

# Phil Maffetone – 2016 Keto Summit

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Christopher: Hello and welcome back to the Keto Summit. I'm here with Dr. Phil Maffetone. Phil has been around -- I don't mean to be disrespectful, meaning, that you're old, Phil, but you have been around an awfully long time. For more than 35 years, Dr. Maffetone has been bringing the latest advances in fitness nutrition to health care professionals around the world. Dr. Maffetone has worked with world class athletes and Phil is an internationally acclaimed author having published more than 20 books. Your latest book is *The Endurance Handbook*.

Phil: I think that's correct. After 20, you get to say more than 20 and then you don't have to remember too many of them. But *The Endurance Handbook* is sort of the follow up to *The Big Book of Endurance Training and Racing*, which is, obviously, for endurance athletes. And if you're not a competitive endurance athlete, the one that's most popular is the red version of that which is called *The Big Book of Health and Fitness*.

Christopher: Okay, yeah. So, *The Endurance Handbook* is the latest book that I have read most recently. And I will, of course, link to that in the page that hosts this video so that people can find it. It's a brilliant book. I said this to Mark Sisson. This is the book that I wish I had when I started my activities as a mountain bike racer. And it's interesting actually. In Mark Sisson's book -- I'm not sure if you've read it -- the *Primal Endurance* book, he cites you probably 50 times in that book. I see that as a great compliment.

By way of an introduction you've completely transformed my joy of endurance activity. Before I knew anything about you I was that guy that was doing the time trial to work every day. I was taking with me thousands of calories of carbohydrate in the form of liquid in my bottle and then also the maltodextrin gels in my jersey pockets and I couldn't go more than 40 minutes without consuming one of these maltodextrin gels. And now it seems unthinkable to me to own one of these things. And I do long fasted ride, four, five, six hours even.

And even at races too, I'm not supplementing with carbohydrates anymore. I feel like it's kept me in the game. You've kept me in the game. It's not really so much about winning so much as it is maximizing enjoyment and keeping me in the game.

Phil: Yeah, yeah. People forget about that. It's about having fun as well. And if you're a high caliber competitive athlete, you still want to have fun, you still want to be in the game and you want to win. So, it all kind of fits together quite nice.

Christopher: Right. And then so today we're going to talk about different energy metabolites and how they can be used by endurance athletes. So, where should we start? Do you want to start talking about carbohydrate as the use of an energy substrate or where would you like to begin?

Phil: Well, that's an interesting question. I sometimes begin with where our energy really comes from. And if you ask that question of many people, they really don't have an answer. Many of them say sugar because we've all grown up thinking that sugar is what powers the human body. And, of course, that's only partially correct. But that's not even the source of our energy. Our energy comes from the sun. Light energy from the sun comes to the earth and plants take that light energy and convert it through that process of photosynthesis into energy, animals eat the plants and then we eat the plants and the animals and we convert that energy into mechanical energy through these very complex biochemical pathways.

More specifically, we can convert carbohydrates, fats and proteins into energy. And the bottom line with, not just for athletes but for all of us, the bottom line is having energy. And the more energy we have the better we're going to feel, the healthier we're going to be, the more fit we're going to be because we'll be able to train better, and so on and so forth. The particular source of energy that we're probably going to be talking more about today is ketone bodies and they come from the same macronutrient from the diet -- carbohydrates, fats, proteins, primarily fats.

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We can adjust like a race car what kind of fuels we're going to use when. And if we want to maximize our human potential, whether it's as a student or a researcher or a competitive athlete, we want long term energy and that's really the name of the game for everyone human, is to have a long term energy system. It's called the aerobic system.

And that aerobic system does use some glucose, of course, but it uses especially fat as an energy source in the muscles. And then we have this other energy mechanism that involves ketone bodies. And just in the course of the day we're all using some ketone bodies for energy. But if we go into ketosis what that means is we're using a lot of ketones and we're not using them in the muscles so much but we're using them in the liver. We're using them in the brain. And what that means is those areas in the bodies don't have to use as much glucose. So, we keep our blood sugar stable. We have these great unlimited sources of energy between the ketones in the brain and the liver as an example and fats in the muscles. And we literally have unlimited energy.

Christopher: So, did I do the right thing then? I've transitioned full circle from a very high carbohydrate diet where I was eating cereal for breakfast, sandwiches for lunch, pasta for dinner, thousands of calories of carbohydrate during my rides. To now, where I eat pretty much zero carbohydrates unless they come in the form of non-starchy vegetables. And I'm eating very high fat ketogenic diet. So, did I do the right thing by your teaching or is what you're teaching something different from that?

Phil: I think you did the right thing. You were in a bad state and what you did was readjust your metabolism so that you could burn more ketones and burn more fat and burn less carbohydrate. So now your energy, your body became a long term. You built your aerobic system through training. You gave your aerobic system the opportunity to have virtually unlimited energy and it kicked in and everything worked well in however much time it took you. It takes some people shorter time than others. But I think you did the right thing. Whenever the body is not in a healthy state, the sooner you can get out of that unhealthy state and into a healthier state the better.

Christopher: So, I sometimes wonder how the different components of this fit together. Before I switched to a very high fat ketogenic diet I was doing a lot of aerobic training. One of the first things that my first coach did for me was got me to slow down. And I feel that was tremendously helpful. But it didn't enable me to escape from the carbohydrate trap. So, it's doing all these aerobic rides never really going above 140 beats per minute with a heart rate strap and still being heavily addicted to carbohydrates. And I think that was because of what I was eating during the day. But at the same time, I don't think that just switching to a high fat ketogenic diet is going to get me to this amazing place where I can do these long fasted rides and I'm able to use fats. So, how did the things fit together?

Phil: Right. They have to go together. And so what you were doing before when you were really glucose dependent because that's what you were eating mostly, a lot of high carbohydrate meals and snacks, you were glucose dependent. And even though you slowed down to attempt to build the aerobic system you were really just going through the motions. There was no way you could have built the aerobic system in an effective way, in an efficient way because you were, your diet was taking precedence over the training. Your diet was saying we're going to be a sugar-based body. Even though your training in attempt to become a fat burning aerobic body, the diet takes precedence.

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And you can't do that. By making the switch and reducing your carbohydrate intake in your diet and with your snacks, you then gave your aerobic muscle fibers, which is where body fat is burned for energy, the opportunity to develop themselves even more. You got your mitochondria working better, your energy was higher. If you monitored yourself, your pace, your miles per hour, however you want to measure, watts, for example, on the bike, became greater and greater and that same 140 heart rate.

That's because your energy started to improve more and more. And it's like that steam engine where they shovel coal into it. If you're limited in coal you're only going to go so fast and so far. But when you start burning more fat, because even the leanest of us has a huge amount of potential fat we could walk a thousand miles on our fat stores or run 600 miles on our fat stores, even a lean person. So, that's a huge amount of potential energy. And as you did that, your aerobic system really developed well. And now you could do these five and six hour rides without requiring food because you're burning your fat stores.

Christopher: I think that's a really important point actually. That's what we're trying to get at here, that you could move your body 600 miles without eating anything. And so if you can't do a 60-minute bike ride or maybe a 90-minute bike ride without eating something that tells me that your metabolism is broken. And yet that is the default. If I was to go out -- I'm here in Santa Cruz at the moment. I could go on to the trails Friday afternoon. I'm going to see a few guys of my age riding their mountain bikes.

And that's what they do. They're out for 90 minutes and they're going to consume two Clif Bars and a gel during that 90 minutes. And that tells me that something is wrong. If you were one of those guys and you were watching this video, where would you start? Would you start by fixing your diet or would you start by slowing down? Where did those guys start?

Phil: Well, the best place to start is with the diet. Because if you're feeding your body a lot of glucose, you're making a lot of insulin, and you're not allowing your aerobic muscle fibers to use as much fat as an energy source. And until that's changing things are just not going to work right. So, the very first thing to do is to stop eating junk food because there's no value in junk food.

Christopher: Right. And can you define junk food?

Phil: Well, one of the biggest problems, with one of the biggest junk food foods is those items with sugar whether it's added sugar or so-called natural sugar, high sugar. Like a loaf of bread has a lot of carbohydrate and that turns to sugar very quickly. But a lot of packaged foods have added sugars and there are some sugars like cornflakes, big popular breakfast food, that are actually worse for us

than pure sugar. Because if you look at the glycemic index of cornflakes, which is a measure of how much insulin we produce after we consume the cornflakes, it's higher than pure sugar.

So, there's no way you can get your body burning a lot of fat. There's no way your metabolism is going to be healthy when you're eating those kinds of junk foods. So, the first thing to do is stop eating the junk food. Then the big question is: Well, how much natural carbohydrate does my body tolerate? Well, the answer is that it depends on you. For example, as we age, we become more insulin resistant. So, the amount of carbohydrate, natural carbohydrate, we probably should be eating is going to be a lot lower than it was when we were younger, when we were more insulin sensitive.

So, a lot of it depends on the insulin mechanism. And I have something called the two-week test which enables people to cut way back -- A, eliminate the junk food and, B, cut back on the natural carbohydrates for a couple of weeks just to see how you feel during that two-week period.

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And a lot of people after two weeks they say, "Well, I'm feeling so much more energy. I'm feeling like it's a miracle that I'm not eating a lot of carbohydrates but my energy is the highest it's ever been. How could that be?" Well, you've now turned on your metabolism so that it can burn more body fat. And that's one experiment that people can do for themselves. But getting rid of the junk food will get rid of a lot of the sugar that will just quickly make a big change for your metabolism.

Christopher: So, tell me more about the two-week test then? Is it in your book? Is that where we should find out more about it? Is it on the website?

Phil: It's on the website. You can go to the website, look up two-week test. It's in a lot of the books. I developed the two-week test in, I want to say 1982 or 1983, so it's been quite a while. But it's a way for people to become more intuitive and to use their instincts about eating. We just allow, unfortunately, the food companies to dictate what we should be eating. Like I said before we started recording, we've all grown up thinking that sugar is where we get our energy from. And it's quite misleading.

And so the two-week test is a way to help us get back in touch with our true instincts. Every animal on earth knows how to eat except humans. We're kind of forced into eating junk because we are living a hectic lifestyle. We think we don't have time to prepare food. We think that there's nothing we could buy that

doesn't have sugar in it. I will admit it's not easy when you make that transition but there's plenty of healthy food out there that doesn't have sugar in it.

So, the two-week test, it just says, look, for two weeks, stop eating all the high glycemic and moderate glycemic carbohydrates. Cut out all the bread, cookies pasta, rice, beans, fruits and fruit juice. And when I would explain this to patients, they would stop me at some point and say, "Well, that's all I eat." And I say, "That's why you feel so bad and that's why you're talking to me now." So, you eliminate that and then you eat a lot of vegetables except for potatoes and corn which has very high amounts of carbohydrates. Meats and cheeses and eggs, fish and so forth.

You don't cut -- you eat enough fats so that you maintain your caloric intake. And it's also good to write a list of complaints. Pretend you're speaking to a doctor and you're giving your doctor all the things that aren't right with you, all the signs and symptoms you're not happy with. Well, I get tired in the afternoon. I'm tired in the evening. I don't sleep as well as I should.

Christopher: Waking up in the middle of the night starving hungry was my big one.

Phil: Exactly. Yeah, yeah. I'm hungry during the day. I'm hungry after I have a meal. I get back to my desk at after lunch and I'm so sleepy I sometimes have to put my head down and I fall asleep.

Christopher: I get back on the ride and I knocked my kid out of the way to get to the refrigerator.

Phil: Yes, yes. I have a lot of intestinal bloating. I have a lot of gas. High blood pressure, when we get into the more chronic problems, we see high blood pressure in a lot of athletes and that often is a sign of carbohydrate intolerance. So, make a list of things. And then at the end of two-weeks of not eating any of these carbohydrates, high glycemic and moderate glycemic carbohydrates, or no junk food.

Look at your list and say, "Oh, well now, I'm sleeping through the night." "I kind of feel a lot of energy. And I'm not getting sleepy when I come back to my desk." Lentils and fruits and very carefully every other meal and see if those foods cause those same signs and symptoms that now have gone away to start coming back. Then you know you've gone over your limit of carbohydrates. And it's really a lot easier than it sounds. It's really quite simple. It's amazing how well your brain will start realizing that, "Gee, I didn't realize how bad I felt after I had that bowl of fat-free pasta." Or whatever. So, it's a fairly easy thing to do. And it's a good way to get started.

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Christopher: Right. It's interesting to me that you didn't talk about measuring blood glucose or measuring ketones or a ketogenic diet or anything. You just talked about eliminating the carbohydrates especially the processed carbohydrates that breakdown into sugar in our blood and taking it from there.

Phil: Exactly. What happens is everybody's different and everybody responds to certain amount of carbohydrate. In fact, as we age, we sometimes have to lower the amount of carbohydrate we're eating. But some people end up at the end of the two-week test realizing, "Well, okay, I could have one piece of fruit a day. That's my limit." But some people realize that they can have any fruits, they can have any carbohydrates and they are, in fact, now in ketosis.

And then we have to explain that to them and we say get some ketone measurements to see if you're there, remember how it feels to be in ketosis because if you drift out of it you might be aware that you've eaten too much carbohydrate without realizing it, which is not a difficult thing. Because if we're out there in the world and we're traveling, for example, and we buy something that we think is okay, you stop and you have a big salad for lunch and you have some ham and cheese on it and you consume that and you get sleepy and you wonder what's going on.

Well, oddly enough, there's a lot of sugar in ham. If you read the package, it will say sugar right there at the top of the ingredient list right after ham, after pork probably. So, we're now on this journey of learning how to eat again. And knowing that we have to limit our carbohydrates, we started reading ingredient list and we're amazed, shocked and dismayed at how much sugar is in so many foods out there. It's quite a disgrace, in fact.

Christopher: And what do you say to people that are in a family. Maybe thinking about my guy on the trail. His family, the house is just every cupboard is just full of sugar. The kids are eating breakfast cereal and there's all kinds of carbohydrates in the house. How does a guy like that transition? Do you think it's -- I mean, it's so difficult. Do you tend to like clean everything out and just ignore the rest? How does he do that?

Phil: Well, what I try and do in a family situation, and it's not unusual, it's a lot easier - - well, I shouldn't say it's easier but it's something that comes up when we have a child who is a diabetic, for example, or child who has seizures and needs to be in ketosis. So, we need to be very strict with this child because their health and indeed their life depend on it. And people say, "Well, how could we do that? We're going to restrict our carbohydrates with my child here but the other children are going to be drinking soda and eating cornflakes for breakfast."

I said, "No, no." This is a perfect opportunity to change the diet of the whole family. And that's really the bottom line. Even if you don't think you're feeling bad, even if you're lean, even if you're a good athlete, you could be a better athlete. You could be healthier. Like I said earlier, there's no benefit to eating junk food. And so, if you're in a family situation and you're the one that needs to make changes in your diet or if you have a child that has to make changes, the worst thing in the world is to isolate, here's what you're eating and here's what the kids are eating and here's what so and so is eating.

Everyone should be eating a healthy diet. We should all be eating a healthy diet especially children because, well, there's just so many reasons to eat a healthy diet, of course. And I think everybody knows that. I think everybody knows that there's no value when eating junk food. Yet most people eat junk food.

Christopher: Right. And I can tell you that certainly what has worked for me.

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My two-year old daughter and my wife eat exactly the same food as me even though I'm a mountain biker doing 15 hours a week of training at the moment. I just eat more food than them but the food that we're eating is exactly the same. So, what are the mistakes you see guys make? I keep saying guys. Of course, there's girls too. I just have this image of a middle aged guy on a mountain bike on the trails right now which is why I keep saying guy.

But what are the mistakes that you see these guys making? Do you see -- I think about maybe non-nutritive sweeteners or is there anything in particular? You've had so much more experience than everybody else out there with this. So, what are the most common mistakes that you see people make with this recommendation?

Phil: I think one of the common mistakes is that people always think that if I'm going to be, if I'm going to start eating more healthy, I'm going to eliminate junk food, I'm going to eat more vegetables and healthy meats and fish and whatever, that's great. But people often have this idea that, okay, moderation, it's okay to eat some junk food once in a while, it's okay to go out on Friday and pig out at the local junk food restaurant where everything has sugar in it.

It's not okay because as soon as you spike your insulin because you've consumed too much carbohydrate which for some people is not a whole lot, you've done a tremendous amount of damage in the body. You've damaged your metabolism. You've impaired your fat burning. You've reduced your aerobic function. You've turned on genes for disease. I mean, if you just look at the genetic factor.

We all have genes for heart disease, for example. Do we want to turn on the genes for heart disease or do we want to turn them off? Of course, we want to turn them off. So, of course, we don't cheat on Friday night because it's not worth it. I don't ever eat anything that I would not want to eat on a regular basis. It is just -- and that's a very common mistake.

And the reason for that mistake is often because so many people are addicted to sugar. And so very much like the alcoholic or the heroin addict, they come up with these rationalizations why it would be okay to cheat. It's okay to cheat because if you're too strict it's not good to be fanatical. It's okay to cheat once in a while because I'm going to eat well the next day. It's okay if I have heroin once a week because it's only once a week and how much harm could that be? And on and on.

So, the difference between today and all of what our ancestors experienced is that we have two choices. There are two cuisines on earth. There's healthy food and then there's junk food. And it wasn't too long ago there were not many generations passed that had those two options. They virtually, for millions of years, humans had one option. It was healthy food. You run down a deer, you pick some roots, you eat what was in the deer stomach. You've got your vegetables. It's different today and we have to deal with that issue and that issue to a great degree is sugar addiction.

Christopher: And then talk to me about diets. We had an interesting conversation a few weeks back about the idea of a diet. And I would describe my diet as a ketogenic diet. And you suggested that might be a problem. As soon as you say diet it tends towards orthorexia. So, I'd love for you to talk about that and whether or not we should be on diets.

Phil: I think diets are a copout. I think diets are unhealthy. Look how many diets come out, new diets every year. They're really a reinvented version of an old diet. But there's all these diets that come out in magazines and new books and wherever. And the idea of a diet is that you follow some list of foods and you don't have to think.

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Well, that's not -- we have a brain. We have an incredible brain. In fact, our brain is so incredible when we're born we can't really move like a deer or a horse. When a horse is born, that horse jumps up, starts running around and it's amazing. While humans have such an incredible brain that we devote so much energy, so much blood supply, so much development here that the rest of our

body is sacrificed for years before we can really get our body moving like that newborn colt or that new foal that was just born.

So, our brain is amazing and what an insult to follow a diet when we have this incredible brain where we already know what we should be eating. We know how to eat. We just have to get away from this nonsense that really the sugar industry has been doing what the tobacco industry did for decades. At one time, some of us who have been around for a while remember the commercials, the TV commercials, where doctors were sitting there with a cigarette saying, "You can smoke these cigarettes. It will help you relax. It's going to be really good for your throat."

The things they said were, I mean, just they make you laugh and they make you cry. And the sugar industry has done the same thing. Sugar equals energy. And if you want more energy you eat more sugar. And I remember my grandmother and my mother always having a big container of white flour and sugar in the kitchen. They were staple ingredients and it's really sad.

It's that sugar addiction and the many ways that they've gotten us addicted in our lifetimes that we have to overcome. And that's not an easy thing to do. But it can be done and it's something that needs to be worked on and just recognizing the fact that you might be addicted to sugar is half the battle.

Christopher: Okay. So, it's kind of -- I guess, it's kind of a nebulous term, isn't it, this word diet? It conjures up ideas of foods you can eat on one list and foods you can't eat on another, which as you say is kind of an insult to our big clever brains. But I would still -- sorry.

Phil: We already have those two categories. We have junk food and healthy food. To call it a ketogenic diet is a big mistake. People often ask me if I'm on a ketogenic diet and I say, "What's that?" I am often in ketosis, high level of ketosis, what I call moderate ketosis. But versus before the ketone started rising I'm a little past that now but ten years ago I wasn't. Because I didn't need to be. I need to be now because that's where my body has taken me and so I've adapted to that and made the changes accordingly.

Christopher: Okay, interesting. Yes. So, I wouldn't say -- So, even though I do describe my diet as ketogenic I don't have a list of foods somewhere and it's very serendipitous. I'd say the main thing that drives the food that we eat as a family is what happens to be available at the farmer's market. I'm very lucky that my wife is a food scientist and she does all the cooking and shopping and that's where the majority of our food comes from. There's a farmer somewhere with an agenda that defines what we eat. But maybe that's not a problem.

Phil: It's not a problem. But in the end, it's that I go out to the garden and I pick certain things for dinner based on my intuition. I want a lot of this. I don't want much of that. Likewise with meats and things. Again, animals do this all the time. The ones that are not in captivity at least. And so, we need to make the choices based on what our needs are not based on a diet or anything else.

Christopher: Okay. All right. So, we're doing the two-week test. We're going to rip this band aid off really fast rather than tearing it off slowly.

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We're going to get rid of all of the sugar and all the processed carbohydrates. We've got the whole family on board. And maybe your wife or husband has agreed to do this too because they might notice something beneficial too. So, how does the training piece fit into this? So, if you're currently a very carbohydrate addicted endurance athlete, what's going to happen when you stop eating carbohydrates when you go out for a ride?

Phil: Well, first of all, you'll have to go through a transition period and that transition period can be one or two weeks in some cases. If you're lucky, it will be longer in other cases. It just depends on your metabolism. It's one of those uniquenesses that everybody is a little different and you're just going to have to deal with it. You can measure fat burning in a laboratory.

Christopher: And would you recommend that?

Phil: I think, I suspect most people know when they're not burning enough body fat and it's simply because they have too much stored body fat. That's as simple as it gets. Energy, if your energy is not almost unlimited then there's a problem most likely. And between those two things I think people know that they're not burning enough fat. If you want to measure something then you can go to a lab and you can, at rest and during physical activity, on a treadmill or on a bike, you can measure the amount of fat you're burning.

And you should burn fat at all levels of activity, even very high intensity. When you're racing we should still be burning some fat. So, that fat burning mechanism once you get it revved up it's going to work all the time. But what people will have to go through is a transition where -- The body doesn't like change. And even when we go from a bad situation to a good one, we still have to go through a transition. And that transition is going to be, I wouldn't say terribly uncomfortable but think of giving up coffee or if you're a former smoker having given up on nicotine or if you were on drugs and you had to come off drugs.

This is somewhat similar. It's quite often not quite as difficult as giving up alcohol or heroin, for example. Although I've known plenty of people who just had a hard time coming off sugar. It was very painful. But that process may only take a few days or a week or two. The bottom line is you have to do it. You just have to do it period. And that transition, however long it takes, you're going to feel discomfort. Your intestine is going to be eating a lot more foods that's not used to eating.

It's not going to be eating foods that you were used to eating, so your intestinal musculature is going to have to go through changes. Your metabolism, your blood sugar, so on and so forth. And when you come out on the other end, you're going to feel great and you'll be able to look back and say, "Boy, that was a transition that I'm glad I'm through now." Which is another reason not to cheat every Friday night because it puts you back into that bad situation which you then have to go through that withdrawal process again.

Christopher: And are there any band aids? So, for me, in particular, there was a product called UCAN SuperStarch that I would describe as -- It's been like a nicotine patch for somebody giving up cigarettes. It's not something I use now. In fact, the last bike race that I did, I did put some of the UCAN SuperStarch in a container and put it in my jersey pocket with the full of intention of using that.

The bike race was two hours and 40 minutes for me. My average heart rate was 171. Normalized power is 276 watts. So, it's something that most people would consider quite carbohydrate based energy metabolism. I never reached back for it. I just didn't want it, just the idea of eating at that intensity made me almost slightly nauseous to think about it.

Phil: Well, sure. Yeah. When you're working that hard the last thing your stomach--

Christopher: Want to do is eat.

Phil: Food. Among the problems is that the blood in the muscles has to be, some of it has to be diverted to the stomach to help digestion and you want your muscles working at their best. So, sure. Yeah, I don't know that there's any real band aids. Sure, we have methadone. We have nicotine patches.

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Christopher: Methadone is awful though, by the way. I know how hard to get off that as well.

Phil: It sure is. And I was going to say what ends up happening is now you're going to get off this band aid. Just don't eat that stuff and go through the transition. And if you go cold turkey you'll go through the transition as fast as possible, as fast as

your metabolism can do it. And that's what I recommend. Believe me, I've tried it myself. I grew up as a kid, as a sugar junkie. I was diagnosed at age 24 with type II diabetes. I said, "Wait a minute. Something has to change here. This is not happening. No, I'm not going to go on insulin." I knew enough physiology and I said I'm going to reduce carbohydrates, of course.

Christopher: So, how many years ago was this? You figured, you knew all this stuff when you were 24 years old?

Phil: Well, it was before that that I first experienced ketosis. I want to say it was probably age 23.

Christopher: So, what year was this?

Phil: You're trying to find out how old I am, aren't you?

Christopher: I just want to know how like ahead of your time you were. I've interviewed Tim Noakes.

Phil: This is the mid, early to mid 70s.

Christopher: Right. I mean, this is ahead of everyone with a possible obsession of Volek and Phinney maybe.

Phil: Yeah. I didn't go into practice until 1977 and then I started telling patients about it. But as a student I was learning by doing. And early on, when I experienced ketosis, I was not looking to experience ketosis, I was looking to experience fasting. And I thought, because I had a lot of intestinal problems and I thought it would make sense if I fasted and fasting means water only, not juice. And I thought, okay, I'm going to fast.

And in reading about fasting, I understood that you weren't going to eat food, how do you get energy? You get energy because you burn more fats and you produce these ketone bodies and you use them for fat or for energy and that's how your brain can work really well. So, I realized that, okay, fasting is not going to kill me, number one. Number two, there's going to be two, three days where I'm going to feel bad but then I'm going to have a lot of energy and it's going to be fats and ketones.

And, okay, I was focusing on the fact that I'm giving my gut a really big rest. And after three days, the energy I had was phenomenal. And I thought, well, I'll do maybe a week of fasting. A week came up and I just said, "I'm feeling so good. Why do I want to eat?" And I ended up fasting about two weeks. I don't remember exactly how many days it was, maybe 13 days or something. But the

experience, I didn't know until after I started reading about ketones that that's what the benefits were, is that I went into ketosis and it made me feel so wonderful. And I really couldn't put two and two together. And when I got the diagnosis of diabetes I was -- everything kind of clicked.

Christopher: Okay.

Phil: Ketosis has been used in medicine for 100 years. There was some literature out there that I was able to get and read about and kind of understand energy systems better. For me, that was the beginning of ketosis and understanding fat burning. So, when I got into practice in 1977 and I started asking athletes to reduce their carbohydrates to a low level I was considered really, really weird.

Christopher: This is what I wanted to talk to you about, was that what made you--

Phil: It didn't go over very well.

Christopher: Yeah, I'm sure. And I'm just wondering what made you so different from -- I interviewed Tim Noakes and I saw Tim present in Iceland a few weeks ago and he showed some data for an experiment that he did with the body in the 1970s. And basically, the purpose of the experiment was to show the need for carbohydrates in athletes.

**[0:45:04]**

And as part of the experiment they stopped eating carbohydrates and Tim and his friend went into ketosis and his wife complained about the smell of his breath. He was this close to the solution. And yet somehow he turned to the dark side and the rest is history. He's come back now. But what made you different? Like why did you not go with that central dogma of carbohydrates for endurance athletes?

Phil: I'm not sure. Probably a combination of things. The experience I had with fasting. And by the way, after the fast I realized that fasting really isn't that healthy and I recommended it a little bit in practice but generally discourage people from fasting. But I experienced ketosis. I got a sense of what fat burning was all about. I had read studies about fat burning. There weren't a lot back then. By the early '80s, I read Phinney's study and some of the others. There were some books.

There was a book in 1959 in the US -- It was a bestseller -- called *Eat Fat to Get Slim*. I still have a copy of it actually. I found a copy of it a couple of years ago at an antique store. And I said, "Wow, look at this book. I remember this book." And there was not a lot of help. I will say that. It was a very difficult task. Like I said, once in practice in working with athletes, I would say, "Look, we want to get

you burning more fat and in order to do that we've got to reduce the amount of sugar." And it was terrible.

What I did was I did a diet analysis on everybody. So, one of the ways I helped them transition was to have them see what percent of their diet was carbohydrate, what percent was fat, what percent was protein. And then I could say, "Look, you're eating 75% carbohydrate and we want to bring you down to 40%." Now, they have an idea of what I'm talking about. And if they were to come back to see me after the first visit, which some of them did, they would be able to relate when they were choosing their meals and so forth.

But it was still -- the first thing I did was say we have to eliminate junk food. And I'm not even sure junk food was the term back then. It was mostly don't eat any more processed food, don't eat sugar, don't eat white flour. Use whole grains. Fruits and vegetables for natural carbohydrates, lentils, beans, and so forth. And I think as bad as a lot of athletes were talking about me back then there were enough who started feeling better and then there were enough who started performing better and--

Christopher: You just go with what works?

Phil: Yeah. Yeah, exactly.

Christopher: That's amazing. And so talk to me about the role of fasting for athletes. So, we've had one expert in particular Jason Fung who's a nephrologist from Toronto that's been recommending getting great results with fasting in his patients. And I think it took me a long time to understand his context. But one day he talked to me about somebody that just walked into his office that morning and it was 70 something year old 400-pound man that was in danger of losing body parts to type II diabetes. And it that moment, it clicked why he was using fasting ahead of any other type of therapy, maybe even including a low carb diet.

And I know that some of the athletes will be drawn towards some of the benefits that the experts that talk about fasting. But do you think there's a role with fasting with athletes? Or do you think it's going to be a problem for someone like me, say, that's doing 15 hours of exercise per week?

Phil: I think when you're talking about fasting you've got to define what fasting is. Of course, water only. But are you fasting from 6:00 p.m. or 6:00 a.m. the next morning? I don't really consider that a therapeutic fast.

**[0:05:08]**

But I think that's giving your gut a break and I think that's a very important thing to do. But we also have to look at difference between a fast, several days of fasting or--

Christopher: That's what I'm talking about, yeah.

Phil: Yeah. The difference between a patient who has a condition and an athlete. The patient who has a condition, very different situation. Sometimes it's a way to jump start their metabolism. I think, supervised, it has great value potentially. I think in an athlete you have the potential problem of not getting enough calories. Yeah, we're going to burn body fat but we still need to eat food. We still need to take in calories to maintain our cellular turnover, for example.

We're always losing cells. All of our cells have a lifespan just like we have a lifespan and at the end of that lifespan that red blood cell dies. It's broken up. We recycle some of the parts and we make a new red blood cell or whatever cell. And those new cells, in addition to the recycled parts from old cells, come from the foods we eat. And so, if we're doing a lot of fasting or for just fasting for a week or two and trying to train and work at the same time, I think the risk of becoming caloric deficient is a very real risk and we see that in enough athletes as it is.

Christopher: Right. Yeah, it's definitely something I've heard a lot about. It seems in some of the food diaries -- my wife works with athletes -- is that when you eat this high fat diet you just stop being hungry. And when you're used to being hungry all the time because you've been eating a high carb diet, you kind of, you're like, "Wow, this is great. I don't really need to eat." And before you know it, you're creating a 1200-calorie deficit per day. And that eventually is a maladaptation, right? So, that leads to problems if you're doing it every day.

Phil: Potentially. What's interesting, and we need to do more research on it, but it brings up the issue of calories in-calories out which is something I've never gone along with. That's a flawed theory. When I work with a lot of athletes during my career and they would win a race I would often have media come and talk to me and say, "How many calories did he consume during the race?" And I'd say, "Well, this many, about." And some of the sharp ones would say, they think for a minute and they say, "Well, that's not possible because he would have burned up X amount and you say he consumed Y amount. How could that be?"

And I'd say, "Well, because you burn a lot of body fat." And that was a foreign thing back in the '80s and '90s. And even today it's a foreign thing. So, what happens when you go into ketosis and when you're in ketosis and you're eating a ketogenic lifestyle, a ketogenic eating style? You become pretty efficient at generating energy. And what typically happens is your caloric requirements go

down. Even though everything else in terms of output is the same your caloric requirements go down.

In my case, transitioning from -- I can't remember how many carbohydrates I was eating. But transitioning, when I went into ketosis and stayed there, I probably over the next few months reduced my caloric intake by 25%, 30%. I talked to Tim Noakes recently and he told me something similar because I asked him, "When you transitioned into ketosis, did you adjust your caloric needs?" And he said yes. I think he said 30% or something like that.

**[0:55:01]**

And I've seen that frequently before. So, we're using energy more efficiently. We can get by with less energy. Tell me what that does to calories in and calories out because it ruins the whole thing and a lot of people say, "Well, it's impossible to reduce your calories by 30% and still have enough energy." Well, it's not because we do it all the time.

Christopher: Interesting. And then you don't worry about -- So, these people that are restricting calories by what we would normally think is allowed amount based on the old paradigm, you see changes in thyroid physiology. So, maybe the TSH is normal, the main signaling hormone from the brain to the thyroid is normal. But then the free T3, which is the most active fraction of the hormone, is very, very low like below the bottom of the reference range. And you don't see that as a problem. You just see it as a normal change that's come about because of the--

Phil: Exactly. I see that as an adaptation. It's like looking at a lot of things, looking at ketone levels, of course, that are going to be a lot higher. Looking at blood glucose, you'll see lower levels of blood glucose. You'll see lower levels of glycogen stores.

Christopher: Interesting.

Phil: You'll see adaptation across the board especially with hormones because that's your metabolism and that's what you're trying to make more efficient. And if you do that everything falls into place. And if you really want to look very carefully, start measuring things, you'll see triglycerides normal, for example, you'll see cholesterol levels normal, your small particles will change. You'll see indicators improve.

There's two key things that I bring up when people are going to do the two-week test which may or may not put them into ketosis. And a lot of them are familiar enough especially these days and they'll say, "Will I go into ketosis doing the two-week test?" Some will and some won't. There's no black and white. It's that

your ketones start rising and at some point you can say, "Well, okay, they're high enough now to be called ketosis."

But there are two things that I cautioned them about. One is if they had high blood pressure and they're on medication, they have to be very careful because when you lower your insulin levels your high blood pressure also lower. And if you're on blood pressure medication and your blood pressure comes down you could go into a hypotensive state which can be very dangerous. So, I say check your blood pressure. I usually say go to your doctor and tell your doctor what you're doing.

And if your doctor doesn't want you to do that, find another doctor that can work with you. Because you're in charge. Your doctor works for you. Because it will change your -- if you have high blood pressure it will bring your blood pressure down and you better be ready, your doctor better be ready to say it's time to get off the medication. Because you can have normal blood pressure without the medication now because your blood pressure is normal.

The other thing that I do for women who are of childbearing age and even the ones that are a little older who think they're not of childbearing age, I give them a caution because they're going to become more fertile. And this happened early when I first established this two-week test, so when I started doing it with people. I didn't realize how profound it could be. But I had a woman. I knew from her history that her and her husband tried to conceive for the previous several years. She came in to see me because of back problems and she was overweight.

She was 40 years of age. She did the two-week test. She came back after two weeks and said, "I feel really good and I tried adding some lentil and fruit and it made me feel bad and blah, blah, blah." And she called me two weeks after that with the news that she was very happily pregnant. And I didn't think too much of that. But then it happened to someone else. And then I started realizing that when you balance these hormones, it's a domino effect.

**[1:00:07]**

All of the hormones are balanced. And when you're not fertile you have a hormone imbalance. And if you balance those hormones you're now going to become fertile. And it became, those two women actually sent me -- When you have a problem you can meet a lot of people who have the same problems. And so there were a lot of infertile women in the area. They all knew each other. The two of them sent me a lot of patients. The therapy was to put them on the two-week test because it had worked so well.

So, the profound changes in physiology are very interesting to look at and if you want to measure them, go to your doctor and have things measured. If you want to measure, for example, your fat and sugar burning at different heart rates, we alluded to before, how much fat you're burning at a 140 heart rate, how much you're burning when you're in a race, you can measure that in a laboratory. You measure oxygen uptake and carbon dioxide output. It gives you the respiratory exchange ratio. And so now you're burning 70% fat, 30% sugar at this heart rate. And as you increase your heart rate you burn a little less fat and a little more sugar and on and on.

It's a good test. It's used more in research but when I started using heart monitors -- Before heart monitors came out I had a cardiac monitor that was used in the hospital and I started using that with athletes. And I realized that there was a certain heart rate that when you were training at that heart rate your gait, whether you're on a bike or running or rowing or whatever, your gait was really good. And if you went above that, your gait started to get impaired a little bit.

I theorize that that must be a high fat burning state. We certainly don't want to impair someone's gait so we want them running at this heart rate not at a higher heart rate where their gait is impaired. And it was not too long after that that I was able to go into a lab and start testing people. I realized that their maximum level of fat burning was at that heart rate that I was finding, that was corresponding to the optimal gait, which became known as the MAF heart rate.

And it had been researched before, as I would find out, and it was called the aerobic threshold. Talk about a no pain-no gain society, everyone in sports knows and has heard of the anaerobic threshold. But you mentioned aerobic threshold to an athlete and they say, "Oh, you must mean anaerobic threshold." Well, no, no, I mean, aerobic threshold. And that aerobic threshold is that heart rate which will also be at that same level as your maximum amount of fat burning. And that's the level where you can develop your aerobic system the most so that you can develop more and more long-term energy and more and more endurance.

Essentially what happens is you literally get faster and faster at that same heart rate. So, when I started working with Mark Allen, for example, who I met as a young triathlete, he was able to run at that heart rate about an 8:30 pace, two minutes a mile slower than he was training. I said, "Well, you have to start there because you have to build your aerobic system. You've skipped over that." And he went from 8:30 pace to 7:30, then he went to 6:30, then to 5:30 and then to about 5:15 or so, over a few years at the same heart rate.

And what was happening is his body was using more and more fat for energy. And the more fat you shovel into those aerobic muscle fibers the more work they can do. So, you can go faster and faster at the same heart rate. And, of course, the best predictor of race performance is to look at submax performance. And so if your submax performance can get better and better your race performance is also going to get better and better.

Christopher: There's a key thing about your teaching that I came to appreciate only recently.

**[1:05:02]**

And that's the MAF formula, 180 minus your age, plus or minus a few beats, is just an approximation on what you learned by laying your eyeballs and laying your hands on people maybe on the track. So, you figured out afterwards that the formula roughly approximated to this point where people switched from an aerobic metabolism to a more anaerobic metabolism. And I think now what's happening is people are taking this formula as gospel. And by not understanding the history of it they're perhaps misapplying saying that, "Oh, well this is my **[1:05:41] [Indiscernible]**." But they don't realize that it's just an approximation.

Phil: Yeah. And what they often do is they see 180 minus your age and they pick that number and they don't realize that they have to individualize it to their bodies health and fitness specifications. So, it's more detailed than 180 minus the age. And it's not the same formula for everybody. It's highly individualized. But it is a formula but what I have found from way back when is that people on the laboratory, when they measure fat max or when they measure aerobic threshold, they find that that level that they've discovered on the treadmill corresponds to the 180 formula quite well. And I typically say it will be within one, two, three beats typically. And it usually is. There are exceptions. There are some people who that doesn't work with. But they are the exceptions.

Christopher: Right. So, Tommy Wood is the doctor I work with. He's my chief medical officer. He's a medical doctor. He's just finishing up his Ph.D. and he does research science for a living. He's a huge fan of yours. But one of the things that he refuses to believe is that this formula could be the same for everyone. It's physiologically impossible are his words, that everybody would have the same 140 formula, that people are different and the formula has to encompass those people in some way.

Phil: Well, it does. And 180 minus the age would not apply to a lot of people. But if you take 180 minus the age and then you find the category, one of the four categories that you fit into -- Okay. There's actually more than four categories. Because if you're on medication you're going to subtract ten but that's because

we want to be really conservative. If you're injured you're going to subtract five. If you're not injured, you're not going to subtract five.

It is a formula and it will have the drawbacks of a formula but the fact is most people are not going to go to a lab and get measured. And when you do that, as important as it is, you have to go back and be re-measured because you want to see if you've gotten better. So, what I do is I say, look we've got this 180 formula. The 180 formula came because someone embarrassed me during a lecture. I was talking about the process I go through because they say, "Well, how do you come up with these numbers for the athletes you train?" And I was explaining how I do it. And then somebody said, "Well, how can we do that?" And I didn't have an answer.

And I realized, well gee, there must be a formula that everyone else can use and with a little bit of thinking I came up with the 180 formula. But it is a formula and there are drawbacks. But if you were to apply the 180 formula correctly to a large number of athletes, the vast majority will correspond to the laboratory data of aerobic threshold and fat max.

Christopher: Right. Let's talk about how your heart rate might change on a ketogenic diet because I certainly saw my heart rate changed when I switched to a keto diet. And I've had tons of people tell me about this. Actually, I didn't realize how common it was until I posted something on Strava. I can't even remember what. It was just like you only get a few characters to describe the ride that you just did when you post something on Strava and I just mentioned something there.

And then all these people starting chiming in saying, "Oh, yeah, when you're on a ketogenic diet your heart rate totally changes and you'll see a much higher heart rate for the given power up." Which is exactly what I was seeing. And then somebody cited Peter Defty who I think you know. And he was adjusting the math formula for a ketogenic diet.

**[1:10:05]**

And I didn't go with that. I didn't buy that. It didn't seem right to me. I've stuck with the 140 beats, seems to work very well for me. And as you described, I've gotten, this season, I've gotten faster and faster and faster whilst maintaining the 140 beats.

Phil: Okay. There is the answer.

Christopher: Right.

Phil: You don't want to just raise your heart rate.

Christopher: Arbitrarily, yeah.

Phil: That could be a disaster. As you go through this transition, you literally stress your body. Now, in the faster study, they saw heart rates increase. I talked to them about this and I said can we get the treadmill data which would include speed to see if the higher heart rates were producing the same paces or slower paces or were the higher rates in the people who were adapted actually correlating with faster speeds or what was going on?

So here's what I see. What I see is just what you went through. In that transition period, again, which can be a couple of weeks but it could be a couple of months, it could be a few months in some cases, during that transition period a lot of things can happen. One of those things is that the heart rates can go up. And what that means is if you're training by heart rate you have to slow down. This is a huge change for your metabolism.

Christopher: Right. Well, let me clarify though. Because I'd been eating a ketogenic diet for two years when I observed this this year. But in order to get faster at that 140 bpm rate, I had to stick to that. So, if I let my natural tendency, my natural desire was to ride around everywhere at 155 beats and when I continued to do that I wasn't getting any faster. So, even though I'd been through the adaptation period with the diet I felt like I was fine with the diet and had been for a long time, I still had to slow down to 140 in order to get faster at 140, if that makes sense.

Phil: Yeah. That makes sense probably because your max aerobic, your MAF heart rate was closer to 140 than 155, is that the case?

Christopher: I think so. I think so, yeah. It's very difficult to do the MAF test. So, there's a test that you can do to measure your progress which I find very difficult to do on a mountain bike.

Phil: Well, you could use a power meter.

Christopher: Right. Which I have. I do have.

Phil: You don't have to do it on the mountain. You can do it on the flat. And you could do it running as well. It will cross over. You can be stationary on your mountain bike as well.

Christopher: Yeah. So, the motor mountain bikes, they don't let you do that anymore. So, I think, there may be are some adaptors you can get, but they've all got through

axles now *[Phonetic]* and so they don't go into those stationary turbo trainers anymore. You have to be moving.

Phil: Yeah. You could do it on the flats. Or a slight incline. The problem is, when you get to be in pretty good shape you're really moving along pretty fast on your bike. And so you've got to find the right course. But you can do a loop, a flat loop that takes you, say, 15 minutes and that's enough of a period for you to see that, well, the last month it took me 15 minutes, now it's only taking me 14 minutes.

Christopher: Exactly, so that's what I saw. In fact, Strava makes this quite easy for you to do. So, this is one segment. In order to climb back up to my house, it's mostly a dirt ride on the trails but in order to get back up to my house there's a little bit of road that I need to climb and there's a 17-ish minutes segment that Strava is going to record automatically every time I ride it. And it can show me the heart rate and the time it took and then it's obvious that you're getting faster at that same heart rate. And that progression wasn't happening if I just went -- If I did it 155 beats, I would just get the same. It would stay the same, the same power, the same heart rate, the same time every time I did it. It was only when I slowed down to 140 beats that I then start to see a faster time and more power.

Phil: And that's the key with training because if you're training at a heart rate that's too high you're not going to develop your aerobic system in a real powerful way compared to if you lower your heart rate to whatever your aerobic threshold is, your fat max, your MAF heart rate is.

**[1:15:02]**

Then you'll start developing that aerobic system. And in that situation, if you're eating a ketogenic style, you should still get faster at the same heart rate. Versus slower at the same heart rate because your heart rate, because you're ketogenic and your heart rate is 20 beats higher. That will happen in the transition because you're stressing your whole metabolism and it should take too long to get through that.

Christopher: So, when you're first transitioning to the diet. So, there's probably two different problems that we're talking about here.

Phil: Yeah, yeah, two different problems. And I think the problem that you had that you had 155 and you weren't progressing, that's called over training.

Christopher: Right, right. And I would have had seen the same results regardless of my diet. And I think this is a problem that in general is people switch to a ketogenic diet and then something goes wrong and they're like, "Well, it must be the diet." No, not necessarily.

Phil: Yeah. There's all these components in our lifestyle. All these physical, biochemical and mental/emotional stressors and we have to deal with them. We have to figure out how they best apply to us, what is the best match for us whether it's the heart rate, the caloric intake, the amount of carbohydrate we consume and so forth. And until you've made all those changes you're often continually in a transition period. The best way to look at all of this is stress. This is stress.

We have a stress mechanism that begins in our brain, the hypothalamic, pituitary, adrenal axis and when we're under any kind of stress, that mechanism is driving us and it's running our body down because it's trying to adapt to the stress. And whether those stresses are physical, whether they're biochemical like in carbohydrate consumption, whether they're mental/emotional, or whether they're combinations of everything, which is usually the case, when we have to change things, when we recognize that we need to change, we're going to go through a transition.

If we have emotional stress with our work situation and we have to transition out of that, that's going to be a transition. If we're improving our diet, there's a transition there. If we're adjusting our exercise so that we're going to run or bike at a lower heart rate than we're used to, painful. People have a hard time with that. There's a transition you have to go through. And so we have to go through all these transitions. And the sooner we get through them all the better we're going to be. But when we're going through a transition it's a stress on our body.

Christopher: Yeah, absolutely. Absolutely. And I should mention actually that I did get an increased maximum heart rate as well on a ketogenic diet that I thought was interesting. I used to be an amateur, fairly fast Cat 1 amateur and then eventually I got my pro license. And when I first started as a Cat 1, my max heart rate was 182. And so this was at least five years ago or maybe six or seven years ago. Yesterday, I went out and did a hard ride and I saw 189 beats twice and my maximum I'd ever seen in a race is 192. So, I improved my maximum heart rate by ten whole beats after I switched to a ketogenic diet. Who knows what's causing that?

Phil: Yeah, yeah. Well, it's the vascularization. You've increased your anaerobic system. And one of the things -- There's so many healthy aspects of the aerobic slow twitch muscle fiber, the aerobic muscle fiber. One of them is they're well endowed with blood vessels, with capillaries. So, by improving the aerobic system, we now have a lot better circulation. It is, in fact, one of the ways that the aerobic system can help the anaerobic muscle fiber, the fast twitch fiber which are called white muscle fibers. They don't have much circulation. And they really rely on the aerobic muscle fibers to help them especially in a race. But as

we improve our vascular system, we see a lot of cardiac changes and the max heart rates are one of them.

Christopher: Interesting. Well, this has been great, Phil. I'm just trying to think back to my guy that I'm about to see. I'm about to go out ride my bike now and I'm probably going to bump into one of these people. And, of course, I can't and I never would try and give advice to anyone.

**[1:20:01]**

But if I had to summarize it, you start with your diet, you do the two-week test, you rip it off like a band aid, you get that sugar out of your house and you start eating real foods, no junk. There's only two types of food, junk and real food. You eat the real food and then you slow down. That's another thing I didn't mention that these guys are doing. When you look over their shoulder, they all wear heart rate monitors, but when you look at their shoulders they're all doing 170 beats all the time. And so slowing down--

Phil: Yeah. Heart rate monitors have become a game. Let's see how many steps I can take today? Let's see how high I can get my heart rate on this hill. And it's really sad because it's such a great biofeedback device. But, yeah, most people by slowing down, yes, most people will have to slow down but there are some people who are actually training at a level below that MAF heart rate and they actually have to speed up.

Christopher: Interesting.

Phil: But probably 80% of the people will have to slow down initially before they start. So they complain that they have to train too slow. And then after a few weeks if they're on a bike it comes quicker or a few months. They start complaining, now they have to go too fast at the same heart rate.

Christopher: Interesting.

Phil: It's kind of interesting, yeah.

Christopher: Awesome. Well, is there anything else that people should know about? Your website is fantastic. You've done an amazing job of overhauling your website in the last six months or so. And then *The Big Book of Endurance Training and Racing* is the latest book. Is there anything else people should know about?

Phil: Well, there's probably 200 articles on the website. It's all free. There's an endless amount of information there. If you're a healthcare practitioner or researcher or scientist or have a scientific mind, I'd been starting to kind of make up for lost

time and write some white papers where I talk about the technical aspects of things like carbohydrate metabolism or carbohydrate intolerance.

Christopher: Right. And I'm looking at that white paper right now. Yeah, you're doing a fantastic job here. And I'm wondering whether any of these papers are going to be published in a journal at some point.

Phil: Well, I just had a paper published with a co-author Paul Laursen just earlier this month, I think, came out in Sports Medicine called Athletes Fit but Unhealthy.

Christopher: I read that paper and I will, of course, link to that in the page.

Phil: Do so, please, because -- I first wrote about that in 1981 after I ran the New York City marathon and realized that health and fitness were two different things. And talk about trying to get the concept across to people. Nobody would even have a discussion about the idea that athletes could be unhealthy. How can that possibly be? That's heresy.

Christopher: Right. Especially when it's coming from a doctor that's out of shape. They look at an athlete and they're like, "Well, you're an athlete. What do you want me to say? Of course, you're healthy."

Phil: I was familiar with Tim Noakes' very first paper that he wrote, I think, in the same year, 1980, '79. It was 1979. It was on marathoners and heart disease. And I didn't realize the rest of the story. He told me the rest of the story when we talked last and he said he wanted to present that paper at a conference and they wouldn't let him because it was -- What do you mean athletes with heart disease? Marathon runners have healthy hearts. How could you write about heart disease in a marathon runner?

Well, that's what he wrote and that's what was published and they wouldn't let him publish. And finally, he talked them into it and they gave him a spot to present it. But the spot they gave him was during the coffee break. So, it's been a long time and people are finally recognizing that injuries are not part of the game, sickness is not part of the game, having a heart attack in the middle of the race is sad and it means that something is wrong. It's not normal for it to happen to an athlete.

So, athletes certainly can be injured and unhealthy despite having high levels of fitness. So, that's a very important paper to finally get out there. And so more to come for sure.

Christopher: Awesome. Philmaffetone.com. Thank you very much, Phil. You are a pioneer and I can't thank you enough for everything you've done for me personally and

keeping me in the game, I think, is the best way to summarize what you've done for me. So, thank you very much.

Phil: Thank you. That means a lot to me. Thanks so much, Chris.

Christopher: Cheers.

**[1:25:13] End of Audio**