

## Shorten Your Cardio Time Even More with REHIT – Ulrich Dempfle with Dave Asprey – #834

Announcer:

Bulletproof Radio, a state of high performance.

Dave Asprey:

You're listening to Bulletproof Radio with Dave Asprey. Today, we're going to talk about exercise, but, honestly, exercise isn't really that much fun if you're just exercising to be healthy. It's different if you're going hiking or going for a bike ride or something you want to do, but a lot of us are trying to make it fun because we think we need more than we actually do. So, I've got some good science here about a new spin on high intensity interval training, and we've got a large number of people from the Upgrade Collective tuned in to our live audience. Upgrade Collective, thanks guys.

If you are new to the show, the Upgrade Collective is my membership and mentorship group where I twice a month have private, confidential meetings with members where we can talk about stuff that you can't hear online. So, if you'd like to tune in on those, get your questions answered, have me and my team of coaches support you and thousands of people learning all of my books, all this content so you don't have to just do it by yourself, [upgradecollective.com](http://upgradecollective.com). I would love to see you there.

Let's get back to exercise because I'm seeing a lot of heads nod and going, "Oh, yeah. I might workout 12 hours a week because, well, I've been told I need to do that and I want to be healthy." Maybe you like it and you want to do that, which is different than feeling like you have to do it and it's competing with being a parent or your career and all that. When I was young, I worked out 90 minutes a day, six days a week to try and lose weight and it didn't work. So, I saw the chip on my shoulder about it. You can hear about that on this interview.

Today, we're going to talk about high intensity interval training. At this point, you're probably going, "Oh, my God! Another podcast on that? I've heard everyone talking about this. Could we stop?" No. This isn't bad. This is something called REHIT, Reduced Exertion High-Intensity Interval Training, specifically for cardiovascular fitness.

I'm anti-cardio because people usually do too much of it, the chronic cardio, things like that, but when we dial in on the science, on the numbers, there's some cool stuff going on.

Our guest today is a guy who had spent a lot of time doing studies and creating something called the CAROL Bike. I've had a couple of episodes about this before, but now we know more about REHIT than we ever did before, and it's something that I'm using. The REHIT technology is something I'm using at Upgrade Labs, which is now franchising into ideally more than 100 locations. So, I'm working on making that happen right now.

So, the CAROL Bike started in 2012 when researchers were working on chronic disease management and they said, "Hey, diabetics don't actually exercise because they don't have enough time, they don't get good results from it, and they don't want to take all of the energy to do that." As a guy who used to have chronic fatigue, I get it.

So, Ulrich Dempfle, all right, Ulrich, I said your last name wrong. I do not speak German in the slightest.

Ulrich Dempfle:

That is entirely fine, Ulrich Dempfle, but you did that good.

Dave Asprey:

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Dempfle?

Ulrich Dempfle:

Mm-hmm (affirmative). That's it.

Dave Asprey:

All right. So, Ulrich Dempfle, I should have asked you ahead of the show.

Ulrich Dempfle:

Perfect.

Dave Asprey:

I've talked to you before. I can say Ulrich right at least.

Ulrich Dempfle:

That's good.

Dave Asprey:

We're going to talk about nine minutes of cardio, and not an intense nine minutes either, and why that is a real thing, and why people get results better than 45 minutes of much higher exertion. All right. Give me the background because this sounds too good to be true. In fact, I thought it was when you guys first approached me a few years ago. So, how did this nine minutes number come to exist?

Ulrich Dempfle:

Well, it's not an accident at all. It's basically the progression of research over some decades, really. So, high intensity training was first made popular and started to become a topic of research as far back as the '70s. In fact, the concept of an all out sprint, like a short all out sprint to get good cardiovascular benefits, that was first developed by the Wingate Institute in Israel, and it's called the Wingate Sprint.

So, the first thing was people found out about it, tried this type of exercise, and they figured out fantastic. You get really good results, but they were doing really long sprints and many of them.

Dave Asprey:

That's brutal, right?

Ulrich Dempfle:

Oh, absolutely. It's really, really tough. So, if you do, say, eight or 10 all out sprints for 40 seconds, you'll be destroyed, absolutely destroyed. So, it worked well, but it was just too hard to really do.

The next thing was to understand why it works and that is really quite clearly understood. When you do those sprints, you increase the energy demand in your body very suddenly, about 100 times higher compared to rest. With this spike in energy demand, the muscle just cannot use its usual source of fuel, which is either fat or sugar that it takes from the bloodstream.

Instead, it would have to burn what's called muscular glycogen, so that is a storage form of sugar that is stored in the muscle itself. That's the emergency reserve. That's what you hold for situations where you have to fight for your life or run for your life. With the exercise, we force the

muscle to tap into those energy reserves, and that kicks off a cascade of molecular changes, of triggers, where certain signaling molecules are released that basically tell the body to get fitter and stronger.

So, that was the next step. First step was we know it works. Why does it work, and then what is the minimum effective dose of that? That's where it really becomes interesting. So, researchers titrated it back and back and back, and found that this release of signaling molecules is literally like flipping a switch and flipping that switch a lot harder makes no difference. You just have to flip the switch, and two 20-second sprints is all that's needed to flip that switch.

It's a research journey that took many years, but it's now well-understood why it worked, and that's basically what we've put into a consumer-friendly, into an exercise bike that everybody can use, and that's very easy to use and to perform.

Dave Asprey:

One of the things that stood out to me as I was just working on the whole Bulletproof lifestyle even writing the very first Bulletproof diet book was what is exercise because I was a long distance cyclist. So, I would ride 30 miles a day even in my late teens trying to lose weight and having fun and all that sort of stuff. Didn't really work. I tried running. That just makes your knees hurt, especially if you're overweight. Of course, I've tried the half weights, half cardio every day, and that was a total failure.

So, as I lost the 100 pounds and all, I really went with the definition from Body by Science of exercise, which is brief, intensive, infrequent, safe and purposeful. I put that in Game Changers, my book. I'm like, "Okay, guys, 46 things you need to know. This is it." So, the idea that exercise is suffering and takes a lot of time doesn't match. In math, we have this idea, you can look at the area under a curve, and that's an integral of doing advanced math stuff, well, mostly advanced.

So, that's the area of a square or something, but I believe in my most recent book, in Fast This Way, I talk about slope of the curve biology, which is instead of looking at how much total work did you do, it's how quickly did you turn on the work and how quickly did you turn it off. It appears that's the thing that flips the switch.

So, what that means is that if you can make the input more intense, whether it's by using the tech that you guys have or some of the other weird stuff that we do at labs, with pulsed electromagnets, anything that turns intensity up really fast makes the body go, "Oh, no! Emergency," and then it changes, but if you just turn it up three quarters of the way and just hang out there, it just tells the body suffering, life sucks, and you don't get the results. Do you think that slope of the curve biology thing applies pretty broadly?

Ulrich Dempfle:

I don't know how broadly it applies across everything, but it's exactly this because it works exactly for REHIT and the workout behind CAROL because in those sprints, we deplete glycogen, so this emergency energy reserve, by about 25% to 30%, and to achieve the same level of glycogen depletion, you would need to go running for about 45 minutes, but you'd still not get the same benefits because it's the rapid onset of glycogen depletion that makes the difference. So, it's exactly that slope of the curve that releases the signaling molecules that tell your body it has to get fitter and stronger, and that basically flip the switch and then induce all the changes that occur through what's called mitochondrial biogenesis, where basically you train with your leg muscles, but you get a whole body response and get a stronger heart, stronger metabolism throughout.

Dave Asprey:

The idea that you're going to be able to burn that glycogen very quickly, turn on that switch and all of that flies in the face of what most people believe about, "I've got to suffer. I've got to grind it up. I've got to sweat a lot." I certainly have noticed the difference from using the CAROL Bike that you guys make, but what I don't know is if I was to go outside and walk really slow and then sprint for 20 seconds and then walk really slow and sprint for 20 seconds and then go in and have some coffee. How different is that from the AI algorithm that you guys are using?

Ulrich Dempfle:

So, the issue with trying to titrate it yourself and getting it right yourself is, frankly, it's hard and it's almost impossible, and that's why you need a special bike for the exercise. I think most people wouldn't actually know what all out really feels like, and what a maximum intensity sprint feels like, and what the AI and CAROL does is it sets your resistance exactly to the right level for you and will basically design and control. It's awfully automated. The exercise that you reach your personal maximum intensity.

So, we think of it a bit like CAROL is your personal trainer, is your AI health coach who knows how far to push you, and what resistance to give you, and she coaches you through the exercise, and it's hard, but it's hard only for a very, very short period of time, and it's also not too hard. So, it's what you can achieve and what you have to do to get those results.

Dave Asprey:

I definitely have been doing high intensity intervals at various amounts. I've been writing about it for a long time, and I do see a difference with doing it with the bike, right? I can't tell if it's because the bike makes me go slower than I want to go during the slow sessions or because it's measuring my heart rate and making you go really, really fast and hard by turning up resistance at the same time, but it is noticeably different. Also, it's literally eight minutes and 40 seconds. So, it's doing nothing and whatever, 40 seconds of going really fast. So, I've noticed the difference to the point that people who do it at Upgrade Labs are also noticing a difference because it's so time effective.

Ulrich Dempfle:

Yeah. Absolutely. So, what happens I think is people are not quite aware what the difference between HIIT and REHIT is. HIIT or Tabata or interval, obviously, has become very popular, and in many products you'll get some interval or Tabata, rides and so on, but where HIIT is high intensity, REHIT is really maximum intensity. While HIIT is often many sprints and longer sprints and all embedded into a moderate intensity exercise, REHIT is very, very casual in the warmup and recovery stages, and then only 20 seconds the high intensity, the maximum intensity phase.

In fact, basically, anything that's longer than 20 second and anything that's longer than two times of 20 seconds is not maximum intensity because you couldn't do maximum intensity for these sustained periods. So, your slope and the change in intensity is just much lower on these traditional forms of HIIT.

In fact, we have very good data on that because on our bikes we allow the use of some third-party apps. So, we can compare the intensity levels that we achieve in our own workouts versus with third-party apps, where in CAROL and in the REHIT, people reach three times the intensity versus other classes that have sold that's HIIT.

Dave Asprey:

Wow. So, you're getting three times the intensity but for a shorter period of time.

Ulrich Dempfle:

Exactly. Exactly that.

Dave Asprey:

That so ties in with the slope of the curve hypothesis there. The idea is you're running along on a graph right at zero, and all of a sudden there's a huge spike and it comes right back down versus if you were to have four much smaller spikes that are spaced out, which is what a normal high intensity interval training would look like. So, then the question is, how do we get that signal in? It's funny, the whole set of tech at Upgrade Labs and we're using the CAROL algorithm, we're working on some custom bikes with you guys, but some of the other equipment we have there, too, is same thing is, how do we get the signal in faster, right?

All of that appears to give you a much greater return on investment of the time and effort that you put in there. What changes do you see over time? How many times does one have to do REHIT versus something else in order to notice what to see, weight loss, VO2 max? What are the metrics you're using to show that it works?

Ulrich Dempfle:

I mean, the principal benefits that people can really expect to get are fitness improvement, and that would be measured in terms of VO2 max, your cardiorespiratory fitness of 12% in about eight weeks. Now, 12% in VO2 max improvement, that's a really big deal. That's like adding two years of healthy life expectancy or-

Dave Asprey:

Two months.

Ulrich Dempfle:

Yeah, exactly, exactly, and it's the-

Dave Asprey:

How many times per week do you have to do that?

Ulrich Dempfle:

Three times a week, three times a week. So, you spend 26 minutes per week for eight weeks, and you have that improvement in fitness. In terms of how it feels like, it's the difference between huffing and puffing versus flying up the stairs. It's not subtle. It's a pronounced improvement in fitness that you can feel or another thing that I find stunning is on average, we lose about 10% of our fitness per decade. So, that means in eight weeks, you can basically turn back the clock by 10 years, and you will literally feel 10 years younger. So, that's very noticeable and also very measurable metric and progress that you can track.

Dave Asprey:

When you do the math on that, Ulrich, it's three and a half hours of total exercise time over eight weeks with the results of a 12% improved VO2 max, two years extended life if you look at VO2 max and the correlations, not causations, but probable, but correlations to lifespan, and you're feeling a lot younger.

I look at ROI and I write about this, too, return on investment, but you're investing energy, and then time, and then money in that order and everything. It doesn't matter if you have time and money. If you're too tired to do it, you're not going to do it. So, that's why energy has to come first, and how much energy do you get back.

Three and a half hours, granted. It's in chunks, which is more irritating, but three times a week, basically 10 minutes each, and that's doable. Does it matter if you do it in the evening, in the morning? Is there anything else we need to do know about?

Ulrich Dempfle:

It doesn't matter, really. So, most of our users do it in the morning or around midday. Few do it in the afternoon or evening. I love doing it in the morning just because it's very easy to make it a routine, to make it a habit. So, I mean, I've got my bike at home, so it's very low threshold, but it's become part of my routine. During the week, I'll do the eight minutes 40 seconds CAROL workout first thing. You only have to do it three times a week. I probably do it a bit more than that, but that's just because I don't have to think about it anymore, and the amount of energy that I have to invest is really very, very little.

Dave Asprey:

The investing little energy is core to everything that I do. I want everyone listening to the show to realize if you invest less energy in exercise and get more return, you have more energy for managing your emotions, and then you won't yell at your boss or your kids. It's that big of a deal because there is a limited amount of energy, and I teach this in the books, just all the practices. You can make the body better at making energy so you have more energy. You can eat the right stuff so you have more energy, and then you can stop wasting energy.

What you're talking about, though, is training the cells to make more energy more effectively, but doing it in a way that's way less invasive than doing three, say, one hour spin or heavy duty cardio classes or something because you have to go somewhere to do it, and then you have to take a shower afterwards, and you're all exhausted, but the return on investment wasn't 12% VO2 max in two months. I've never heard of that from people doing longer term cardio. Is there anything else that will give you 12% improvement in VO2 max in a couple of months that you've heard of?

Ulrich Dempfle:

No, not that I know of. We've compared it. There were head-to-head studies with a control group and we've basically outperformed the control group by a factor of two in 20% of the time. So, in terms of ROI, I think it's, yes, granted, it's almost too good to be true, but right now, so this is something we're very proud of and very excited about. We have over 10,000 active users, hundreds of thousands of rides. So, we can really say with great confidence that our users achieve on their own the same results in fitness improvement that researchers have demonstrated in a lab under supervision.

So, yeah, we've taken some really exciting academic research and translated it and brought it into the real world. So, yeah, it's just that, and it works. It's something that makes us feel really good about the product.

Dave Asprey:

Some of the guys in the Upgrade Collective are saying, "All right. I guess it's a little bit skepticism sort of thing. Couldn't you just do the sprint?" Like I asked earlier, can you sprint yourself? What is it about the bike or the headphones, the AI algorithm that gets people to push themselves more than they would if they were just on a spin bike or something?

Ulrich Dempfle:

Look, I mean, I'll tell you a story why we got to make the bike because, obviously, the research, so we didn't do the research. We've come across the research and fell in love at first sight and saw that it was really important to our work in healthcare. So, literally, the next day I heard about that research, I went into a shop and bought myself. I paid attention.

Dave Asprey:

You're an engineer, so-

Ulrich Dempfle:

Yeah, exactly. I bought myself the exercise bike that I thought was closest to doing that, and I tried it, and I failed because it was really, really impossible for me to replicate what I've heard and read about in terms of the science. So, we spoke to the scientist and asked, "Hey, what's up? Why can't we do that?"

They said, "Well, you need a special bike," and they showed us what they used in the lab, and it's a \$15,000-\$20,000 piece of equipment, and it's operated by a second person, who, basically, like the lab technician that coaches you through the exercise.

We thought, "Okay. Well, how can we package that into something that's a whole lot more accessible?"

So, basically, what makes it really hard on a different bike or on a normal bike is those sprints have to be performed at exactly the right resistance level, and that's higher than you'd think, but it needs to be in your sweet spot. Then you need to accelerate really fast. It's like going up a hill. You have to accelerate at low speed while the resistance is low, and then the resistance has to be applied really, really fast to the right setting.

That's, frankly, impossible on another bike if you have to turn a knob while you're spinning like a sewing machine. CAROL, basically, takes all the guesswork out. So, it's fully automated and optimized for this exercise. The AI sets the resistance exactly to the right level for you.

So, that is something, a lot of data helps. We just have the, by far, largest database of REHIT rides in the world. So, that gives us the ability to build those and train those algorithms that optimize the resistance for each individual.

Dave Asprey:

It's really interesting. When I look at another piece of gear that we have at Upgrade Labs called the Cheat Machine, same thing. How can I copy that using weights? Well, the bottom line is you can't because we're playing with the slope of the input curve to your biology. In all of human history, we either pick up rocks or we run away from tigers or towards tigers if you're hunting one. Those are the only kinds of exercise we have. The resistance curves are very clearly defined mostly by gravity, and then by human effort.

That description was really helpful for me to understand because it feels different when I'm on the CAROL, and it's because of the way it ramps up resistance. So, the more I push, the more it pushes. In the real world, that's not how it works. The input to the body is the more you push, the faster you go, and then the less resistance you get because, one, resistance isn't a big deal, but you have inertia that carries you forward, and then the body worries about twisting an ankle so it slows you down a little bit, and all these automated systems we don't think about, but you're taking all that out, and then it's slope of the curve, but it's not just a ramped up curve, it's what do you do, what does it do. So, almost all of the gear that we have is messing with the input curves of the body.

I love that description, and that's why when I go out in the front yard, if I want to sprint for 10 seconds or 20 seconds or I guess it would be two 20-second sprints, it doesn't do the same thing. What you're saying is you have lab data and you have however many rides you have, and you're seeing the 12% VO2 max.

Just the math, too, you said compared to people doing other types of cardio that take way more time, if someone's doing about 18.5 hours of cardio over that same two months, they might see a 6% increase in VO2 max.

Ulrich Dempfle:

That's right. That's right. Yeah.

Dave Asprey:

You're doing three and a half hours of work and getting a 12% increase in VO2 max. This is an order of magnitude better. It's almost an order of magnitude, yeah, very much because you're spending one-fifth the amount of time doing it and you're getting twice the results. That is worthy of consideration in the whole world of exercise and cardio, but if you want to run triathlons and marathons, and there are people in Upgrade Collective who do that, I totally respect you. That's a willpower. Thing is it's not necessarily going to make you healthier, right? That's a different kind of training.

For most of us, we want to have a cardiovascular system, lungs, heart, circulation that works really well, keeps us alive for a long time, makes us feel good, but we don't want to spend all day every day doing it. This looks like it's the most effective that I know about for this.

Ulrich Dempfle:

Absolutely. That's how we look at it, too. Dave, it's not just about fitness. So, fitness is, obviously, super important, but there are also health aspects that I think are quite worth pointing out. This is the same trial, the same academic research that was done. So, it was not only the 12% improvement in fitness, but also the risk of developing metabolic disease and type 2 diabetes. That risk dropped by 60% in only eight weeks.

Dave Asprey:

Eight weeks? In two months?

Ulrich Dempfle:

Eight weeks, yes. Absolutely.

Dave Asprey:

So, 60% reduction in the risk of diabetes or actual occurrence of diabetes?

Ulrich Dempfle:

So, the risk of developing type 2 diabetes. So, that is measured through a basket of risk factors. It's high blood pressure, high triglycerides, high blood sugar levels, low HDLs, so good cholesterol.

Dave Asprey:

Insulin resistance, okay.



Ulrich Dempfle:

Yeah. Exactly, and obesity. So, you can measure it quite daily what's your risk of developing type 2 diabetes, and the risk for those participant dropped by 60%. Now, what does that mean? That's the same risk reduction you'd expect to see from taking, for example, metformin.

Now, I do a number of hacks. Generally, I try a few things. Metformin is not one of them because I find the risk-reward balance not-

Dave Asprey:

I'm with you. I don't use it for anti-aging, but I used two years ago.

Ulrich Dempfle:

Yeah, yeah, so if I-

Dave Asprey:

You don't need to if everything else works, right?

Ulrich Dempfle:

Yeah, exactly. For 26 minutes a week, why would I do that if I can basically take care of my metabolic health in an as effective way with 26 minutes of exercise per week?

Dave Asprey:

You lost, was it 10? Using kilos, was it 10 kilos or 20 kilos?

Ulrich Dempfle:

No. I lost 10 kilos.

Dave Asprey:

That's only 20 pounds. Come on, jeez!

Ulrich Dempfle:

I'm on video. I don't want to lose terribly much more. I don't know. It's not going to come across on the podcast terribly well, but I think I'm a fairly normal weight guy now. I mean, there's a general thing. I think the balance between fitness and weight management or in fitness and fatness if you want is slightly wrong. So, it's been shown that the, basically, low fitness levels cause as many avoidable deaths as smoking, diabetes, and obesity combined.

So, if you want to do something for your health, it's much more important. In fact, five times more important to do something for your fitness than it is to lose weight. Now, obviously, I think it's entirely fair and everybody would want that to have a healthy weight range, but if you have to make a choice where you invest your energy, I think you're much better off, and at least if good health is your target, you're much better off to invest some willpower into improving your fitness rather than losing a ton of weight, and you should do exercise to get fit and live long rather than do exercise to lose weight. The first is much more important.

Dave Asprey:

Given these benefits and the much lower amount of time that you put in on it, this is one of those groundbreaking things that if everyone did this kind of cardio instead of the other kind, we would be freeing up millions, actually, tens of millions of hours a year to do other stuff, and getting twice the results than we're currently getting, and maybe needing less drugs for diabetes, and since diabetes is a precursor to cardiovascular disease, and cancer, and Alzheimer's, and you guys read about that if you read my Super Human antiaging book, well, this looks like it's one of those things that's just worth paying attention to in a more so than I should go for a sprint. It's not the same thing.

Ulrich Dempfle:

Yeah, yeah. So, I think the other thing that's really important is it makes it really very easy and easy to adhere to, and that is something we also observe in the data from our users and that we get as a feedback that it's something that's easy to fit into your day. It's easy to stick to it. What's, again, something we're very proud of is that the vast majority of our users manage to stick to the good intentions and actually use it.

So, that's I think not a thing that could be said about every piece of exercise equipment, but because it's so short and it's so easy to develop a habit around it and it's got really tangible results that you can feel, that it is really easy to stick to.

Dave Asprey:

It is easy to stick it, and there's something else that we haven't talked about. The world of calories in, calories out, just has been punched in the face over and over over the last 25 years. It's just such stupid ways of thinking. So, you've seen me mention on Instagram if you eat a piece of bread or drink some orange juice, it pretty much goes straight in. It doesn't take any energy to absorb that stuff, but if you eat a piece of steak, you're going to be burning probably 30% of the calories just to break down the steak.

So, the calories in component, it doesn't really make sense. Then you say, "Oh, but I'm a good calorie counter because I like to tell myself stories and write down numbers that I think are real," then you say, "How many calories did I burn during my exercise?" So, you write that number down, but it doesn't take into account all the calories that you burned after you exercised because your metabolism was sped up.

One of the reason I want to have you back on the show was that Western University in Colorado just published a paper talking about excess postexercise oxygen consumption. In other words, how much extra mitochondrial activities happening after an exercise? What did they figure out?

Ulrich Dempfle:

Yeah. So, we were surprised ourselves by the results. The paper just came out a couple of weeks ago, which we had [inaudible 00:35:09] and have this now incorporated in our product. So, while the exercise is so short and you burn really few calories while you're on the bike, it raises your, and sorry if I sidetracked, but it's so short that most people don't even sweat, yeah?

You burn so few calories, your body heat goes up by so little that most people don't even sweat, but what happens then afterwards is that over an eight-hour period, your metabolism operates at an elevated level, and about 67% of the total calorie consumption from the exercise basically happens when you get off the bike.

So, for myself, just as an example, I can do eight minutes 40 seconds and that would create a total, let's call it a calorie deficit of around 215 calories. Now, that's more than 10% of my baseline

calorie need. It's so easy that it helps me with weight management. So, I don't watch terribly much. I eat healthy things, but I'm certainly not in the calorie counting camp. It just makes it easier to manage my weight and hold a very healthy weight.

Dave Asprey:

It sounded like there isn't such a thing as calories burned, it's just that if you're to look at the number of calories burned during that eight-minute ride, it's negligible, but the signal it puts into the body causes this couple hundred calories to be burned all day long, and unless you had that study that just came out, no one would ever know that, which is one of the reasons that calorie counting is fantasy because there aren't studies like that for most other kinds of exercise.

So, if you're to do normal sprints, how many postexercise calories did you burn based on the length and intensity of the sprint, which you don't know. So, what I'm saying here is that you know the number, but that none of us knows the number for any of our other kinds of exercise, which is why the numbers are random.

Ulrich Dempfle:

We do know that normal moderate intensity exercise usually causes about 10% to 20% afterburn. So, it's a very moderate amount. Whereas if you have this high gradient or change in slope, you have this much, much higher level of afterburn for, yeah, eight hours after you get off the bike.

Dave Asprey:

The study actually showed almost 70% of the calories were consumed after they got off the bike versus, like you said, 10% or 20% for normal exercise, but when you get the calorie counting bros out there, they don't even talk about the 10% to 20% postexercise consumption because they can't measure it. So, it's one of those things. You also can't measure air temperature and humidity, which are variables for calories that you're burning. So, they're making up a number going, "As long as I track it I'll lose weight, and as long as I'm hungry all the time I'll lose weight," and I'm just here to say, guys, you're making yourself suffer. You're wasting time, and you're math is wrong.

Other than that, I know you're trying to be good people, but you're angry all the time because you're hungry. So, have some food, take a break, and then you can be nice to other people. It will be great.

Ulrich Dempfle:

So, I mean, I'll tell you what it does to me. This is one of the reasons I do it in the morning because I obviously do it before I have breakfast. I do my ride and then, typically, I don't have breakfast because it suppresses my appetite and it just helps me stay longer in a fasted state and easy. It takes me over past lunch and have a much reduced feeding window.

That's the other effect that at least it has to me and it's been observed in observational studies in other users that it suppresses appetite. So, you don't have to have that croissant for breakfast or whatever it is you have.

Dave Asprey:

In fact, Anette wanted to ask a question about fasting and timing. Anette, you want to pop in and ask something? Chris will path you through.

Anette:

Yeah. I was just curious, and thanks for taking my question. If you could have any research on using the bike towards the end of a fasting state, and if there's been any benefits that you've noticed from that. Thank you.

Ulrich Dempfle:

Yeah, sure. So, I have definitely any equal one research in what I do. So, I'm a big fan of intermittent fasting or time-restricted eating or also doing five-day fast from time to time. I definitely still use the bike in those periods. So, I find it helps. I find it helps to suppress appetite and, therefore, extend my fasting windows.

Dave Asprey:

On a five-day fast you do that?

Ulrich Dempfle:

Yeah, I do.

Dave Asprey:

Wow! That's a little bit of-

Ulrich Dempfle:

[crosstalk 00:40:31] qualify that. I do the fasting mimicking. I do that two, three times a week. So, there's a little bit of calorie intake still happening.

Dave Asprey:

During the five days? Okay. That makes more sense. Okay. It will be like a Bulletproof fast where you're changing the type of calories. You might be doing 100 or 200 or 300 a day kind of a thing.

Ulrich Dempfle:

Yeah. It's the Valter Longo program, which I find quite nice every few months.

Dave Asprey:

He's been on the show. There's definitely an argument for doing a low-calorie, low-protein period every so often or just doing a full 24 or 48-hour fast. I would just caution listeners, especially if you're not super metabolically fit, it's more work to go on a multi-day full fast and burn a couple hundred extra calories with exercise. I wouldn't do that, personally. If I'm going to do a multi-day fast, it's going to be I'll exercise at the end of it maybe, but during that time, I'm going to be resting and reflecting. If I'm doing a working fast, I would definitely do the CAROL and I would probably do it at the end of the fast versus in the middle of it. Do you have any good data on that?

Ulrich Dempfle:

I don't, actually. No. I just have my own experience. What you said made perfect sense, and the viewers would have seen me nod along. So, I agree with your recommendations there.

Dave Asprey:

Okay. That makes a lot of sense because REHIT is different than HIIT, it's different than other kinds of exercise. Ski, you want to come on and talk about your experience with it? Ski is one of the guys in the Upgrade Collective who's on. He just texted me on our little chat window and said he's doing it after his intermittent fast.

Ski:

Yeah. I use it three to four times a week. I mean, three is minimum, four is my bonus, but always at the end of an intermittent fast. Of course, I'm combining it with the Vibe plate and with the B Strong bands and throwing all sorts of stuff, and I can get as much done as possible, but I haven't noticed any downside to doing it at the end of intermittent fasting.

Ulrich Dempfle:

That's great.

Dave Asprey:

Okay. Beautiful. So, you're definitely a biohacker. You've got all the stuff from the Dave Asprey box, the B Strong bands and the Bulletproof Vibe and everything. That's super cool. Do you see people combining this with stretching, with yoga? Is there an order? Do you do this before or after other kinds of exercise, Ulrich, or is this just what you do?

Ulrich Dempfle:

So, I think that's personal preference, and I couldn't say do this or that, but what we do see a lot is people who love to spend time on yoga or on honing their skills for sport that they love the ... Basically, they understand they need to do something on cardio for their fitness levels, and so it just allows them to get that done in a very efficient way, and then either spend more time with their weights or spend more time with their yoga or spend more time on honing their skills.

Dave Asprey:

To me, that's it. I just want everyone who listens to the show to have more time to do stuff that matters more. If I could brush my teeth for one second, I would also do that and save the other two minutes of brushing to do something else that matters more. Why are we spending all this time on self-maintenance if there's a better way to do it? I don't know the one-second toothbrushing technique, but if there was, I would do a show on it because this is time that humanity gets back. So, I'm totally in on that. Speaking of time-

Ulrich Dempfle:

Yeah, yeah, exactly. We might have something for you. So, we're working at the moment, and that will come out in August for all those for whom eight minutes 40 seconds is definitely too long still.

Dave Asprey:

Really? You're going to come out with an even faster one? Can I upgrade the bike I have?

Ulrich Dempfle:

It will be automatically upgraded.

Dave Asprey:

A new program? Okay.

Ulrich Dempfle:

Yeah, yeah, exactly.

Dave Asprey:

That's so good. All right.

Ulrich Dempfle:

It's going to be the less than five-minute workout because here's the thing. The magic, the stimulus happens in the 20-second sprints, the two 20-second sprints. So, we have to keep those. They're important. Also, the three-minute cool down at the end, that's actually also important to give your body a chance to just normalize and recover a bit before you step off, but the warmup, the two-minute warmup and the three-minute recovery in between, there you can shave off a little bit of time still.

Basically, what we'll do is we'll give users control and, basically, whenever you're ready to start sprint, the bike will recognize that, and you can basically shorten the warmup, shorten the recovery, and so you could get it in maybe four minutes 30. Definitely under five minutes.

Dave Asprey:

I'm going to sound like the biggest jerk, but if I could do it in four minutes, I would be happy to only get a 10% improvement in VO2 max versus 12. I don't care about the extra 2%. Give me my four minutes back three times a week, I'm totally down.

Ulrich Dempfle:

Yeah, no, absolutely. I mean, this is basically a response from ... I thought eight minutes 40-

Dave Asprey:

Like me.

Ulrich Dempfle:

Yeah, absolutely. So, we listen to our users. Some of them said, "Oh, the warmup feels a bit slow. Why do I need to do that?" So, we consulted our academic friends and did some testing. Yes. So, that's going to come out in August, and it will be the ultra short version. You'll do it, and you'll have the absolutely highest ROI on your time investment.

Dave Asprey:

Wow. I'm really excited about this. All right. One other question for you. We know from high intensity interval training research over the past 10 years or so that telomeres can lengthen from it. What do we know about REHIT and telomeres?

Ulrich Dempfle:

So, there was recently a quite interesting study and it maybe ties in, I don't know whether you said that or somebody else, but there are definitely people who feel that cardio is a bit a waste of time, right? I

have good friends who basically swear that resistance training is all you need to do. So, all you need is lift some heavy weights.

There was a relatively large study, 125 participants, in to the effect of different types of exercise on telomere lengthening, telomeres' activity, and they found that both endurance training and HIIT significantly upregulated telomeres' activity. Whereas resistance training didn't have the same effect.

So, I think the takeaway from that for me was just, no, just weights alone is probably not enough, even if you're really into building muscle, and I have no issue with that. That's a good thing to do. It's good to put some cardio into your routine, and if you basically do it out of necessity, then you want to get it done as quickly as possible, and that CAROL is your go-to piece of equipment to get that basically done as quickly as possible, and then by all means, spend time with your resistance bands or your weights or your Cheat machine, and build muscle.

Dave Asprey:

That is really cool. I believe that we are on the cusp of seeing a renaissance in exercise, even things like resistance bands, which is not what you guys do. They have a different slope of input curve than gravity and they seem to work better. There's so many cool things. So, the instruction manual for what you can do to maintain the human body for long periods of time, it's just changing because we have better technology to maintain it than we ever did before. I think what you're doing is actually really unique, which is why I'm fascinated with five minutes for 10% improvement. It's enough that I'm likely to do it.

These aren't going to be five minutes where you can be on a call necessarily because you're going to be focused. You're listening to the headphones. They're telling you what to do, but it's only five minutes, and you don't have to take a shower afterwards unless you're going to, anyway, which is another big time saving. So, I'm there.

The other thing about this that's intriguing, we have some members in the Upgrade Collective who are early 20s and we have some who are in their 60s and 70s. One of your riders who's 78 started riding the CAROL. What happened then because this something that can work very different ages?

Ulrich Dempfle:

That's absolutely right. So, because CAROL is personalized and basically adapts the rides to you, it can be done by a very broad range of users. So, John is 78. He started to ride in July 2020. So, he's got a number of things. He's got heart disease. He's got five stents in his coronary arteries. He's got atrial fibrillation, type 2 diabetes, and was obese.

Now, since starting CAROL, so he just emailed that to us and it's really gratifying. It's very rewarding to hear that. He's emailed us to say that ... So, he's A1C has fallen below seven for the first time since he developed type 2 diabetes. He lost 41 pounds of weight. His cardiopulmonary capacity is significantly up, and some of his lab scores on kidney functions, which were completely out of range are back to normal.

So, these are his words. I quote him. He says he's in the best physical condition that he's been in since his 40s. So, he's had significant medically demonstrable improvements, and that after years of steady state moderate intensity exercise that never produced results.

Dave Asprey:

Wow! So, he was exercising this whole time and it just didn't work, and then he changed the slope of the curve using your AI algorithm, and then magically, it started working.

Ulrich Dempfle:

Absolutely. Absolutely. Here's the thing. So, he tells us that he's trying to convince his family and friends to try the bike, to try CAROL, and the people who were most easily converted and convinced were actually his internist and his cardiologist because they've seen the numbers. Everybody else thinks, "Oh, it's too good to be true." That's actually something we hear quite a lot that it's too good to be true because there's dominant narrative out there that more is better, no pain no gain, and all that stuff.

Dave Asprey:

You know what else is too good to be true? Putting butter in your coffee. At a certain point when it works and you have millions of people talking about it, then suddenly it becomes obvious and then everyone wants to do it. That's just how it always happens, right?

I mean, I took a lot of hits for bringing that out, but, really, there's people losing weight, but it's one of those things where something that's dramatically better, you're going to see a lot of guys like, what was his name? John, who you were just talking about, who just can't stop talking about it because it made a meaningful metabolic difference and enough people will listen, then they'll start talking about it, and that's how we bring about change when it's something that says, "Oh, you mean more exercise isn't better? You mean more starvation isn't better or more low-fat diets, all that stuff?" To break the paradigm, you just have to show it and if you got the cardiologist and the internist, they're going to tell people.

So, I foresee good things around this kind of just massively better because depending on how you want to do the math, you're at least five times better and probably 10 times better because you're getting twice the results and you're using 20% of the time. That's enough to get everyone's attention. I like that.

So, thank you for just going out there and doing the weird stuff and then facing all the critics and just saying, "Here's what it does." Now, you have 100,000 rides or something. So, all right. You guys you can argue and say it doesn't work, and you can go back to eating your low-fat McMuffins or whatever the heck you eat, but it doesn't mean it doesn't work. It just means that you didn't listen.

Ulrich Dempfle:

Yeah. The good thing is it does work. It's very quantifiable. It's very feelable. So, you can really experience it. Maybe I just mentioned that, but we're so confident in it that we're now offering 100-day free home trial. So, you can get the bike, you do the exercise. So, that's beyond the eight weeks, and you really have the chance to experience and see it and feel it and track the results. So, if you're in the too good to be true camp-

Dave Asprey:

Then just send it back if it's not real.

Ulrich Dempfle:

Absolutely. Absolutely.

Dave Asprey:

There you go. All right.

Ulrich Dempfle:



So, we know it's not too good to be true. We know our data. We've got the results. So, we're confident to make that offer. If you need to be convinced and you need to try it for yourself, yeah, you can.

Dave Asprey:

That speaks volumes because, look, if it doesn't work, then you guys now have a used piece of gear. I should mention [carolbike.com](http://carolbike.com). By the way, guys, you can use code Dave, save an extra \$100 because I ask any guest who comes on the show who has a product, "Hey, hook up our Bulletproof Radio listeners."

Also, when you come to the Biohacking Conference in September in Orlando, CAROL is going to be there, so you can try one out while you're there and see how it feels. I'm saying this because I have one. This is real. All the numbers you just heard, they're university-validated. So, maybe we can set down the chains of endurance cardio just once and for all and be done with it. Ulrich, thanks for being on Bulletproof Radio. [Carolbike.com](http://Carolbike.com), use code Dave. You can send it back if everything here on the show isn't true.

Ulrich Dempfle:

Fantastic. Thank you for having us.

Dave Asprey:

If you liked today's episode, you know what to do. You should come to the Biohacking Conference. This is the seventh one that I've put on. It started with just 83 or 85 people at a barn in San Francisco. Now, it's become a big thing with community. We're doing it in Florida where hugging is legal. You'll be able to see people smiling at you. It's going to be amazing, and you're going to get to play with the CAROL bike and 100 plus other pieces of gear and technology to actually experience what it's like to be around people who are passionate and motivated doing things better, [biohackingconference.com](http://biohackingconference.com).

If you just can't wait to get a CAROL bike, remember [carolbike.com](http://carolbike.com), use code Dave, save 100 bucks, and you might even get it in time to get in shape before the conference, so you can stand there and flex. I'll see you guys in Florida.