tell them, I'm like, look I eventually want you to stop needing me as a coach because so much about training that you don't need me anymore.

The only thing you need from me is to bounce ideas off me and iterate your training based on that. So that's always that's like the ultimate goal of my coaching. But. I'm going to take from this conversation is dictate the program at first, based on, what the athlete needs and what, and who they are and where they're coming from.

And then from there iterate on it and eventually get to the point of kind of the autonomy, right. For that athlete, cause that there's a level of empowerment with that too is if you have an athlete that's Oh, Hey, this is this is the training program that I thought up for myself.

And you're like, Wow, that's pretty good. Go for it. They're like, sweet. I know what I'm talking about.

[01:15:12] **Dr Mike T Nelson:** Yeah. And I think there's also the long term thing of so I think it's some of my clients I've had for many years of, I have a pretty damn good idea of what they're good at, what they want and how their body responds.

And so I can usually get pretty darn close and I get from their side to have someone that they trust and to not put as much thought into it. I think is also a huge benefit, right? Knowing that, Hey, I've worked with this person, I've done their workouts or training nutrition for three years and most of the time they've been on the money.

Cool. I'll just shut up and do my portion. We'll still do markers. We'll still do, HRV. We'll still do some feedback on it. But I get it that it's also nice to know out of all the things you have to think about in your day, you've got kids, you've got a job, you've got everything else.

I get that not having to think about your training is a nice benefit. And you can just focus on the execution portion also.

[01:16:10] **Dr Phil Batterson:** Yeah. And that is that is the benefit of having a good coach, right? You trust them. You say, okay. Yeah. And then you just show up. You're good. And then you just show up.

Right. Yeah, exactly.

[01:16:23] **Dr Mike T Nelson:** Yeah. And I think trying to figure out what is best for each person. So for example, I hired my buddy Adam Glass to do my program for lifting the inch dumbbell. And I've worked with Adam for years off and on. So I knew what to expect. And so I paid him money, which was great.

It's just what I wanted to do. And he literally sent me maybe 200 words, if that, of Hey, test this test. Here's a three tests do this, then this, then that there's no program, there's no writing. There was no rep number, no, nothing else. However, for where I was at and what I needed, that was absolutely perfect because I was doing exercises.

I haven't done before. I understood the progression. I knew what to do if this wasn't going to work and I have enough working knowledge that was exactly what I needed. However, if someone was brand new, they'd be like, what the hell? I paid how many hundreds of dollars for these 200 words? You're an idiot.

Yeah. So it's always this thing of trying to meet the client where they're at too, at the same time.

[01:17:24] **Dr Phil Batterson:** Yep. Yeah. It's tough because it's like, we're talking about, Oh, everybody, should do a VO two max test and stuff like that. And it's I personally hold off on testing for individuals.

If they've never been consistent with exercise, that's like where I would start. It's okay, you want to exercise, you want to get into shape. Okay. What we need to figure out consistency first. And then we can start to, see where your numbers are because it doesn't make sense. If we did a test on the first day that somebody came in, they'd never exercised on anything like that. They're going to come back two weeks later and they're going to look like a totally different person physiologically.

[01:17:58] **Dr Mike T Nelson:** Oh, sure.

[01:18:00] **Dr Phil Batterson:** And it's, so, so it's okay, well, maybe that would be really good to be able to track that early progress, but it's well, anything you do at this point is going to result in gains.

So it's the same thing with weightlifting, right? It's like I was doing CrossFit during my PhD. We had so many people who, and it's actually more women who would come in and they were so surprised that every time they would do like a one rep max or a five rep max their max would go up.

I'm like, I'm not surprised at all, because I know the neuromuscular component of, being able to recruit those muscle fibers, better coordinate them, better do other things like that. Yeah. Especially if you're new, but then inevitably about what would it for four months in. They're like, Oh, I've done, I've, we've been doing the five rep maxes and stuff like that.

And I'm not getting better anymore. I'm like, it takes time. Like now this is your, you're in like the patient, this is where you gotta be patient and you gotta trust the process. So, that's where I'm like, okay, well, do we really want to spend, all that time and money doing the testing in the beginning?

Just to, cause I, I can guarantee you, it's whatever you're going to do, you're going to get better. But then after that's where it really starts to become important because if you start to get an idea of that physiological or how somebody's physiology is changing, then you can start to say, okay, well, we know your performance is going up.

And for example, it's oh, because could be because your VO two max went up 10%, over the course of the last 10 weeks or something like that, or maybe your VO two max never doesn't go up. And your economy got better. Cause you just got better at running or better at moving or something like that.

So I've been thinking a lot about this as like physiology explains how you got to where, you are right. It's yeah, your performance got better, but if you don't ever look under the hood, then you have no idea how it's changing. So then you're just blindly throwing darts at the board being like, well, this seemed to improve it, but we don't really have any way of telling you why or how it did.

[01:19:59] **Dr Mike T Nelson:** Yeah. I've gone back and forth on. Testing people to start and I guess more part of the last five years I've gone back to Testing everyone via some form of assessment to start. And I agree that physiologically it may not be the most valid, but I also charge people a lot of money. So I only take people that are motivated and I do use the data to design their program.

But I also found it was very valuable to show them where they needed to work to ensure their compliance. Because I think one of the mistakes I made early on was that if I just charge people enough money, they'll do what I say. And so like for the example aerobic training, a lot of people didn't do the aerobic training.

But now if I show them like, hey man, like your VO2 max is like 20 percent of the general population, which is pretty untrained. And so hey man, like your VO2 max is 20 percent of the general population, which is pretty untrained. Oh, and you can only lift three days a week. Oh, and you want to get bigger and you want to have these performance gains.

Oh, you want to get better body comp. Well, this is your rate limiter, which I can probably get from some sub max testing and from some other parameters. But I think to have that test and even if it's done on the rower and they've never rode before, like I know. If they did the test tomorrow, they'd probably get a little bit better.

It's I'm just trying to get in the ballpark, but I'm also trying to use that to demonstrate to them that, Hey, this is the thing that I think is the issue and yep, it is. Because sometimes I've been wrong, like a buddy of mine, just for giggles, we were in Costa Rica, and we put him on a rower to do a 2k, he doesn't do a lot of cardiovascular training, big natural body builder, it's my buddy Ryan but his training is pretty intense, like he trains hard, he does some short rest periods, and so my buddy Ben House just said, Hey, follow this little pace car.

You put the little pace boat on there and it's the middle of the test. And he's just, he's in there just going balls out. I asked Ben is, Hey man what did you set it at? He's I just told him, don't let that boat beat you. And so he gets done. He like falls off the rower. It looks like he's going to have a coronary.

I look at his time and I was like, what the fuck? He got like six 53. Which again is not an elite rower status, but for a dude who doesn't train cardiovascular has not done a lot of rowing. I was like, you did better than I've ever done. And I've been training this shit for five years. You bastard.

[01:22:20] **Dr Phil Batterson:** Yeah. That's impressive.

[01:22:22] **Dr Mike T Nelson:** So you get those freaks too, where you're like, yeah I, yeah. I wouldn't have you do a lot of cardiovascular training. Yeah,

[01:22:28] **Dr Phil Batterson:** you're like, yeah, exactly. But, and going back to your point, I think if you're not testing in the beginning then, it's you don't know where he's really starting.

And I know he's got really good, really good performance, but is that because his VO2 max is massive, his second threshold is pretty high or his economy is really good. Right. So, yeah I think everything is context specific, but I do think, in some cases, right, maybe it does make sense to just immediately start testing and then do something along the lines where you're try to catch the steep curve of adaptation, maybe you're doing testing every two weeks or something like that.

And then you're showing them, you're like, Look your performance is getting better, but your VO2 max is going up, right? Because that's generally the response that, that occurs is your VO2 max will go up first and then you'll start to see increases to your second threshold and other things like that.

You don't know unless you track it. That's what, that's, it's the same thing with the blood test that we were talking about earlier, right? It's you don't know if if 600 testosterone, when you're 40, Is a good number or bad number if you've never gotten test before, cause maybe when you were, 18 and, or 25 and you weren't eating a lot and doing other things like that, your testosterone was like 200, right?

Cause you just got done with a PhD and you're, like abusing yourself really bad, or maybe it was like a thousand and now you're, you got that slow decline over

time, right? You just don't know. And you can't say one way or the other, right? Whether how it's changing unless you actually measured it.

[01:23:50] **Dr Mike T Nelson:** Yeah, I think it's into like you were talking about different like fractions or like an inventory threshold or lactate testing or kind of these sub markers. I think there's a lot of argument. I'd be curious on your opinion about getting too far down in the minutia. Like I get it if you're a competitive cyclist or you're a competitive rower or something and you are, at a pretty advanced state.

Cool. Makes a hundred percent. Yes, I understand that if you have a high VO2 max, that is not the only thing that's going to predict races. Tons of research has shown that's not true. However, cyclists seem to be the worst for this. There's a thing where it seems like Some people get hung up on always testing the next thing of Oh, bro.

I already tested my VO two max. Now I need to know what my fat max is. Now I need to know my VT one, or I don't like the way that VT one was done. I think lactate is better. Well, let me, well, what level of lactate should I look at? How, what tests do I use? How often do I prick my finger? Oh, shit. I'm doing rowing.

I can't prick my finger while I'm rowing. Like someone poked me in the ear when I'm doing it or, it seems like never ending and those are the people who, Get so hung up on numbers. I'm like, bro, what are you doing for training? Like you're testing all of the time and now you're so confused. You don't know what to do.

[01:25:05] **Dr Phil Batterson:** Yeah, I, my, my philosophy is do the same test with the same machines. Repeatedly over time and a good assessment or a good test will give you all of that information or at least some estimate of all of that information. And, so, so it shouldn't be, Oh, I'm going in and I'm doing my VO two max test.

And then you have to come in the next day and do a lactate threshold test. And then you have to come in the next day and do another test. It should be this test. We're going to do, I'm going to do it every single time you come in, for testing, and it's going to tell us your economy. all of your zoning variables, because that's another thing that I think people is a common misconception is Oh, well I use my FTP and then that tells me all of my zones.

That's just giving you an arbitrary idea of where that zone should be. And yes, it works for some people because of population norms and statistics and stuff like

that. If you, but you can measure your first threshold, if you can measure it, that's going to be way better than if you just put an arbitrary number of 50%, for example.

Again, it's not for everybody, for the everyday person who's just well, I need to know how to, how slow to do my easy stuff and how hard to do my hard stuff. Okay. Then find your heart rate max, and then just use 90, Right? We could argue till we're blue in the face about Oh, well, that's not great because this, that, and the other, and this exception, and that, but for most people, that's better than doing nothing.

But, if you're really getting into the testing. It's okay, you need to do something that is going to, give those performance fair those predictors of performance, which are your economy of movement. So how much oxygen you're using for a certain speed or a certain intensity, your first threshold, which is the first transition point between, or where you maximally are oxidizing fat and then transitioning to more carbohydrate oxidation during that time, you're also using carbohydrates.

So it's not just a hundred percent fat. But it's maximal fat oxidation. And then that second

[01:27:07] **Dr Mike T Nelson:** fat max is what you would use

[01:27:08] **Dr Phil Batterson:** yeah. Like from a gold standard point of view, like if I could measure fat max, that would be my measurement of where zone two should occur. LT one VT one years break 0.

1. All of those are all just trying to figure out just subtle changes in physiology. And typically that's the tipping point is where you're getting away from fat max. You're recruiting more type two fibers and then you're, using more carbohydrate. So. They're all really close. So this is, again, this is like why my philosophy is.

Do the same test with the same devices, repeatedly, because for example you've made a, you had a really good podcast about body composition and like the variability between that. And it's well, if you did a, if you did body composition on a DEXA scanner and then an in body and then the air displacement and then the water displacement, yeah, you'd get different numbers every time and you have no idea.

What the heck is going on and how, how things are changing, but at least You can reduce the you can reduce the amount of systematic error by keeping the system the same, right? Obviously there's still going to be air. I don't know if that was the correct definition of it, but you can reduce the amount of, variability within your measurements by not changing, from like a Parvo.

Cart, a cost med cart to a canoe to master right back and forth. Just pick one, again, we can argue until we're blue in the face about which one's the most accurate, blah, blah, blah, blah, blah. If you're doing that, then you can start to see, okay where's my first threshold. Which is that transition from, fat max to carbohydrates, that second threshold, which is sustainable to unsustainable pacing.

So whether you want to measure that as your FTP, your critical speed, your ventilatory threshold to your lactate threshold to at four millimolar or the second inflection point or the D max method or whatever method you want to choose nears break point to I'm probably missing a few of them, but maximal lactate steady state.

There's another one, there's 8 million definitions and each one of them again is just trying to get at where do we go from sustainable exercise intensity to unsustainable exercise intensity. Then the last thing you're trying to measure is your VO two max. That's your maximal aerobic capacity.

And then personally, I like a fourth one, which is like sprint capacity. So then you have, you basically have four delineation points you have, and then you can make those into zones. Right? So, so that's how I make my aerobic training zones and it's based off of all stuff that we can measure. It's not taking Oh, well, I take 25 percent of second threshold to get the middle point between, it's yeah.

There is a zone between first threshold and second threshold, and that is what I call, and that is the zone, right? There is a zone that's second, or first threshold and lower. Yes, you can break that up if you have a recovery day. Just go really easy and be really low in that zone. If you're trying to build volume and stuff, be a little bit higher.

But don't tell me that you're gonna get, greatly different that, oh, well, 50 percent of that is gonna be your recovery day. Because there's no real justification for it. Cause you're not, you're just picking a number in the middle of that zone. So that's how I do it. And that's how I would recommend, people who are like serious about, figuring out what intensities to exercise at is if you're going to do some physiological testing, that's how I would do it.

If you're somebody on the wellness side of things, cause I know we've been jumping back and forth. It's do a step test, get a heart rate monitor. You can probably measure your heart rate, either like on your watch or from a chest based perspective. And do a step test on your bike or on your treadmill and figure out what your maximal heart rate is.

Don't use the, don't use the number of quick, like the 20 minus your age or other things like that. And then, then you can use just like an arbitrary zone calculator, cause that's going to get you the majority of the way there. At least that's a good starting point for, people who are like in the wellness, world who want to just make themselves better.

They've heard about this zone too. They want to do some more zone too. They've heard about, via to max stuff. So, you want to do a certain proportion of what your maximal heart rate is. And that would, that's what your target should be. So that's where I would start. And then for the more serious individuals who are going to be doing the testing, just stick with something.

So then you can measure it and measure changes over time, because if you can find Changes that are truly actually happening, right? And they're not because of, oh, well, I switched from, my, my LT1 being at 2 millimolar to the first inflection point. It's you have no idea if 2 millimolar was even your first inflection point to begin with.

Yeah. So it's so then you're muddying the waters with potential measurement error, right?

[01:31:47] **Dr Mike T Nelson:** Yeah. And I think that's the advantage of having technology to do it. So someone came in here, like I have a Pinoy, so a metabolic heart, I've got a three moxie sensor set up so we can put you on whatever modality.

I don't have a treadmill, but you can actually just go run. If you need to, we've got a rower, got a bike and do some form of what I call a bastardized max test. And like you said, I can get pretty much anything I would need from that one test and do it online because we don't have as good an output. I might have you do a 2K, you might do a 30 second Wingate, 60 second Wingate, whatever.

Cause I'm left with just looking at these functional outputs because it's online. I can't get any insight per se into a test. And then I have what I just call bastardized zone training. So like zone one is just sub max. If you have to think

about it. You're definitely not in zone one. If walking should be zone one for a healthy person, zone two, your cap is the old school talk test.

You should be able to get a complete sentence out. If you're calling someone on the phone. Yeah, they could probably tell you're exercising, but you could have a conversation. You're pretty close. Zone three is classic cardiac development. A little bit more effort. Your breathing is going to be definitely more labored, but it's a pace you should be able to continue for 5, 10, 15, maybe 20 minutes should be hard, but you shouldn't be able to only do it for three minutes, unless you're incredibly deconditioned or your zones are all screwed.

Like zone four is. Pretty hard. You're going to take a lot of effort. You probably can't sustain it for more than a few minutes. Five is just, light your ball sack on fire and go as hard as you can for the short period of time and call it zone five.

[01:33:28] **Dr Phil Batterson:** Yeah, that's a, that's called the hot seat. If you're on the lower Oh my gosh. Yeah. That's something, some, I was talking to somebody the other day on my podcast and he was saying. As opposed to the talk test, do something where you're doing a purely nasal breathing.

[01:33:43] **Dr Mike T Nelson:** Yes.

[01:33:43] **Dr Phil Batterson:** So that's a, that's another way that you can delineate is as opposed to doing the talking work in zone two until you start to.

That sort of thing. You hyperventilate out your nose and you feel the urge to actually go to mouth breathing. That's something that I think people might do a little bit inappropriately sometimes is they breathe in through their nose and out through their mouth. And that's actually, I think a lot easier and it conflates your zone too.

Zone two for a lot of people is actually really low. So it's lower than

[01:34:14] **Dr Mike T Nelson:** what most people think. Yes,

[01:34:17] **Dr Phil Batterson:** and did we say this online or on the recording or not? It was thinking about the zone to, I think a lot of people have a tendency to be like, well, if I don't feel anything, then I am not getting any benefit from it.

Yeah. Yeah. And I think that's, I think people, like a lot of people who train a lot, they have a tendency to be like, well, I wasn't even breathing hard. I wasn't,

so the, so there's no use in it. Right. It's like adrenaline junkie sort of things. Like back when I used to go to CrossFit, I would just crush myself all the time.

And that was like how I got my endorphin rush. Right. Oh, totally. So it's so, so zone two should not feel like that. It should not be like, I need to go punish myself. It should be like, you should have. Thoughts and you should be able to read a paper, like a research article or something. If you're into that, watch a YouTube video, have cohesive thoughts and stuff.

And it should feel almost like sinfully easy in a sense before. Yeah, exactly. So you have to, so then, but the good thing is actually for what I found is That then opens myself up to being like, okay, well I'm getting the benefit of actually exercising and now I can focus on something else.

Right. That's interesting to me, like listening to a podcast, reading a book, doing other things like that. It's you should have the, that mental capacity like that. You're not like, huh, I'm focusing on, like pushing the pedals and breathing hard and other things like that it should be.

Yeah, it should be boring, but then you can, but then that opens yourself up for more entertainment.

[01:35:44] **Dr Mike T Nelson:** Yeah. Do you look at output and cardiac drift at all during zone two, or I should say by use more different terms, like changes in heart rate, because I've seen some people will just say arbitrarily they're pedaling at 15 miles per hour on stationary bike.

Their heart rate starts at one 20. And then by the end of it, they're at like one 41 and they're pedaling at the same rate. I'm like, I don't think you really did zone two the whole time. They're like super mad at me.

[01:36:15] **Dr Phil Batterson:** Yeah. So, so I've been using a little bit of a test that I got from an account called uphill athlete, and they do have a little bit, they do have some good scientific backing for it.

So like you could probably find it on their blog or something. Not affiliated with them at all. I just like this test. So what they do is they say, okay, well, if you want to do some field testing to figure out where your zone two actually is, what you're going to do is you're going to go out and you're just going to run out.

What you think is a comfortable pace for, 30 minutes to an hour, depending on your fitness level and stuff, or ride a bike or row or whatever it is. Then what you're going to do is you're going to analyze how much drift you had in your heart rate over that amount of time. What you want to do is you want to keep that between about three and a half to 5%, which is very tight.

Yeah, exactly. It's not, there's not very much room wiggle room. So, so then what you can do, and this is what I've started to adopt, because I think zone two, rather than the mechanical output, it's the internal, stress that you're trying to elicit during zone two.

I then take that and I exercise by heart rate. As opposed to speed. So, so that gives you a better way of being like, okay, well, I know that drift starts, starts to occur around 130 beats and 5 percent of that. Don't know what 5 percent of that is. I'm not going to do math on here. Would be, would be the cap of it and you slow down your pace based on that.

And if you have to slow it down too much, then that's probably an indication that you're done for the day with your zone two stuff. So, yeah, that's how I would approach it. I like from afar, just being like, okay, well, if we can just incorporate, some sort of like field test for an athlete into their regular training and then adapt and do it again.

I love that because then it's. I'm taking in the information as a coach. The athlete doesn't have to get all psyched up for a test day or something like that. And then we can, then have good actionable outcomes for the next time they do their zone 2 stuff.

[01:38:18] **Dr Mike T Nelson:** Yeah, and that's what I do online because online is a little bit harder.

And then I'll look at how much disparity there is. So for example, if like you said, we clamp your heart rate at 125, let's say, and your start off at 15 miles per hour, but to hold 125, you're at 11 miles per hour at minute 60. I don't have any rough cutoffs per se, but to me, that's too much of a drop. So I'm going to back you up to 40 minutes of zone two stuff.

Cause I don't want to see those. Get too disparaging between each other, because I think at that point your fatigue is too high, and you're just training to get ridiculously slow. Like my own bias, and I can't point to any research study at this point, is I think you're crossing the point where it went from beneficial to

now I think you're not getting much benefit and I think you're actually probably making yourself worse.

[01:39:12] **Dr Phil Batterson:** Yeah, I think there is certainly diminishing returns. And I was reading, I got sent this really cool article the other day. That was, I think it was from MSSE. But it was like a, an expose on this. Misinterpretation of zone two and how it's supposed to stimulate your cardiovascular system more.

So, it's everyone's Oh, zone two stimulates, central, central sort of stuff or capillaries and mitochondrial density. That's like what we hear all the time. But what they were arguing is that the argument for central adaptations was actually due to. A misrepresentation in data of stroke volume, actually plateauing around the 40 to 60 percent mark.

So, so there's a common misconception and it's been shown now with better technology and better research and stuff like that, that, that plateau and stroke volume actually doesn't occur in females, trained females, trained males. So it really only occurs, I think, in males. And so the idea is Oh, well, if we're only exercising at 40 to 60 percent of max heart rate, we're getting maximal contraction because maximal stroke volume, we're maximizing that.

[01:40:24] **Dr Mike T Nelson:** So in English you're trying to basically, because your heart rate is slower, you're literally jamming as much blood flow into the cardiac system as you can. Maybe you get a little bit more of this cardiac stretch, like you get a better output because the Frank Starling effect and blah, blah, blah.

But basically I explained to clients, correct me if I'm wrong. You're just pushing a shitload of blood through the heart, and hopefully you get a little bit more of this kind of diastolic, this cardiac stretching effect. Is that kind of the classic explanation?

[01:40:55] **Dr Phil Batterson:** Yeah, that's the idea, that you're maximizing that effect.

But, now, from the contemporary research that's been, published, We know that you actually continue to stress the heart for higher and higher and higher intensities. So, so that argument first and foremost is a little bit, debunked, but then on the second side of things, I think people misconflict.

Zone two with what other research articles have said, where it's volume is actually what is important for capillary and mitochondrial density changes. And some of the studies that come to mind, they come out of David Bishop's lab in Australia. And. What they showed is that by increasing volume, that's where you start to get more PGC one alpha activation, VEGF activation, which then leads to more capillaries and more mitochondria within your muscles, they weren't looking at zone two training zone.

Two training is really low intensity, but. What I will say is that zone two is good for increasing your volume. So it's not because it's just zone two, it's because you're increasing your ability to take on more volume within your training. So, so I, it's a little bit of a, like a nitpicky point, but.

It's one of those things where it's like, it's, there's nothing magical to that zone two perfect, exercising exactly at fat max. It's how much volume you're taking on within your training. And if you're taking on more volume, that's what's been shown to increase your capillaries, increase your mitochondrial volume density per se.

[01:42:33] **Dr Mike T Nelson:** Yeah. And I think that's a good point because I've over the years, I've actually switched people who have a decent VO two max to a lot more of what I call cardiac development, which is a little bit higher intensity, but shorter. And then I'll just blast them with frequency. So if they can even only do 10 minutes or 15 minutes, cool.

It's not in a trained person, enough volume that they're going to be torched the next day. They can still train. They can lift in the afternoon, but some people I'll have them do that. Six out of seven days a week, just to get up in the morning, do 10 to 15 minutes, and I seem to get better results from that because again, I think you're trying to hit a high enough intensity where you're going to see an adaptation, I'm doing more frequency.

So I am getting the volume over the course of a week, but I'm not dosing them so high where now it's not. It's detrimental for 24 to 48 hours that they need to recover from it,

[01:43:28] **Dr Phil Batterson:** right? It's it's like when people, like when myself included, like first get into lifting and you're like, I'm going to go to failure for everything and then you can't even, then you can't even walk up or down the stairs in the engineering building to get to your classes for the next week and a half.

And then you finally get back into the gym and you do the same thing. You're spinning your wheels, right? Whereas if you're giving like a small dose every, every day. Then you're keeping that wheel spinning. And hopefully, it's dose and duration. So you're minimizing the duration, but you're increasing the dose of the hormesis or the poison.

And then hopefully that's going to then result in adaptability over time. And that's you asked me, it's well, what was the largest amount of change in VO two max that you've seen in studies? Yeah. And I, so I had to go back and I had to start looking at some meta analyses and stuff and there was one study that they, so they were compare, a lot of the studies I actually found were meta analyses, so studies of studies.

And what they found was there was one study that they did that was, they did five days a week VO2 max training. And they parsed it into high intensity interval training or sprint interval training, where they did three minutes on three minutes off for the high intensity and then 30 seconds.

So a wind gate test with three minutes off or something like that. And they claim that they saw improvements in VO two max of like 25 to 30%, just over the course of, I think it was a 40 training sessions. So eight weeks. Yeah, that's incredible. That is so high. I've met I remember doing like some deep dives into this sort of stuff.

I'm like, oh yeah, you might be lucky to get like a 6 percent improvement in VO two max, if you do like block training where it's super hard, what they did, but yeah, that, that study, especially, I was just like blown away. Granted it was in, I think, untrained males, so they had a lot to gain.

Whereas as you get more elite, you have less to gain. So you're not just going to go from, 20 to 30 in terms of VO, two max, you might go from 50 to 57. And that's actually, that's a, or 55 to 57. And that's a meaningful change in your VO two max. So, yeah, I w I was blown away by that, but on average, if you're doing, say proper VO two max training.

Depending on who you are, because there's a lot of inter individual variability, you could probably expect, a negative change, if you're over training to maybe 10%, depending on how trained you are, what you've done in the past, how how developed you are, in those sorts of things.

So, it's, I always try to tell people, it's it's again, coming back to, we're trying to do the least amount of work to elicit the most amount of change, and I would

never recommend to a client. To be like, yep, we're going to follow this VO two max training five days a week, just that, bury yourself in, like with VO two max training, I'm like no, we might do it like once a week maybe like what you're doing, I really liked that idea of one thing I do with all my warmups on the bike where I used to, and I've gotten away from it a little bit is I do accelerations.

And those accelerations are up between 30 and 45 seconds. I'm getting upwards of 400, 500 Watts for those. Yeah. So it's so, so that stimulus, right. If I'm doing it every single day and it's not exhaustive, I can then go into I've been able to do really well on a VO two max workout after that, or, like just a regular day, but people, whenever I tell them I do these accelerations and they're at that wattage, they're like, Oh my gosh, that's just going to ruin your zone two training that you do afterwards.

I'm like, No, because I'm fully warmed up and I actually feel good going into it. I don't feel any fatigue because I stop before I accumulate too much fatigue. It's I don't just Oh my gosh, this is like really hard. And I'm going to hold it, for another 30 seconds. I'm not doing wind gates.

I'm stopping exactly. I use, I actually use I use Moxie monitor as well. And I stop when I hit, a low point in SMO too. And then I just let it come back up. So, so it's this undulation effect and I'm. I'm purposefully looking at the response in SMO2 rather than here's what the power output should be.

I'm just like, okay, I'm just writing as hard as I can. Wait till it comes down. Wait till it comes all the way back up. I found that to be really effective for me. And then it keeps my high end stuff good and it allows me to do, all my other stuff as well.

[01:47:41] **Dr Mike T Nelson:** That's cool. Another one I've used is The four to six minute, I call it progressive four to six minutes in the morning on a rower, just get on, don't warm up, just start low.

And it should feel pretty easy, but by the end, your RP should be a seven or eight. It should feel relatively hard. Most people like the back of the envelope should be hitting, at least 1500 meters, maybe 1600 if you're really good, but it's enough of this kind of slow increase in RPE. That it's not enough to torch you.

You're not getting on going balls out right away. You don't need to warm up. And then I'll have people do that six days a week. If you add up the volume it's not high by rower standards, but if you got, 1500, two days, that's 3000, four days you're at 6, 000, 9, 000.

It's like doing two 5Ks a week. But it's a much more manageable than that. And your fatigue overall is going to be lower. It doesn't affect the rest of your lifting. Most people feel better. They feel more awake, so yeah, I think I like that kind of stuff. I've done the same thing too with Moxie, let's just, I don't know if I got this from Evan Pycon, but same thing.

Let's just bury your SMO2 and then let's just wait till it recovers and then let's just bury it again.

[01:48:58] **Dr Phil Batterson:** Yep. Yeah it's a really good feedback mechanism as well, because heart rate takes too long to come up. Power output is lying to us, right? It's Oh, well, I think I can do 400, but I don't know what my internal physiology is telling me.

So, so that's why I really like, that feedback. Cause I'm looking at it on a graph and I'm seeing it. Okay. It's starting to come down. Okay. I'm done. And then, and then you rest and yeah, at the end I'm breathing pretty hard, but it's nothing that I'm like. I, it's not like after a Wingate test where I have a splitting headache.

I want to throw up, I want to roll off the bike and I need, five minutes to recover. Right. And that's, I think that's the thing when, whenever I introduced that idea to people, they, I say accelerate. And then they see me doing four or 500 Watts and I've done this a lot. And then they're just like, they're like, bury myself.

I'm going to bury myself. I'm like, no, that's not the point. Like we're warming up here. And this is, I use this primarily with just a warmup and it's no, the point of a warmup is to get your body. As primed as possible. So we want to make that dynamic range in SMO too, as large as we possibly can out accumulating fatigue, the big bold letters are without accumulating fatigue because you could crush yourself and then your SMO too, is going to be through the roof, but no matter what you do, it's not coming back down because you're toast.

[01:50:19] **Dr Mike T Nelson:** Yeah. I like that. And I spent years looking for and research. That's why I'm always curious. Cause I'm sure the studies I'm missing, like the question I asked you what is the biggest vo2 max so far the study I found is hickson 1977 and they Absolutely brutalized these poor bastards for 10 weeks.

They just kicked the ever living shit out of them. I don't know how they all made it through the study, but on average did they say

[01:50:48] **Dr Phil Batterson:** how many people had to drop out?

[01:50:50] **Dr Mike T Nelson:** I have to look again, but I don't think the dropout rate was real high. I'd have to double check, which I was shocked because I don't think it was that high and I don't know where they got these people, but

[01:51:01] **Dr Phil Batterson:** it was probably like, it was probably like one of the guys.

And then he had a bunch of buddies who were on a team

[01:51:06] **Dr Mike T Nelson:** and he was like, I'm sure it was. Yeah. Right. Yeah. I'm sure it was a very biased selection, but what was crazy is that their average VO two max to start was 44, though not elite by any stretch of the imagination, but not bad. People trained, it's okay.

And within 10 weeks, they got them to an average of 60. Bonkers. That is the highest I've ever seen. And so I've taken a couple of those principles from the study and tried to apply it because it seems to work, but I can't take the study at face value because I don't think anyone would complete it.

Tabata protocol. They got some good stuff to learn from that, but no one's doing six weeks at 170 percent of their true VO2 max. You're just not. Devon himself designed the protocol for no one to make it through that many rounds.

[01:51:56] **Dr Phil Batterson:** Yeah.

[01:51:56] **Dr Mike T Nelson:** So again, take the principle for what it's worth, but yeah, I thought that was interesting and it shows what is the most curious as to what is actually possible. And then if people do that, like you said, make it like a specialized thing and make it a short term. So I did this with my buddy, Brian Bornstein, where his 2k, I want to say was 714. And then in six weeks he hit 703, I believe.

Which is pretty good. He had done a fair amount of rowing before, not a ton, but the poor bastard, we just beat the ever living shit out of him, in a progressive way, but he said, Hey, this is my number one goal for these next six weeks. You hit it great. We wanted to get below or right around seven.

And then he's I'm not doing any of that shit for the next eight to 12 weeks, which I 100 percent totally agree with. It's like we hit the goal. We did the thing cool. Let's move on to the next thing.

[01:52:52] **Dr Phil Batterson:** Yeah. Did you have him like taper before his next 2k, or did you just roll into it?

Okay. Okay. Cause that's there, there was a study that was released in like cell metabolism. And I know it's gotten like a lot of. A lot of researchers and stuff like everybody's arguing, but it's essentially what they were showing was that like during a period of overtraining, like performance, skeletal muscle, mitochondria, insulin resistance, everything is just bad.

Oh, it's horrible. Yeah. But then after that overtraining is over, it just bounces back to normal, or better. Right. It's a super compensation effect and it was blown out of proportion because the New York times got ahold of it and they were like, Oh, it's too much high intensity interval training bad for you.

And I was like, yeah, if you actually read, if you read like the New York times article, they brush over, they're like, Oh yeah, they had these people do, right. A lot of high intensity interval trading, like twice a day, blah, blah, blah. They brushed over it. But then if you look at the actual study, it was something along the lines of in the morning, they were doing 4x8 minutes with 4 minutes rest at some insane, percentage of VO2max.

And then they were following that up in the afternoon with 4x4 minutes. Four minutes rest. So it was like a little bit of a threshold workout and then into a view to max workout every single day for a week or two weeks or something, and you're just like, nobody in their right mind would ever actually do that, right?

It's so, so by, by having these article that was that are like, is too much high intensity bad for you. It's even the cross, even the people who are doing CrossFit, that's like very high intensity driven, aren't doing that much CrossFit.

[01:54:26] **Dr Mike T Nelson:** No.

[01:54:26] **Dr Phil Batterson:** So it's so, so, it's this is again, this is like the translational side of things, right?

It's you gotta be able to tell, what the research is doing and then realistically know that what the researchers were doing was good in, for the study, they were

trying to induce overtraining and they absolutely did. Nobody in their right mind is going to take that protocol, I hope, and be like, yeah, let's give it a shot.

It's if you want to die, if you want to like, bury yourself, yeah, but no.

[01:54:53] **Dr Mike T Nelson:** Yeah. And I've even wondered, probably a topic for another day, is super compensation even a real thing? And by that, I think it's just adaptation, but because fatigue masks fitness so much, which is the line is still from Eric Cressy years ago, that if you're measuring performance as you go through, you definitely see a drop in performance, but I don't know.

If you compensate above baseline, I think it's just adaptation. And when you remove that fatigue, it allows you to display that level of fitness. I, it might be just completely splitting hairs and semantics.

[01:55:33] **Dr Phil Batterson:** No, I, that, that is very interesting. And like you were saying earlier, right. Is there seems to be undulation and everything too.

So you have to you. You have to think about it from that perspective as well as if you're inducing more fatigue or if you have more stress, or maybe there is just decreases in performance on any given day, and then you come back up. And, but over time, right. If you're training properly, it's just like the stock market, right?

You should see it go up constantly. But if you zoom in so close on it, then it's it's hard to tell what those actual differences are. So no, that's a that's thought provoking for sure. I don't know if. Anyone's going to answer that. Yeah.

[01:56:11] **Dr Mike T Nelson:** It's like daily weight. If you take your weight every day and you don't track the trend line.

You don't really know if you're losing weight or gaining weight, unless you really think about it, because there's too many fluctuations day to day of going up or down. But if you plot it out over the course of, a couple of weeks, you can see, Oh yeah, I am going down. Which is always amazing to people.

And I show them their plots. They're like, Oh wow. I didn't know that. But if you didn't do the measurement frequently enough, you've got too much variability from week one to week three, if those are your only two data points that It's not useful at that point. And that's the hard part about exercise performance, because by nature of doing a max test, you induce so much fatigue that.

You kind of mess up with the thing you were looking for. You know what I mean? Like you, you almost need a non invasive way that would be accurate, but I don't know of one. So,

[01:57:04] **Dr Phil Batterson:** well, and that's, well, you need a way of not having to do the test in order to see if the test is getting, if you're getting better at the test, right?

That's that's the big conundrum. And you see this a lot with people who over race, right? Is typically they're really good at the beginning of the season and then because they can't go back to actual development there, they're either, they either plateau or they just actually go downhill.

And, so it's have to implement the tests in a strategic fashion, or like we were talking about, you have to do some level of field testing that like, just, and this is something I've talked a lot with Evan pike on, and I love how he uses repeat workouts and other things like that to then track how somebody is changing over time, because then you're not chained, you're not going in and saying, I'm going to do a test today.

You're just doing another workout. And then the coach behind the scenes is just analyzing, okay, well, this is actually what's happening. So I like that approach in the in between, right? Cause then you can say, okay, well, we're going to do say the maximal exercise testing, physiological assessment, those sorts of things, maybe every eight weeks or so, but then we're going to have repeat workouts that we do that give us an indication of how your fitness is actually changing.

And it's going to be probably based off of. The performance metric that we're chasing the most, which is time to complete whatever, workout it is, or whatever race distance it is.

[01:58:26] **Dr Mike T Nelson:** Yeah. I just call those like sub max assessments. It's, Close enough where if you look at them frequently enough, you can have an idea if everything is going in the right direction, doesn't 100 percent guarantee a performance increase, but if you do that and you do a max test enough, like you can, like now with some people I can look at their sub max stuff and be like, yep.

Okay. And some of them I'll just wait until I know. Their max test is going to be pretty good because I know psychologically they can't handle it otherwise. And

I don't want to mess them up. So I'll be like, ah, bro, let's go another, three weeks with this. And you see those changes yep.

Let's do a taper and then let's test wow, I always get better each time. Ah, great.

[01:59:05] **Dr Phil Batterson:** You're like, good job me by design. No, that absolutely. It's a. It's really interesting because I've started to do like remote physiology testing. So I have a like a little Pelican case and I have my VO two master, my three moxie monitors, like the, the calibration syringe, all that sort of stuff.

And I just buckle it up and then I can take it. Wherever I want, as long as someone's got a bike and a treadmill and I did some testing for some professional triathletes and high level age groupers down in Kentucky. And it is really amazing how reporting of the numbers and the testing conditions themselves can really like mess with somebody or, change the way somebody thinks about themselves.

It's I didn't realize I was just like, yep, I'm just here to do the physiology testing and see what we're, what's happening. And, people are like. They're so competitive and they're like, Oh, well, it's is this a test I can pass, going back to that?

It's no. And then, at the same time, it's okay, well, if the numbers don't come back in what you expect, or if you have a bad test or something like that, it's it could be detrimental. So for some people, it's man, is it even worth it to tell them the numbers? Or is it just worth it for us to just be like, yep, we're just going to tweak the training, just based on how you're responding and other things like that.

And then we're going to get these numbers over time. And I haven't come to, I haven't fully figured that out yet.

[02:00:25] **Dr Mike T Nelson:** Yeah. And if you test people in a group that are competitive, that's its own dynamic. And I learned this from my buddy, Sean Mishka. So I did not. When I did all my testing in the lab, I made sure there was only one person at a time and they never saw the results from anyone else because if they did, they were like, Hey, what'd that guy get?

I can do better than that guy or that gal. And my buddy, Sean Mischko is telling this story. He was an intern for the Chicago bears like back in the day and he

shows up day one and they're like, okay, you're in charge of Brian Urlacher. If he hurts himself during training. Just pack your bags and leave.

Don't even say goodbye. You are automatically fired. You are out of the building. It's oh, okay, sure, whatever. So he gets in there and he had to do some baseline testing on him, and it was some max treadmill test or whatever they were doing. And, they had both athletes going at the same time. And so Erlager's going as hard as he can on this treadmill, looking at the guy next to him yelling at him.

He's I'm gonna beat the crap out of this guy! And he's watching him go on the treadmill, and he goes, Oh my God. If anything happens, he is going to go through the wall into the GM's office on the other side, I'm going to be fired. And he's yep. Don't test highly competitive athletes next to each other.

They'll almost kill themselves.

[02:01:43] **Dr Phil Batterson:** Yeah, there is a, yeah that's absolutely, something that, that is a big factor is like everybody, especially in, any sort of racing or was I, we're always trying to compare ourselves to somebody else. And I tell people and I need to get away from this because I do report like, Oh, you're in the top X percent of, your view to max, whatever.

Yeah. Yeah. And people want to know that, but at the same time, it's Is it really necessary to know that, or is it better to know this got better or this stayed the same, or it got a little bit worse? I think it's better to compare yourself to yourself over time. But again, that then requires you to do that testing iterative and over and over and over.

And I still don't, I still think, we're at a time or in a time period that the technology isn't fully available to us to allow us to actually be doing those sort of repeat tests. Repeat testing. I think there's a lot of things that are coming out that are pushing that needle in the right direction, but it's still it's expensive.

It's hard to coordinate sometimes. You got to make sure you get the same person over and over or else, it's like their interpretation of the test might be a little bit different. So, so yeah, there's still like challenges with it.

[02:02:55] **Dr Mike T Nelson:** Yeah. I use normative data on an individual basis to determine their motivation and where they want to go.

And then I try as hard as possible for them to only compare themselves. Right. So like the concept to you can do 2k, you can go into logbook and you can see All the people who are crazy enough to log their stuff in Concept2, are you the 50th percentile, 20, 30, 75th percentile, 90th percentile, whatever. And that's a skewed population for sure.

But if somebody sees they're in the 30 percent of that, they're like, Oh cool, where's, oh where, oh wow, I suck more than I thought. Or, if you're the 75th percentile, you're like, I want to get to the 90th percentile. Okay, but that, Getting that pickup of, what, 15 percent is way harder up there than going from 30 to 45 percent of a population.

But at least it allows you to have those discussions and be like, okay, is this, It's something you really want to do. Yes, we can train for it, but just realize you're probably enough to be more specialized. We may have to give up other things potentially, unless you're just a freak who just responds really well, which those people are out there too.

[02:04:03] **Dr Phil Batterson:** Yeah. That's a, and in, in terms of your testing, what's the highest VO two max you've ever measured?

[02:04:11] **Dr Mike T Nelson:** I think the highest I've ever measured, I want to say was in like the sixties, like 64, somewhere in there. We didn't test a lot of elite people at the U and on my own, it's mostly people were hit or miss.

I don't do a lot of testing with endurance athletes per se. It's usually run of the mill meatheads that we test and that you

[02:04:30] **Dr Phil Batterson:** coerce into doing a maximal exercise test. And then they're like, I'm never going to do that again.

[02:04:34] **Dr Mike T Nelson:** That's pretty much it. Like I have one, one friend who still texts me and she's I'm never coming to your place and doing a 2k max test ever again.

Yeah. We do it out of our garage or sometimes we'll have people come in for weekend. We'll do a bunch of testing and lectures and stuff. Yeah. One of the neighbors called me up when they were here. She's I'm just checking to see if everything is okay. There's a blonde girl who looks like she's puking and the flowers around the corner.

I'm like, oh, we're just doing some max testing today. It's all okay. She's okay, just checking.

[02:05:07] **Dr Phil Batterson:** I heard a lot of yelling coming from your garage. Is everything okay? Yeah,

[02:05:10] **Dr Mike T Nelson:** pretty much that. Yeah that's a

[02:05:12] **Dr Phil Batterson:** normal day for us. Actually.

[02:05:14] **Dr Mike T Nelson:** People running out of there going, ah, yeah,

[02:05:19] **Dr Phil Batterson:** no, that is a. Yeah that's probably what I would say is probably about, where most people, like maximally, like where I would find is like 60, 65.

I'm like, okay, you're doing a good job. Oh yeah. I saw a guy at a, an, it was the endurance exchange, which is like traff USA triathlon puts on this conference and he got up to 79. Yeah. But granted his name. I'm going to mess it up. Josiah Middow, he's a, he's like a famous like trail runner and stuff and like absolute beast.

Like I think world championships and stuff like that. So you're like, his numbers are going to be good. But like when you see it in person and you're like 79. That's 20 points higher than the highest I've ever, like measured Oh my gosh, this is where that difference between, like the, you're like the serious athlete versus like the elite of the elite are actually at, you're just like, it's crazy what their physiology is actually doing.

[02:06:17] **Dr Mike T Nelson:** So we're going to go find more about you.

Tell us about your good Instagram stuff. I don't know if you have a newsletter. I know you've got a podcast.

[02:06:24] **Dr Phil Batterson:** Yeah, so, my Instagram is critical O2 and on there, I'm always just sharing physiological principles in order to help really just athletes optimize their physiology and then maximize their athletic potential.

I have podcast, similar name, it's Critical Oxygen, you can find it on Spotify, Apple YouTube. I don't have a newsletter, but that is something that I have, toyed with the idea. I'm still in the infancy of the business development and all of that. So if if you guys are listening to it and you think a newsletter would be

good, shoot me a DM on Instagram and I'll start to cultivate that because I do think it would be really nice to be able to put my thoughts either down on paper or record videos and do a newsletter like that.

So I'm always open to suggestions, Mike, thank you for having me on. This is a. In, in my opinion, I've wanted to come on your podcast for a long time. So for me, it's been a long time coming and I, this was just a really awesome talk. I always love nerding out about this sort of stuff. And for all of your listeners out there, please, if you have any questions, literally that like my passion, my purpose is to help answer people's questions about this physiology stuff.

So please do not hesitate to reach out with questions or anything like that.

[02:07:35] **Dr Mike T Nelson:** Yeah, and I do like your Instagram stuff because not only is it useful, it's actually accurate, which I can't say that by a lot of accounts. And again, I live kind of my own world. I don't follow a lot of people on social media, but it, the handful of other ones I've looked at, I just want to facepalm myself because it's either so research heavy, which is great.

If you're a researcher sharing your thoughts, cool. But Some people get so far down the research path that they've never trained anyone, which is fine. That might be a good source of information on research, but it doesn't necessarily mean applies to training. And some people may be really good trainers, but they get basic principles completely wrong.

And I just drives me insane. So good job on that.

[02:08:20] **Dr Phil Batterson:** Thanks. Thanks. I appreciate it. That's a good stamp of approval. Yeah.

[02:08:25] **Dr Mike T Nelson:** Awesome. Well, thank you so much. I really appreciate all your time today.

[02:08:28] **Dr Phil Batterson:** Yeah. Thanks for having me on.

[02:08:30] **Dr Mike T Nelson:** Thank you.

[02:08:32] **Dr Mike T Nelson:** Huge thanks to Phil for coming on the podcast, make sure to check out all of his wonderful stuff on Instagram and everything else that he's got going on. Not only is this stuff accurate, it is great information.

Not a lot of people I follow on social media where I can say, especially in the aerobic realm, I'd probably say that about the anaerobic realm too, that have good information that is also accurate and based on research. And he actually coaches people in real life. So he has practical information at the same time.

So make sure to check out all his stuff. Huge thanks to him for being on the podcast and for all of his time. If you wanna know about where your VO two max number should be, check out the answer in the Flex four. Go to mike c nelson.com/ FL ex four.com for all of that information. And we'll send it directly to you.

It'll also put you on the daily newsletter. I've got lots more information coming out. Speaking of more information, the Flex Diet Certification also opens June 17th. Go to flexdiet. com for all of that information there. Get on the wait list for some exclusive bonus items. If you're looking for a complete system for nutrition and recovery, everything from Protein, fats, carbohydrates, ketones, NEAT, sleep, micronutrition, and much more, go to flexdiet.

com. And if you're looking for a great tasting ketone ester drink, most of the ones on the market, in my opinion, taste pretty damn horrible. This one actually tastes quite good. It's not super sweet which I actually prefer. So if you really like everything, like incredibly sweet. necessarily be the best for you, but it is way better tasting than the other ketone esters on the market.

I go to the link below for information on Tecton. You can use my code, Dr. Mike D R M I K E at checkout to save 20%. And note, I do have a conflict of interest as I am a scientific advisor for the company and an ambassador. I make a few shekels if you use my discount code there, but you save a bunch of money there also.

And that is all. Thank you so much. Really appreciate it. If you can give us the old hit the subscribe button, all those little things help us with the old algorithm to keep the podcast going. Really appreciate it. Thank you so much. Talk to you next week.

You know something? That was a sweet number. It sure was. You know something else? What? I hate sweet numbers!

[02:11:17] **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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