Dr. Mike T Nelson

Hey there, what's going on? It's Dr. Michael Nelson here back with another episode of the Flex Diet Podcast. And today is just a solo cast with yours truly nerdy. And I'm talking all about the effects of cold-water immersion, primarily on metabolic rate. I think there have been some interesting discussions on this. And I wanted to go back and do an even more immersive, deep dive into the literature on this again, so that you can be updated and decide for yourself if cold water immersion, for the purpose of changing metabolic rate is going to be useful for you or not.

And if you enjoy this podcast, today, check out the Physiologic Flexibility Certification, because a big component of this is temperature changes. Your body is a homeotherm it wants to maintain 98.6 degrees, or doesn't even trust that stamp. So I pulled more data on it, and it's probably about 97.7. But whatever your body wants to keep that core temperature, it has to keep that core temperature, it can't deviate by more than a few degrees, otherwise, you're dead. But we can go into a sauna, we can go into cold water, via air, also cold air exposure, exercise in the heat, etc. And we can challenge the body, just like you would challenge your right bicep or your pectoralis muscles on the bench press.

Mondays in the gym, it's really the same idea. And when you challenge it in an intelligent manner, and don't go too far, just like lifting too heavy of a weight or improperly you could injure yourself. If you're following immersion in cold water, or exposure to heat, and you do it in an intelligent manner. You will also see adaptations, right we all know of times when you were more acclimated to the heat, it seems easier. In the past, we've gone to our good buddy, Dr. Ben houses place flow retreat in Costa Rica. And most of the time when I've been down there, it's been in spring. And normally it's not very warm in Minnesota then. So I tend to not do very good in the heat down there unless I've done some specific sauna work.

And you've had this experience if you live in a cold climate, such as Minnesota, Canada, Midwest, Northeast, Northwest, etc. Or even different parts of the world. We've got people listening in from all sorts of northern climates, that when it gets to a warmer temperature in spring, it's t-shirt weather, it's time to run around in a T-shirt, even though that temperature maybe 10-15-20 degrees Fahrenheit, below what it felt like in fall. So just that little bit of exposure when you're outside during the winter, you adapt to the colder temperatures. So in the flex cert, we cover temperature as one of the main ways you can challenge the homeostatic setpoint of your body.

So homeostasis, that is the point where your body wants to stay happy. And it will defend that the other three key areas are pH and then also fuels which will be glucose and ketones. And the

last one is air oxygen and carbon dioxide. This gets into breath holds and breathing fasts and kind of Wim Hof type techniques and other things. The reason you want to train these systems, which I don't think get trained all that often is that it's going to enhance the resilience of your body and allow you to recover even faster. And again, in my biased opinion, I think this is also probably one of the best ways to increase your longevity. So after you then go to doing exercise and great nutrition, getting good sleep, all those things obviously help longevity, I think this would be the next main area to look into.

So the phys flex cert is the level two follow up to the level one, which is the flex diet certification. So on the flex diet certification may go over the eight interventions to better nutrition and recovery and the physical excerpt we expand that into the four areas I just talked about, and the action items. So what you would actually do include everything from cold water exposure, like taking a cold shower being outside when it's just a little bit cold, heat. Breathing techniques from breath holds to breathe in really fast box breathing.

Many different ways of doing it. breathwork also pH changes, which can be done by lower intensity exercise or especially high intense exercise. Some things such as blood flow restriction training, that's going to alter the local environment in the muscle, when you should consider doing a ketogenic diet, even if you are healthy individual. And once you consider bumping up glucose and carbohydrates even more, especially for performance. So all that's included in the phys flex certification is opened today, which is Monday, April 4. So go to physiologic flexibility.com. For all the information there. It will be open for one week until April 11 2022, to go to physiologic flexibility.com.

And enjoy my solo cast hear of me ranting away with data about the potential effects of a cold water immersion primarily. And its effect on metabolism. Is that even true? So claims of boosting your metabolic rate by 350%. If it is true, what do you have to do to get that kind of bump in metabolism?

Dr. Mike T Nelson

So listen in. Thanks. Alright, welcome. So on this one, you may be listening to this only an audio but there will be a video also, what I wanted to do is covered the effects of specifically cold water immersion and the claim of does it increase your metabolism? We're all looking for things to increase metabolism with the idea there that that would help weight loss, which that itself is a separate question.

So we're going to tackle this sub question here of this cold water immersion increase metabolism. And so if you type this into the old Google's here, we'll see some interesting things pop up. Some of it, they did get correct. So what you'll find right away is that cold water immersion increases metabolism in two main ways shivering the thermogenesis and non shivering thermogenesis not chirping, thermogenesis is mediated by special kind of mitochondrial dense fat called brown fat, which converts food to heat to keep you warm without shivering.

So that part is 100% true. And what's interesting about some of these claims is if you think about them, they do kind of make sense, your body wants to maintain his normal core temperature. So, if you expose it too hot or cold, in this case cold, it has to then produce a little bit more heat in order to keep up that core temperature and the production of heat is going to consume calories. Therefore, doing this is going to be a big caloric drain. Therefore, increasing your metabolism.

And two ways here are shivering thermogenesis and non shivering thermogenesis. So the term thermogenesis increase in thermo increasing heat. If you've ever been really, really cold, and you started shivering, that is your body's way of trying to create muscular activation, because we all know the byproduct of that is going to be heat. And this is important to keep in track or to think of because shivering is going to burn more calories than non shivering. While it's a little bit of an over simplification.

Non shivering thermogenesis is primarily using fat as a fuel, shivering thermogenesis is primarily using carbohydrates as a fuel. Again, we're not going to go too far down into that we're going to talk overall, does it increase metabolism, so looking at the total amount of calories, it is also true that exposure to cold water cold temperatures over time can increase a brown adipose tissue or this a bat tissue bat brown adipose tissue. And it is brown because it does have a whole bunch of the mitochondria, little furnaces of the cell.

And yes, they do more than just create energy, but that is kind of their primary job. So some of that part so far. All good and true. So I tried to find some other claims here. We've got another one of let's see this was drinking. I think it was drinking cold water, which we won't talk too much about here. This is actually talking all about hold water therapy. Who uses it? What are some of the benefits and most of the time you'll see here and other articles, that this increases your metabolic rate.

Another article nine ways to boost your metabolism back by science. And this gets a little tricky because they're talking about drinking more cold water. So when you drink cold water, it does increase metabolism by about 10 to 30%. This is about half a liter of cold water again, only that stays for about an hour. So if you do some small things like that, could it add up to something beneficial? Yeah, I think I think that it could. But we have to keep in mind, how easy is it to do those things, drinking cold water relatively easy. getting exposure to cold water takes more time, even if you're just doing a shower, and it's much higher in what I call the pain in the ass factor.

One of the other claims that you'll find is see if I found it earlier, but that cold water immersion will increase metabolism by 350%. So that seems like a huge on that. Also, be careful when you were googling these things. Most of the time is not going to take you to the actual study, I was able to find this one. So my Google search here is sort of preferentially loaded into that. So we will come back to that particular study. Looking at how cold the water do you need, how long do you need to see that kind of increase. So it is true that we do have a study showing that your basal metabolic rate. So this is increased from baseline, how much energy it takes just to be up and moving around. We found one study that does show it is increased by 350%.

So keep that in mind, and we will come back to that one. So some other things to consider when we're looking at actual studies is like most things, it's pretty darn messy. Right? I pulled up some of the studies here. And if we go into just a little bit more depth on that. So the first one I'm going to talk about here is this is a great table. And I will give you the full reference here at the end. But this was the best accumulation of cold induced thermogenesis and humans that pulled together a lot of the studies that have been done in the flex diet, or I'm sorry, in the physical X certification. I do talk about this void was one of the very first studies that have been done that actually had been published that was in the year 1878. So in terms of scientific things, we've been looking at this for quite a while.

So that study was pretty interesting. If you read the subject line, this is actually true. They used one and air quotes, strong man, they did put them in cold for six hours sitting. And this was an air temperature that ranged from 4.4 to 30 degrees C. So keep in mind, zero degrees C is 32 Fahrenheit, 10 degrees centigrade, or C is 50 degrees Fahrenheit. So this person was sitting in minimal clothing if you pull the full study for six hours, at just above freezing.

So if I go through some of these real quick, if we look at the percentage increased in most studies, and again, this is pulling together other studies, the two things I want you to think about is what was the average percent increase? And then how long? And how cold does it have to be? Now again, keep in mind some of these early studies, and a lot of them are done with exposure to air. So you could argue that if you're doing exposure to cold water, which we'll get into, you can

decrease the amount of time, right because we know that cold water, like water as a medium compared to air is going to pull heat away from the body really, really rapidly, especially compared to air.

So what you may not know is that my master's thesis, I did a master's in mechanical engineering. And I initially did study biomechanics, but my thesis because I could not find research funding for biomechanics. I actually did heat transfer. So I did heat transfer making a computer generated model, the big monkey head and we shot the monkey head with these Very high gigahertz microwaves. And we look to see on the computer generated model, how much deep tissue heating we saw in the monkey. Turns out, we didn't really see a whole lot. So all that to say, I have a fair amount of experience of looking at heat transfer rates in humans, or I guess you could argue monkeys.

So we're looking at here percentage of increase, I'm not gonna so swift 1932 11% increase, this was about 1.2 hours supine in air of two to 24 degrees centigrade. A couple other studies, zero increase I granted they used a small number of people to in most of the studies again, that was air exposure again, next study is 7.5% increase for what they call responders. So in that study, they divided them into responders versus non responders, that was actually 13 women. Most of these studies were men, but not all of them. And it's two and a half hours, supine air temperature a little bit warmer, 22 to 35 degrees. And that was do boy in 1952. Other ones 7%, another one 5%, another one 8.5%.

Again, these are all percentages of average increase in what's called Cold induced thermogenesis. Most of them here 10 5.1 2.8. Here's one who compared lean versus obese 13.7 for Lean 17.2 For obese. Another study here 1%, increased 5.9% 3.5. So you get the gist here that most of the percentages of increased here are relatively small, we're not seeing huge increases. And most of the time, because this is air exposure, it is going to be quite some time. Right now some of these didn't use super crazy temperatures, we've got a couple like this one used by people's 6% increase, and they dropped the air temperature for 24 hour daily living between 19 to 24 degrees centigrade, as published by Li 2014.

In terms of methods to analyze this, the next way we can divide them is by using something called a portable metabolic cart, the early version of this use something called Douglas bags. So for my PhD work, I did a lot of stuff with metabolic carts, we've already seen those pictures of a device where you're breathing into some tubes.

And they go out and be analyzed by this device that's usually sitting next to the treadmill or the bike. Some of the newer, more smaller units now like I have a device called a piano, he lets piano he that is in a backpack shape. So I do have a have my own metabolic carts which I can do my own measurements, which is pretty fun. Not cheap, but definitely fun. So these devices look at the air so oxygen, a carbon dioxide. And from that they can make inferences on the total number of calories burned, and then sometimes are using fat or carbohydrates, depending upon the sophistication of the device. So this is a more accurate way of doing measurements.

And what we'll see here is that for some of the studies, again, we do see a little bit more of a bigger increase. Again, this is called a noose thermogenesis percent increase. And so this is not necessarily the same as converting that to metabolic rate. But what I wanted to point out is that overall, we're not seeing huge percentage changes. So for this one, one of the greatest ones they saw was looking at winter swimmers. 65% increase, again, to our supine at Air 11.8 degrees centigrade was by Davis 1961.

So for some of the other ones, again, we're seeing 11%. We did see one here at about 280%. I don't know how much I trust that study though. Some of the later studies, they were trying to differentiate between people who are more cold adapted versus people who were not. And they're trying to make some corrections for them. We had some studies that were compared endurance trained versus untrained people for endurance, we saw an 11.8% increase for untrained and 8.0% increase for trained individuals.

And this was actually trying to account for the point at which they would start to shiver. So they change the temperature based on that. And that was 2015 so I won't go through all the other ones here. Again, we see there's a fair amount here also at the end. One study which I thought was pretty interesting, started getting into water immersion So on this one, we do see some studies for that. So here was a bigger study that can and including 1960, we saw a 91% increase for Lean and 26% increase for overweight, as looked at six normal weight and to overweight or obese young men. And this was about 2.5 hours seated submerged up to their neck.

They did individualize the temperature per individual. So the temperature did range from eight degrees C to 38 degrees, which is relatively warm. Keep in mind that eight degrees C is about 46 degrees Fahrenheit. If you've ever gotten into a tank of cold water at 46 degrees, that's not real fun. I don't want to sit in there for long periods of time. Again, like I mentioned, they did some studies on Eskimos here, one hour immersed except for the face, water temp, they're 33 or 35 degrees centigrade, so not super cold, they did see an increase of around 5.7 to 2.6. So again, the key takeaway here is even when we look at water immersion, we're generally seeing a longer

times and colder temperatures, although not super cold. Again, if you want to read this whole study, which was awesome.

It's called Cold induced thermogenesis in humans. It is by Rg brought Chica, I'm probably slaughtered that name Bry CH, T A, and k y Chen, just look that up, you'll find it a European Journal of Clinical nutrients 2017. So that shows us that yeah, we do see changes there in terms of cold water, and also air, but they are relatively small.

So if we go back to the other main study here, and we look at so where this 350% increase was mentioned first, the first place I saw it cited was in a paper called measurement and prediction of peak shivering intensity and humans accepted September 2000. Main author here is Douglas A Ellefson. And this is in the European Journal of Applied Physiology 2001. And with this one they were trying to model when peak Chevron intensity occurs in humans.

So if you're going to look at just total caloric burn, or percentage increase above metabolism, you want to look at maximal shivering, right, that's going to be the point at which you see that introduction and talk about shivering is a well recognized mechanism, the maintenance of body for temperature. This goes all the way back to Horvath and 1955 and some earlier studies. And this is the first time I saw that they record that it is five to six times a metabolic rate based on otoo consumption. So they said quote, the intensity of the shiver peak has been reported to be five to six times resting metabolic rate, and a 4060 50% of maximal oxygen consumption.

They cite some of the earlier work here from endorphin modular 1946, and some other papers. So if you see things that say, cold water immersion, can increase your metabolic rate by five to six times. That is what it is in reference to keep in mind that this is shivering most of the time. Again, for this not very much fun, right. And in this paper, what they did is they took a group of 15 young fit healthy men, for women were studied. And they took a bunch of measurements, they looked at their vo to max body fat, a bunch of other things.

And they were trying to correlate actually skin temperature and other methods to determine when peak shivering would occur. So they're trying to do a more predictive model. But if you pull the full study, and you look at it, what you'll see is the time that they had to spend, again, they use a particular protocol there, so 4.9 times a metabolic rate, right? So this is giving their average and milliliters about two, right? So in the lab, if we're measuring metabolic rate with a metabolic cart, we're going to look at owed to consumption. So for this study, here's what they actually used to have people come into the room, just 22 degrees.

See, they had him do a resting measurement for 10 minutes while they sat outside the tank, and then quote, they were immersed to level the sternal notch. So basically almost up to the neck and stirred in a water bath initially set at 20 degrees centigrade, though not super cool, definitely cold but not super cold. And then they lowered the temperature to eight degrees C, about 46 degrees Fahrenheit, over 15 minutes by adding ice. And then next they did their measurements at that low temperature of eight degrees C 46 degrees Fahrenheit for 60 to 70 minutes of immersion, and then they slowly raise the water temperature again.

So if you can imagine sitting in water temperature that's about 46 degrees Fahrenheit for 60 to 70 minutes, yes, you can dramatically increase your metabolic rate during that time. But that sucks, I don't really want to do that I've done up to five or eight minutes pretty easily at 46 degrees Fahrenheit, I thought of sitting in there for another 50 plus minutes would not be real fun.

That's after I was doing it a fair amount. So yes, you will see an increase there. But pretty long temperatures, long times also are low temperatures, I should say. So if we go back to our study here that we promised we'd look at that says a 350% change in metabolic rate. This is quote, human physiologic response to immersion into water of different temperatures. The main author here is ceramic. I may have mispronounced that s r a n EK. This is a European Journal of Applied Physiology 2000. Pretty interesting study. Side note, this is also the study that looked at big changes in epinephrine, norepinephrine and dopamine. There have been some other studies that showed maybe shorter times and colder times, we can see pretty big changes in that.

But again, I won't necessarily cover that right now. So our main question is, if this 350% increase in metabolic rate is true, the thing that I always see left out online is the context I need, what do you have to do to get that rate. So this study again, generally using healthy individuals, they did a lot of measurements, they used oxygen consumption again. So that's a good way to look at changes in metabolic rate. So that was good. They use 10 young men aged just 22 On average, body fat, relatively low, because they're not necessarily overweight. VO two max or peak of 56. So pretty, pretty good people in terms of representative of more athletes, and in terms of healthy individuals that you would see in terms of a study. Yeah, and so some studies are looking at different pathologies, which is very interesting, but may not necessarily correspond to healthy human beings. And then they put them in underwater for head out immersion, sitting on a chair for one hour.

Another interesting part when you're reading studies is a water constantly moving or do they move the water, you will build up a little bit of heated water next to your skin, if you're not

moving. If you've ever gotten into super cold water, you'll realize that you don't want to move. And the second you move around a little bit, it feels a lot colder as because your skin is heating up and transferring energy to a thin layer of water next to you. It's kind of thermal barrier. And when you move it disrupts that barrier and you get much colder.

This is why things like wetsuits works so well. So wetsuits have different thicknesses, and usually you can buy them in terms of the seams are sealed or not. It's a way of looking at how much water is going to be exchanged between you and the environment. The thicker the suit, the more seal the seams are, the more you can heat up that thin layer of water next to the skin. And it will help keep you warmer. So similar idea here, but we're not looking at anything that's keeping that barrier in so as soon as you move disrupts that barrier immediately. So in this study, the water was stirred manually every two minutes.

During the emergent subjects only wore swimming trunks and they didn't have them rest beforehand, did a bunch of other measurements and everything else. So that part interesting. They also collected a whole bunch of measurements and and everything else. And they did this study over different water temperatures, they did 14 degrees, 20 degrees and 32 degrees and random order with one week interval between each one. So again, for our reference point, 14 degrees C 10 degrees C is about 50 degrees Fahrenheit.

So 14 degrees C is cold, although not ridiculously cold, I think that is definitely more manageable. However, you're looking at an exposure time of most of your body here for about one hour. Right? So yes, you can see an increase in metabolic rate. Yes, that is true. These based on this study will be true is always relative. But that is what they did show in this study, however, you're going to need a place where you can be most of your body exposed to water, you'll need to move around every couple minutes. And the water not super cold, but relatively cold. And you need to be in there for about one hour.

Now, if we compare that two, what are some other things that you could actually do, and what are like a realistic rate of calories that are being burned? Right, because we know exercise will burn a lot of calories. So I did find this other study here called the effect of cold water immersion of metabolic rate in humans, as the International Journal of kinesiology and sport science, volume five, number two, April 2017. And with this one, they took six males, 14 females, no injuries. And they came into the lab, this is the University of Wisconsin across.

And they did a whole bunch of measurements, again, they're looking at oxygen consumption. And if we just kind of skip to the parts that are most interesting for us, they looked at this over a 15 minutes of treatment, and the temperature see that they used here. Let's see, let me double check the temperature. The temperature they used was waist deep, cold water at nine degrees centigrade. So about 48 degrees Fahrenheit, pretty cold, not horrible, horrible, but pretty darn cold. And what was nice is it this converted to mean energy expenditure. And if we look at the little graph that they have, and interesting enough meat energy expenditure went down a little bit, the longer they were exposed.

Again, this is just looking at what was it if you take a sample every five minutes, if we take the highest amount, and we assume that will be around that point for the whole time. It's actually it was lower. It is 2.43 kilocalories per minute. So if you did this for 10 minutes, you would burn an extra 24 kilocalories. Really not that much. Right. Now, again, you could argue is there some other effect of this after you get out? Maybe, you know, some studies have looked at that. But generally, once your skin temperature has rewarmed up, there's not too much of an after effect. Again, if you're getting crazy, and you're doing really cold levels, and you're almost shivering, maybe there is some carryover effect for a couple hours at best. Again, the data in that area is almost non existent, I had a really hard time finding anything related to that.

What was interesting, though, is that they publish the changes in metabolic rate during the five minutes and beforehand, and then the 15 Minute cold water treatment. And you see a pretty high amount of variability. Now again, this was not necessarily total, per se. But we see it range anywheres from like participant 10 here was that 3.61 And one of the lowest ones for the cold water block was at about 1.73. So what's interesting to me is that we do see a fair amount of variability from one person to the next.

But it wasn't massive, wasn't a huge effect. We're not seeing, you know, five or 10 times different effects. Now keep in mind that the average for the baseline for most people here is about 1.5. Right so this is not an absolute we're seeing that change, for example, participant, one 1.63 kcals per minute at baseline, and then five to 10 minutes later 2.6. So they are definitely going up.

What's interesting is that almost all of them over time went down. And if we do look at the treatment afterwards, so they used a five minute post treatment measurement, they were staying elevated over baseline. But even at that point, almost all of them were starting to come down. So this is some data to show that it does the elevated above baseline. But we're not seeing massive elevations above baseline stain for long, long periods of time. If we compare it to exercise, and again, I'll give the title of what the study is from here.

Most people would say if you're doing an intense a CrossFit workout, and that's what they did in this study, which was, I think, a PhD or masters defense. So some data again, you could argue this wasn't the most high quality data and published in a peer reviewed journal. But you can look up rate of caloric burn for different types of exercises online, tons of data on that multiple sources, just using this one as a reference.

If you did about one hour of CrossFit training, the amount of calories you would burn ranged from 362 to 693k. Towels, they compare this to what they call the quote traditional workout, which was 327 to 600 kcals per hour. So that just gives you some frame of reference of how many calories you can burn with exercise. Again, these are all pretty well established tables that you can find online. So you can look that up. And this one was caloric expenditure during one exercise session following ACSM and CrossFit guidelines. And this was a thesis defense. So the takeaway here is that, yes, you can see changes in cold water immersion with relation to metabolic rates. The caveat is you have to be kind of careful reading just the abstracts without the context.

So for the main study we talked about here, if you read the abstract, sounds amazing, right. So we have here cold water immersion, 14 degrees, lowered rectal temperature and increased metabolic rate by 350%. Plasma noradrenaline and dopamine concentrations were increased by 530 by 250%, respectively. So again, super interesting. But the abstract here doesn't necessarily tell you how long you were there. It does at the very top, which is kind of removed. This was for a duration of one hour. So if you have a lot of time to kill, and you like being miserable, and you'd like shivering, you can increase the metabolic rate using cold exposure. However, for just a simple caloric burn, I don't think it's all that useful.

I do like cold water immersion. I'm actually a huge fan of it. I do think it has a lot of potential again, in the physical excerpt, I cover all sorts of things from the effects on exercise performance, hypertrophy, what parameters, how would you set everything up. But I didn't go super hard down the metabolic total calories burned area. Because I don't think most people are gonna sit in a tub full of cold water for an hour and be miserable. There's probably a lot of other things you can do. If you look at air exposure, you need to sit in a very chilly room with minimal clothing for many, many hours.

Right now, you could argue if you want to drop your temperature at home to a super cold temperature, and those can add up to changes over time, maybe. But I do think there is some benefits to cold water immersion, potentially for aerobic performance, which is modified via

something called PGC. One Alpha. There is some interesting things on athletic performance. There is some big caveats related to hypertrophy, adding muscle mass, super interesting stuff with changes to metabolism, especially fat use brown adipose tissue glucose, while your body can use that. So I am a big fan of cold water immersion.

And especially do just train your body to do hard things day in and day out. So I'm a big fan of cold water immersion, however, to bump up or to increase your metabolic rate. It is true but the parameters to do that, I don't think are very good investment of your time for most people. So there you go. That's probably like trying to use a sledgehammer to kill them. Edo way more information than you probably ever wanted to know. Thank you for sitting through all the studies.

And the reason I wanted all the quotes and stuff from the actual studies and have them pulled up in the video is so you can go back and read them yourself and see where they actually came from. And make sure that you do understand the context.

Thank you so much. Thank you so much for the podcast and listening, I really appreciate it. If someone you think would enjoy this podcast, please send it over to them. If you enjoyed this, and you want a much greater deep dive into all things related to physiologic flexibility, that looks like different breathing techniques, ketones and glucose, high intensity interval training, more lower intensity training, so cardiovascular adaptations, and as we just mentioned, temperature changes, go to physiologic flexibility.com.

The Phys Flex Certification is now open as of today, and, if you're listening to this on the data podcast, came out is April 4, Monday 2022; they will be available until April 11 2022. If you're listening, you can still go to the same link outside of that time, and it'll put you on n the newsletter waitlist for the next time it opens. I'm super happy with how the certification turned out.

As far as I can tell, it's the only one that covers all four areas in terms of the actual research, and then brings everything back together with a physiologic reason of why you would want to do these things. And especially when would you want to do them all into one system. And it has 40 specific action items you can do yourself or if you're coaching clients, and we have a system to determine which action item is going to be best for the client.

That particular system is client-led and the client then also helps decide what is will best for them by using the concept of coaching leverage. So check out physiologic flexibility.com. If you have any questions, you can reach out to me also via the website to contact. And than mek you so much for listening to this podcast and sharing it. Really Appreciate

And I hope to see you enrolled in the course there. Last thing, if you enroll in the course and you have any questions about the material in the course, you will get my person and I will answer your questions. Normally within 48 hours. Sometimes it's a little longer if I'm traveling or away. But I'll do whatever I can to help you understand the material and make sure that you can apply it. I will personally answer any questions that you have.

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