Welcome to the Huberman Lab podcast where we discuss science and science-based tools for everyday life. I'm Andrew Huberman, a number of professor of neurobiology and ophthalmology at Stanford School of Medicine. Today we are discussing fitness. Fitness, of course, is vitally important for cardiovascular health, for strength, for endurance, for lifespan, for health span. I can't think of anyone out there that wouldn't want to have healthy hormonal function, healthy cardiovascular function. To live a long time and to feel vital, that is to have a long health span, as well as a long lifespan. Fitness and fitness protocols are tremendously powerful for developing all of that. However, despite there being an enormous amount of information out there on the internet and in books and elsewhere, you can be a bit overwhelming. So today's episode is really designed to synthesize science-based tools that we've covered on the podcast, some with expert guests like Dr. Andy Galpin or Dr. Peter Atia, or World Renowned Movement Specialist, Edoportal, or physiotherapist and Strength and Conditioning Coach Jeff Cavaliere. We've had all of them on its guests on the podcast, and each and every one of them provided a wealth of knowledge in terms of the various things that you can do to optimize very specific or multiple aspects of fitness. Today we're going to do something a little bit different than usual. Typically on the Hubertman Lab podcast, I offer mechanism up front or first. And then we talk about protocols that you can use that really lean on those science and science-based mechanisms. Today I'm going to describe a specific protocol that serves as a general template that anyone, in fact, everyone can use in order to maximize all aspects of fitness, so that includes endurance, strength, flexibility, hypertrophy, aesthetic changes, etc. However, this general framework can also be modified that is customized to your particular needs. So if you're somebody who really wants to build more strength or bigger muscles, you can change the protocol and the overall program according to that. And I'll talk about very specific ways to do that. Or if you're somebody who really just wants to maintain strength, but you want to build endurance, we'll talk about that. And of course, we will cover real life issues such as, should you train if you are sleep deprived? What about food? When should you eat? What if you have an eaten in your hungry? Should you still train, etc., etc.? We're going to cover all of that again in the context of this, what I would call foundational template of fitness. And this foundational template of fitness is something that I personally use. In fact, I've used it for over three decades. I don't believe it on that old, but I just recently turned 47. And I still use this basic protocol or template across the week and modify it according to what my particular goals are. That year, that month, even that day, because I like you living the real world. And sometimes I've been traveling or I miss a workout. Yes, it does happen. Or life isn't organized in exactly the way that I need to in order to have everything go according to the protocol that's on paper. So we're going to discuss real world issues and how to work with the real world issues in order to get the most out of your fitness program. And again, by the end of today's program, I can assure you you will have a template protocol that you can build up from, build out, change in modify, and that will really serve your fitness goals according to the science and what peer reviewed studies and the experts that appeared on this podcast and other podcasts really tell us is best and optimal for our fitness. I'm pleased to announce that the Hubertman Lab podcast has now launched a premium channel. It can be very clear that the Hubertman Lab podcast will continue to be released every Monday at zero cost to consumer. And there will be no change in the format of these podcasts. The premium channel is a response to the many questions we get about specific topics. And it will allow me to really drill deep into specific answers related to those topics. So once a month, I'm going to host and ask me anything, so called AMA, where you can ask me anything about specific topics covered on the Hubertman Lab podcast. And I will answer those questions, because of course, will be recorded. There will also be other premium content available to premium subscribers, such as transcripts and short videos of new tools and unique tools for mental health, physical health and performance. If you want to check out the premium channel, you can go to Hubertman Lab.com slash premium. There is a $10 a month charge or $100 per year. And I should mention that a large portion of the proceeds from the Hubertman Lab premium channel will go to support scientific research that develops the very sorts of tools that we talk about on the Hubertman Lab podcast. The rest of the support for the Hubertman Lab podcast premium channel will go to supporting the regular Hubertman Lab podcast. Again, that's Hubertman Lab.com slash premium before we dive into today's content about fitness and fitness protocols. I want to tell you about a brand new study that is very exciting and frankly very unusual. This is a study that was published out of the University of Houston examining a, what I would call a micro exercise or a micro movement. It's a very small movement of a very small portion of your body. In fact, just 1% of your musculature that when it's performed continuously while seated has, at least what they report are very dramatic, positive changes. In terms of blood sugar utilization and metabolism. So the title of this study is a potent physiological method to magnify and sustain solace oxidative metabolism improves glucose and lipid regulation. This study was published in eye science and as I mentioned earlier, it is getting a lot of attention and it's very unusual. Without going into all the details of this study, let me just briefly give you a little bit of the background. First of all, you have a muscle called the solace. The solace muscle is a more or less wide flat muscle that sits beneath what most people think of as their calf, although it's part of the calf muscle. The other portion of the calf is called the gastrocnemius. The solace sits below that. Now the solace muscle is a unique muscle because it's largely slow twitch muscle fibers. It's designed to be used continuously over and over again for stabilizing your body when you're standing upright. For walking, this is a muscle that's designed to contract over and over and over again. In fact, you could walk all day on this muscle and most likely it would not get sore. You probably done that and it did not get sore. In contrast, a muscle like your bicep or your tricep, if I were to have you perform hundreds or thousands of repetitions even with a very light weight, one pound weight or two pound weight. Eventually it would fatigue. You would feel it sort of a burn there. It's a very unusual set of muscles to use repeatedly. But the solace isn't unusual muscle in that it really is designed to be used continuously. Now this study was focused on how people who sit a lot of the day and don't have the opportunity for a lot of physical movement or maybe who don't even exercise at all can improve their metabolism and glucose utilization. Without going into a deep dive about glucose utilization because we've done the deep dive on this podcast, episodes such as metabolism, etc. You can look those up at HuberumLab.com. They're all timestamped and available there. Anytime you eat, your blood sugar goes up to some extent. So your blood glucose, as it's called, goes up to some extent. And then insulin is a hormone that's used to essentially shaperone and sequester and use that blood glucose. So basically the idea is you don't want blood glucose to go too high. Hyperinsulinemia is something associated with blood glucose that's too high because insulin goes up to essentially match the level of blood glucose. You also don't want to be hypoglycemic. You don't want to have blood sugar that's too low. And insulin is involved in both regulating peaks and troughs in blood sugar, blood glucose. So we can basically say, and this is very simple, but we can basically say that you don't want blood glucose to be elevated too much or for too long. That's not good. In fact, people who have diabetes because they don't make insulin, people who have type 1 diabetes do not make insulin at all. Their blood glucose is so high that they actually have to take insulin in order to regulate it. Otherwise, their blood glucose can go so high that it can damage cells and damage organs that can even kill people. People who have type 2 diabetes are so called insulin insensitive. They make insulin, but the receptors to insulin are not sensitive to it. And so they make more insulin than normally would be made and blood glucose isn't regulated properly, etc. The take home message about blood glucose is that you want your blood glucose levels to go up when you eat, but not too high and you don't want them to stay elevated for too long. This study looked at how people who are largely sedentary or at least sitting can increase the utilization, the clearance of glucose from the blood stream after eating. And they also looked at overall metabolism for people get this that we're using just that 1% of muscle, the soleus, by doing what they call a soleus push up. So the soleus push up can be described very simply as if you're sitting down with your knee bent at an approximately right angle, like a square corner, and pushing up where I should say lifting your heel while pushing down on your toe and contracting the calf muscle as it were. And then lowering the heel and then lifting that heel again, lowering the heel, lifting the heel again. Each one of those is what they call a soleus push up. This study had people continuously do soleus push ups and they looked at things like blood glucose utilization, they looked at metabolism, and so on. Now a couple of important things about this study before I tell you what they discovered, which was frankly pretty miraculous, almost hard to believe. And yet I believe the data, the data look to be collected quite quite well. And there are a lot of statistics and the study looks to be quite thorough. First of all, they used an equal number of male and female subjects. There were wide range of body mass indices. Okay, so this wasn't just super fit people are people that were purely sedentary and not fit. They used a wide variety of ages, time of day, that people who tended to walk a lot or not walk a lot. They measured changes in metabolism and blood glucose utilization in people that had done these soleus push ups while seated in the laboratory. And I must say they had them do these soleus push ups for quite a long while continuously. So they had them do it for as long as 270 minutes total throughout the day. So if you divide that, that's four and a half hours. You might say, well, four and a half hours of lifting the heel and putting the heel down, lifting the heel, putting the heel down. That's a lot. But they didn't always do it continuously. They had some breaks in there. So this is the sort of thing that you could imagine you or other people could do while seated while doing zooms or while on calls or maybe even while eating doing that sort of thing. Although I'm not suggesting that you constantly be focusing on soleus push ups throughout your life. The point is that people who did these soleus push ups experienced dramatic improvements in blood sugar regulation and in metabolism despite the fact that the soleus is just 1% of the total musculature. So here I'm going to read from the abstract about what they found people who did these soleus push ups. Despite being a tiny muscle and using very little local energy, in fact, they measured muscle glycogen, the burn or essentially the utilization of fuel within the muscle and there was very little utilization of fuel within the soleus itself. And that's because the soleus has this unique property of needing to basically keep you going all day, walking all day or moving all day. What they saw was a large magnitude, for example, 52% less post-pranidial, that's after a meal, glucose excursion. So 52% less increase in blood glucose and 60% 60 less hyperinsulinemia, so reduced levels of insulin. They also miraculously observed that despite this being again a small muscle, 1% of the total muscle mass, so very small oxidative use, they saw big improvements in systemic metabolic regulation. So this is interesting and I think something that we should at least know about. I'm not aware that anyone's replicated this study yet. I know there's a ton of excitement about this study in the popular press. And if the data turned out to hold up, which I like to imagine they will, I can understand why there's so much excitement. What this means is that if you're somebody who cares about blood glucose regulation, you want to keep your metabolism running, please don't stop exercising the other ways that you exercise. But if you're somebody who wants to maximize your health, doing these soleus pushups fairly continuously while seated is going to be beneficial. And in addition to that, I know that there are going to be people out there who, for instance, might be injured or you're traveling and you're stuck on a plane or you're in the classroom and you're forced to study all day or take notes all day. You're just not getting enough opportunity to get those steps that you want to take, whether or not it's 10,000 or fewer or more, getting enough steps or movement. Maybe you don't have time to get out and do your run or maybe you're also running weightlifting and doing yoga classes and things of that sort. But you want to further improve your fitness, at least in terms of your metabolic health. This seems like a terrific, very low investment way to do it, certainly zero cost. It does take a little bit of attention. So you have to divert your attention from other things you're doing to make sure that you're still doing these soleus pushups. I'm sure that many of you are going to have a lot of detailed questions such as, you know, how high did they lift the heel and did they contract the muscle very hard or not. A couple of things about that, they did not have subjects really contract the muscle hard. They did measure the angle of heel raise and it was anywhere from 10 to 15 degrees. So you didn't have to go way way up on their tippy toes or things of that sort. In any event, 270 minutes, 4 and a half hours of doing these soleus pushups is a lot. But by my read of the data and the rather significant, or I should say very significant effects that they observed on blood glucose regulation and metabolism, etc. Seems to me that doing less would still be beneficial and that you don't necessarily have to do the full 270 minutes in order to get the benefits that they observed. More about this study includes the fact that the benefits they observed were very long lasting as long as two hours after a meal, they could still see this improved blood glucose utilization. I don't know because I wasn't able to find it in the methods whether or not they were doing the soleus pushups while they were consuming blood sugar in this study. The point being that if you're somebody who cares about their fitness, this study is interesting because what it means is that again, if you are forced to be immobile or sitting longer than you would like, I feel stuck in a meeting or zooms or class or on a plane, etc. Or if you're simply trying to add a bit more fitness and metabolic health to your overall regimen, soleus pushups, at least to me, seem like a very low investment, simple zero cost tool to improve your metabolic health. For those of you that want to prove the study in more detail, we will provide a link to this paper published in eye science in the show note caption. Before we begin, I'd like to emphasize that this podcast is separate from my teaching and research roles at Stanford. It is, however, part of my desire and effort to bring zero cost to consumer information about science and science related tools to the general public. Let's talk about fitness and let's talk about how you can develop the optimal fitness protocols for you. So that includes what to do each day of the week and your fitness protocol across the week and indeed across the month and the year and even year to year. When we had Dr. Andy Galpin on the podcast, he said something very important that we want to keep in mind today, which is concepts are few methods are many. That is, there are an infinite number of different programs and exercises and set and rep schemes and different runs and burpees and pushups, etc. etc. that one can follow. However, there are really just a few basic concepts or principles of muscle physiology of cardiovascular function of connective tissue function that provide or set the basis for the adaptations that we call fitness or that lead to fitness. So I'm going to list those off now. We can talk about a fitness protocol that's really aimed mainly toward developing skill. That's one or speed. That's another or power, which is speed times strength or specifically strength or hypertrophy, growth of muscles or endurance, such as muscular endurance, muscular endurance is for instance your ability to stay in a plank position or to do a wall sit, you know, to sit on an invisible chair against a wall. Or other forms of endurance like near pure anaerobic endurance, so a one minute sprint or less or one minute all out cycling on a stationary bike, this sort of thing or endurance that occurs in the kind of three to 12 minute total duration range. So that might be sprints or high intensity interval type training, it could be a all out swim, it could be all out row. That's another form of endurance taps into different fuel systems, different aspects of muscle physiology, etc. And then endurance that last 30 minutes or more, which is typically what people think about when they think about endurance, but of course the other forms of endurance matter. So we've got skill speed, power, strength hypertrophy, muscular endurance, anaerobic endurance, what I would call three to 12 minutes endurance, although it goes by other names as well. And 30 minutes or more endurance type exercise and adaptations, each and every one of these requires different principles, different concepts in order to improve, say your muscular strength or your hypertrophy or both. However, there's a general theme that sets beneath all adaptations leading to fitness, and that's what we're really going to set down as the base layer, the foundation of everything we talk about today. And that's that we need to think about what are the modifiable variables. And I'm borrowing directly from the episode with Dr. Andy Yalpin, he was the one that said modifiable variables are the key thing to think about what are you going to modify what are you going to change in order to increase one or some of the various things I listed off before skill speed, power, strength hypertrophy, endurance, etc. And some of the key concepts that emerge from that discussion are that we need to think about progressive overload. Normally, when people hear about progressive overload, they think about adding more weight to a bar or picking up heavier dumbbells, but that could also be progressive overload in the context of running up a hill of steeper incline or running a little bit faster a little bit further and so on and so forth. Now, as I promised earlier, today we are not going to drill into each and every one of the mechanisms that underlie the different adaptations that are going to develop speed and strength and endurance, etc. Because that was covered in the podcast with Dr. Andy Yalpin and the other podcasts with experts that I mentioned earlier and we again will provide links to those podcasts if you want to drill into those mechanisms. Instead, what we are going to do is we are going to start with a program that essentially is designed for you to maximize all aspects of fitness to the extent that you can simultaneously maximize all aspects of fitness, but then to change or modify that protocol so that if you want to build up more for instance strength and you want to just hold on to the endurance you have, you don't want to build endurance, at least not in that week or that month. You can do that or if you want to improve your endurance while maintaining your strength, you can do that and so on and so forth. Most people I do believe would like a combination of strength and endurance and flexibility and maybe even hypertrophy particularly for certain muscle groups that maybe are not as well developed as other muscle groups they want to bring balance to their physique both for sake of aesthetics and for sake of health and for sake of general functioning to maybe even to eliminate pain. The protocol that I'm going to describe really works as a foundational template for that as well. So let's drill into that foundational protocol and I'll keep referring to it as the foundational protocol not because it's the one that I use although it is the one that I use and not because it's the one that we're talking about today although it's the one we're talking about today but because we need some general framework from which to build out the more specific protocols that we'll get into in a bit more detail later. So in this foundational protocol for fitness what you'll notice is that on any one given day you're going to focus on one particular aspect of fitness maybe it's endurance maybe it's strength maybe it's hypertrophy in particular it might be hypertrophy for a particular muscle group or muscle groups that said across the entire week it's designed to bring fitness and different forms of fitness to all aspects of your body. So this particular protocol begins on Sunday although that's simply the day that I happen to begin the protocol and again this protocol is not important because it's the one that I follow I follow it because it is important in other words it's a protocol that's really glean from the scientific literature and the experts that is for you so this fitness protocol is really about you I just may refer to it as the one that I follow simply for ease of communication and for me my week begins on Sunday so I do my very best. To get a workout in on Sunday and for me that workout is that of a endurance workout is designed to either maintain or increase my endurance and the endurance type that I'm referring to is endurance of 30 minutes or more in fact for me the goal is always to get either 60 to 75 minutes of jogging so this would be so called zone to cardio people probably have heard of zone to cardio but if you haven't that's OK zone to do it. You haven't that's OK zone to cardio something that you could measure with a heart rate monitor or other device but you don't need to zone to cardio is the kind of cardiovascular exercise in which you're pushing yourself to move such that you're breathing faster than normal your heart is beating faster than normal however you are still able to sustain a conversation but if you were to push yourself any harder that is move faster or go up a steeper incline at the same rate you happen to be doing. At the same rate you happen to be at any one moment you would lose that ability to speak you wouldn't be able to complete sentences you would be out of breath you'd have to pause mid sentence now it's near impossible even with a heart rate monitor to stay exactly in zone to unless you're very very skilled at that so I don't obsess over that and in fact I don't wear a heart rate monitor when I do this exercise but for me the goal is to head out on Sunday and get 60 to 75 minutes of jogging in zone to now of course I like to jog but that doesn't mean that you have to jog you could be able to do it. You have to jog you could replace jogging with rowing on a rowing machine or maybe even rowing an actual boat if you have access to that or cycling or swimming something that allows you continuous movement for 60 to 75 minutes at that zone to threshold we talked about earlier for me that can include some hills and when I say hills they could be very steep hills but I simply slow my pace down in order to stay in that roughly zone to range or it could be that they are more low grade hills and I might you know just slow down a little bit or I might even push myself a tiny bit that day but really I'm just trying to build that long endurance I'm trying to build up my capacity or maintain my capacity to go a long distance without fatiguing. Now some days meaning some Sundays since I tend to do this almost always on Sunday although there are exceptions instead of doing the 60 to 75 minute jog what I'll do is I will head out for a long hike that could be two and a half hours or three hours or maybe even a four or five hour hike sometimes it's very long and I'll do that sometimes simply to mix up the routine because sometimes jogging and jogging the same routes gets boring to me. I do enjoy running that's something I've been doing for a very long time but sometimes it just gets a little bit tedious and I want to do something different also sometimes I want to be social on Sundays I want to head out on a hike with my partner or I want to meet up with friends and hike with them and so taking a long hike on Sunday is something that also could be quite social and then I don't have to worry about also getting in my workout when heading out on a hike with my partner or going out to meet with friends or things of that sort. I will say that there's a specific tool or a specific change that you can make to this Sunday long endurance or at least what I consider long for me it's by no means a marathon or an ironman but this long endurance training and that's the use of a weight vest so something that I really start utilizing more recently and by more recently I really mean within the last year or so is I purchased one of these weight vest that can be anywhere from 10 to 50 pounds. What I use in the weight vest is irrelevant but it certainly changes the level of effort required when taking a hike or even a walk now there's an additional benefit of the weight vest which is that if you are going out for a hike or even for a walk for social reasons and you're with somebody that's not quite at the same fitness level that you are frankly it's a little bit rude to just walking ahead of them and running back or running ahead and running back you know oftentimes you really want to spend time with the person and you don't want them to feel as if they're holding you up. And so the weight vest is a terrific way to get some additional work then as you'll find if you wear a weight vest it is additional work on say a shorter hike so maybe the person you're with only has time for an hour long hike or maybe they just don't have the fitness to do a two hour or three hour hike so I'll throw on the weight vest and I'll head out for a walk with them or a hike with them or sometimes I'll go out on a long hike with the weight vest myself. So again the point of this for me Sunday although it could fall on any day for you workout is really to build up that long form endurance and this fits well with what Dr. Andy Galpin and Dr. Peter Tio referred to as the real need to get in some long endurance type work at some point or even multiple points throughout the week for me this long Sunday jog of 60 to 75 minutes or long Sunday hike or weighted walk or weighted hike really accomplishes that goal. Sometimes leads to a little bit of soreness particularly my calves or if I'm wearing the weight vest sometimes my my midsection will get sore because I'm trying to remain upright so I think it also builds up some muscular endurance not just cardiovascular endurance but again throughout the entire time that I'm jogging or hiking what I'm trying to get to is a place where I can feel that my pulse rate is definitely elevated but it's not so elevated that I have to stop because I'm out of breath. And because I know some people out there might be really neurotic about this sort of thing if you have to stop because you're out of breath that doesn't mean that you blew the workout that you know you aren't getting endurance of course you're getting benefits from it so I'm not absolutely neurotic about always staying exactly in that heart rate zone I might stop and have a conversation for a moment if it's along your hike although I really try and keep moving and I try and push myself just a little bit further than where I'm exceedingly comfortable and so for me doing this long Sunday hike or just a little bit more jog really provides a foundation a base for endurance that then the other endurance workouts that I'll describe later and that take place later in the week can build on. Now as I mentioned earlier we will get back to the mechanisms that this taps into and why this is so useful there are multiple benefits to doing these kinds of endurance type workouts and zone to cardio but by putting it at the start of my week again my week starts on Sunday I'm sure that regardless of how the rest of the week goes I'm sure that I got my endurance training in and of course I'm going to want to and I will do endurance training other days during the week but if something comes up or I happen to get sick or I'm really behind in terms of work and I can't get other workouts in this Sunday long jog or hike really provides that fundamental I can honestly say foundation for cardiovascular fitness and endurance that I can hang my hat on and say okay I've got that one in the bag and I can then look to other days of the week to focus on other aspects of fitness. Now a really important point to make about this Sunday endurance workout is that allows you to check off a box and that box is 75 or so minutes of zone to cardio because as you may have heard either in this podcast or from others out there like Dr. Peter T. getting 180 to 200 minutes of zone to cardio per week has enormous positive effects on longevity and enormous positive effects on general health again in terms of cardiovascular function but also metabolic fuel utilization also in terms of your musculature and your ability to use your body over long distances for long periods of time. So while it doesn't complete all 180 to 200 minutes per week it certainly gets you a good distance pun intended toward that goal. Now I want to acknowledge that some people might be starting a fitness program and so 60 to 75 minutes of jogging might be too long or a three hour weighted vested hike or some people might even do what's called a rock like you were a rucksack that might be too much in which case certainly start with less and go on flat ground and go at the rate of the day. So I'm going to go on flat ground and go at the rate that allows you to get into zone two but that is not excessively difficult for you and then as you build up fitness you can add time or you can add weight through weight vest or if you don't want to buy a weight vest or can't afford one as a simple solution to that I actually have a good anecdote about that one time I was heading out for a hike with a friend of mine he was former seal team operator I'll never forget this and he said oh yeah I'll bring you I'll bring you a sack and I thought he meant like a sack lunch like he was going to bring lunch and I showed up and he loaded with a bunch of stuff in the backpack weighed about 40 pounds and then we took a hike. So I was thinking lunch he was thinking weighted backpack and a weighted backpack or even just any kind of strong sack that you can put over your shoulders or even carry in your arms it's going to work exceedingly well to build in some extra requirement for effort so you certainly don't have to purchase a weight vest in order to in order to get the benefits of bringing additional weight along with you on these long cardiovascular events but again build up over time you can add time you can add time. You can add time you can add weight and that's also a really nice feature of adding weight which is at some point your schedule might be such or you just don't really want to keep adding more and more and more time on this long endurance Sunday in this case work out in that case add weight you can also as you build up fitness you can add speed to it your zone two and what zone two is won't shift but what work is required from you in order to get into zone two will shift that is as you can do it. You can do it in a real shift that is as you get more and more fit you'll have to move faster and or bring more weight in order to stay in zone two and that will simply tell you that you are indeed improving your endurance. Okay so then Monday rolls around and I like most everyone else out there I work on Monday I get right into my emails and preparation for podcasts and running my laboratory etc. However I make sure that at some point on Monday and for me that some point is typically and ideally early in the morning. So seven a.m. or so I train my legs on Monday so that includes quadriceps hamstrings and calves why do I do that work out on Monday and what is that workout designed to do well that workout is really designed. To make sure that I'm either maintaining or building strength in my legs and this is not simply for aesthetic reasons this is not simply to grow bigger calves or grow bigger quadriceps and hamstrings although it can accomplish that as well depending on how you train we'll talk about details of training. The reason for training legs on Monday is several fold first of all they are the largest muscle groups of the body and by training your legs on Monday it sets in motion a large number of metabolic processes that carry you some distance even through the whole week in terms of elevating metabolism in terms of amplifying certain hormonal events in your body etc. that are really beneficial in addition to that I'm of the belief that the legs are the foundation of the body and provided you can train legs safely that training legs is vitally important not just for strength of the legs but also for strength of your entire body again some of that is through systemic hormonal effects because if you're going to train the large muscle groups of your body under substantial loads you will get systemic release of hormones not just testosterone although certainly testosterone but also things like growth hormone you get increases in all sorts of so called anabolic hormones that even if you're somebody who's not trying to increase muscle size because I realize a lot of people are not trying to do that these are hormones that shift your metabolism and your overall tendon strength and ligament strength and overall musculature into what I would call a strong foundation so for me Monday is leg workout it also just feels good to get the leg workout out of the way early in the week and it accomplishes another goal which is that I sometimes sometimes will take one or two days off of a leg workout because they can be very intense and they are large muscle groups and I'll explain what I do on the off days they're not pure off days they actually include some recovery type training or even some all out training but by training legs on Monday I'm able to get what I consider the hardest strength and hypertrophy workout out of the way and again set all those positive physiological effects in motion for the entire week the other thing is that no workout exists in isolation what you do one day is going to be determined by what you did the previous day and even though the previous day I may have taken a three hour weight vested hike never are my legs so sore from that long slow endurance work because it is long and slow then I'm unable to train legs contrast that with a say high intensity interval training workout which comes later in the week and my legs might be sore in fact they might not even be recovered such that I'm able to do a real leg work and when I say real workout I'll describe what that means in a moment so legs come on Monday and I think that for those of you that are using or interested in using resistance training I suggest getting your leg workout done early in the week and for those of you that have heard the phrase you know don't skip leg day I will go a step further and say don't skip leg day in fact make leg day your first day of strength and hypertrophy training put it on Monday okay so now that we're talking about resistance training the question is going to come up about sets and reps and all of that business that was covered in a lot of detail on the podcast with Dr. Andy Galpin and I'm going to get into some of that detail now but I'm going to wait until I describe the entire set of workouts for the week before I go into even more detail because there's a way of what's called periodizing that is changing the sets and reps etc across the week and indeed from month to month that's really optimal but I don't want to make it seem as if all of that just pertains to the leg workout it actually pertains to all of the resistance training so I'll just give you a couple of teasers about the key principles of resistance training that I think are almost universally if not universally then generally accepted in the strength training and physiology community then later I'll get back to some of the overarching principles that apply to all strength and hypertrophy workouts across the week including the ones for the torso the arms etc. okay so legs fall on Monday I should say that leg workouts like all resistance training workouts for me consist of about again I'm not neuratically attached this but about 10 minutes of warming up and then about 5050 to 60 minutes of real work now of course some of that is going to be rest between sets but by real work I mean really hard work not necessarily to failure we'll talk about failure in a little bit but hard work where I'm struggling to complete the final repetitions if not going to to failure to continue to move the weight repetitions and again the entire work portion of that workout is about 50 to 60 minutes why well past 60 minutes you start getting increases in cortisol that really impede recovery and I personally am somebody that does not recover very well from high intensity exercise I realize that within the literature it is believed and I think generally accepted that when you stimulate muscle hypertrophy or strength increases it impacts the nervous system it also causes things like protein synthesis etc there are a number of different forms of adaptation that occur to give you muscle strength and size changes and these days people talk a lot about needing to stimulate muscle growth or muscle strength at least every 48 hours but I can tell you that I recover rather slowly and I benefit from working the same muscle group about twice per week with longer work or I should say more days of rest in between those workouts so if I train legs on Monday believe it or not I'm only training legs on Monday I do not have a second leg workout during the week however on Friday I do a high intensity interval training session that serves two purposes one is it serves the purpose of triggering a certain type of endurance and getting my heart rate very very high and in addition to that because of the way I do that workout it acts as a sort of supplement or a more moderate intensity workout for quadriceps hamstrings and calves such that I at least never lose strength and in fact generally build strength from one leg workout to the next provided I'm doing things correctly so what I'm not referring to is the kind of classic you know super high intensity training once per week and then not actually training that muscle group again for me it's really training each muscle group twice per week once directly and then once indirectly either during another weight training workout or during a cardiovascular I should say endurance training workout so again legs on Monday the workout is 50 to 60 minutes after a brief warm up I generally pick two exercises per muscle group so again I'm doing calves I'm doing quadriceps and I'm doing hamstrings you should pick the exercises that work for you so that's why I'm actually not going to share which exercises I use I'll give you a couple suggestions about the ones I do use but really exercise selection as Dr. Andy Galpin pointed out is a very important variable and the key thing to emphasize for that variables that you do not want to do is not really do that. I'm not going to do that for a few days for that variables that you need to be able to perform the movement safely so I know there's a huge debate out there and people love to argue about whether or not one can squat or deadlift for long periods of time or should or should not some people say you absolutely should I personally do not squat and do not deadlift I've actually never done much squatting or deadlifting and I know some people out there are probably rolling their eyes or switching the channel at this point but I can say that for me I've been able to achieve the strength and hypergill with my hypertrophy goals that I've been seeking doing things like leg extensions and hack squats or for hamstrings doing things like leg curls and glute ham raises or for calves doing standing and seated calf raises and so on. I think a key principle that everyone should pay attention to is one that was taught to me by an excellent strength coach years ago and I still use this and at least it works for me. So this muscle group try and find an exercise in which you get that muscle into a weighted stretch position so this would be for instance the standing calf raise down at the bottom it's weighted and you're in a deep stretch provided you're doing the movement correctly as well as another exercise where you're getting contraction in the shortened position of the muscle so for the hamstrings that would be the leg curl for the calves it would be a seated calf raise or for the quadriceps the leg extension is you know if the machine is designed right and you're doing it correctly the peak contraction is largely going to occur at the at the legs extended position but then another exercise for each muscle group that puts the muscle into more of a stretched or at least a larger range of motion or compound type movement but ideally where there's some stretch there so I guess I will tell you what exercise exercise I do for the quadriceps is going to be leg extensions and hack squats I use hack squats because I don't do free bar squats for safety reasons and I like that. I do leg curls and glute ham raises for hamstrings and I'll do standing calf raises and see calf raises for the calves again those are the movements that I use because I can perform them safely in the repetition ranges and with the weights that are required for me to either maintain or build leg strength and calf strength but you might decide that for you dead lifts are absolutely essential and terrific or squats free bar squats are absolutely terrific or front you know front squats I'm not here to tell you which I can do. I'm not here to tell you which exercises to do or not do I am telling you that it's probably wise to at least consider doing at least two exercises per muscle group probably three maximum if you ask me if you're doing your entire legs and calves in one day but to think about doing one exercise where the muscles brought into that short and peak contraction position like like curls or leg extensions or seated calf raise and then another exercise for each muscle group where there's more of a elongation and maybe even a stretch on the muscle group. In fact that's a principle that you'll hear me talk about later when I talk about training other muscle groups for strength and hypertrophy so now you know approximately how long to train. You might be somebody who can get away with training for an hour and a half and that won't impede your recovery for me that really starts to impede my recovery also if I'm staying on task that 60 minute limit really works well for me do I occasionally train for 75 minutes yes because if I'm waiting for a piece of equipment sometimes I have to just wait longer so that happens. But I really try and keep the total duration of the workout shorter how many sets and reps and rest intervals well that was covered by Dr. Andy Galpin as well without getting into the total science here's a brief summary of how to structure that it's pretty clear that if you're going to do lower repetitions and heavier weight that you're going to want to do a bit more volume. I know that this fits in the face of what a lot of people think but so if you're going to do five sets of five that would consider five repetitions low low repetition range heavier weight. And if you're going to train with higher repetitions you can do fewer sets that certainly works for me. I generally follow a program where for about a month so three to four weeks I will do all my resistance training in the repetition range of about four to eight repetitions so that's rather heavy a few more sets so it might be anywhere from three to four sets per exercise again still just two exercises and longer rest between sets anywhere from two minutes to maybe even four minutes if it's really heavy legwork. And then for the next month switch to repetition range that's closer to eight to twelve maybe even fifteen repetitions per set but do fewer sets overall so maybe just two to three sets per exercise again just two exercises per muscle group typically and shorten the rest between sets so that it's more in the 90 second maybe even as short as 60 seconds rest between sets but typically 90 seconds to about two minutes or two and a half minutes. So basically it's one month heavier the next month slightly lighter although I wouldn't say light I would say moderate weight and moderate rep range that tends to work well for me it also adheres to a principle that came up during the discussion again with Dr. Andy Galpin that for hypertrophy you really can use repetition ranges anywhere from five to thirty three zero rep. But he emphasized changing the repetition ranges in order to offset boredom frankly I like to train heavier I enjoy training in the four to eight rep range however I noticed that if I do that for more than four weeks in a row and I don't switch over to training in the eight to twelve maybe in fifteen repetition range for about a month well then I can't make continuous progress I start to actually lose ground but by switching back and forth I actually can make continuous progress at least across the year. So I hope that that principle or I should say that protocol was communicated clearly it works very well I assure you does that mean that I never get ten repetitions on a week when I'm supposed to train in the four to eight repetition range no occasionally I'll venture up into the ten repetition range but I really trying cluster the low repetition work for about a month again across all workouts and all exercises and the slightly higher out you say moderate repetition work across to the next month. So one thing that you'll notice since we are talking about total fitness programming is that during the month where you are doing moderate repetitions you'll notice that your endurance work will actually be facilitated and I do not think that's a coincidence in fact it's not a coincidence it's because when you are training very heavy or in the heavier range low repetitions etc you're tapping into different processes in those muscles so when you head out for that long Sunday hike or as you'll soon hear whereas on Friday you're going to do high and low repetitions. So you'll notice that during certain months of weight training when you're training more heavy those workouts will feel literally will feel different then they will during the months when you're doing moderate repetition work. I'm not a competitive athlete I'm not running races or triathlons like some of my friends I'm very impressed by them I'm really just trying to get overall cardiovascular fitness overall strength overall hypertrophy where I need it maintain muscle size and etc in muscle groups where I'm just trying to maintain that's really my goal so I'm not trying to optimize any of these workouts for any one performance feature but in a little bit we'll talk about how you can change various aspects that is variables of this protocols in order to maintain muscle size. The ones of these protocols in order to say for instance really emphasize hypertrophy or really emphasize endurance okay so with what I would call a standard endurance workout done on Sunday and I say standard because most people when they hear endurance they think of the ability to endure to continue repeated movements or exercise over some period of time with that workout done on Sunday and then with the leg workout done on Monday you can feel really good about how you're heading into the week. After training legs on Monday, I experience that doing cardiovascular workouts the next day is either inefficient or at least doesn't really allow me to completely recover from my leg workout. Now I realize that some people are going to immediately scoff at that and in fact there are really beautiful papers out there talking about how one can actually do a fair amount of cardiovascular exercise without interfering with their strength and speed and hypertrophy improvements and vice versa. In fact there's a terrific review that was mentioned on the podcast with Dr. Andy Galpin. This is a review that will provide a citation to and a reference and a link to which is the review by Murak and Bagley which talks about whether or not there's interference between strength and endurance workouts. Really interesting review if you want to prove that. But with all that said, I like to take Tuesday as a no endurance, no resistance training day. But that doesn't mean that I'm not doing anything for my overall health and fitness. On Tuesdays, I do a series of heat cold contrast. In other words, I get really, really warm and then I get really, really cold. I get really, really warm and I get really, really cold repeatedly. The way I do that is by getting into a hot sauna. So for me that's really hot but I've built up my heat conditioning. So please don't do this unless you've built up your ability to withstand heat. I'll get in for about 20 minutes, sometimes 15 but usually 20 minutes, then I get out and then I will get into an ice bath or a cold water bath that's about 45 to 50 degrees Fahrenheit. Again, don't get into water that's so cold that you go into shock. I'll explain what a good cold stimulus could be for you and how to determine that. Or if I don't have access to my sauna and my ice bath, what I can do if I'm traveling is I will take a hot bath and then alternate with cold shower, hot bath, cold shower. It's hard to do hot bath ice bath unless you have two baths. I don't know any hotel rooms, at least I've never stayed in one that has two baths, although I'm sure they're out there. But for me, this is heat cold contrast and really what this day is about is two things. First of all, I'm trying to accelerate recovery from the leg workout I did previously. Also, if you listen to our episode of the Hubertman Lab podcast about deliberate heat exposure or you listen to our episode of the Hubertman Lab podcast about deliberate cold exposure, I talk about some of the benefits of heat and cold and I get into a lot of details about how you can access heat. You can do baths, you can do sauna, you can even take hot showers. If you don't have access to any of that, you could even wrap your body from the neck down in garbage bag, plastic garbage bags. Believe it or not, wrestlers used to do this. Put on some sweats and go running. That'll get you warm. Again, be careful not to overheat. And then you can get into a cold shower. So there's a lot of ways depending on your budget and what you have access to. I don't use cryo, these cryotherapy chambers. They're hard to find. They're expensive. Again, I use sauna and ice bath and I will do anywhere from three to five rounds, which is a lot. Anywhere from three to five rounds of heat for about 20 minutes and cold for about five minutes. How cold should the cold be? We covered this in the episode on deliberate cold exposure. Here's a general rule of thumb. It should be cold enough that you really want to get out, but not so cold that it's unsafe. And that will vary from person to person. So I cannot give you a simple prescriptive there. Same thing with the heat. Hot enough that you're sweating and that you want to get out, but not so hot that you're running the risk of injuring yourself or killing yourself. And again, that will vary from person to person. So you have to build up slowly, be careful and build up empirically. I do that on Tuesdays again as a way to accelerate recovery. Not because it's very clear that their cardiovascular benefits may be even benefits for the brain related to the cardiovascular benefits, because of course the brain needs a lot of blood flow and needs a lot of nutrients and other things flowing into and out of there to breathe out and nutrients and other things into the brain. Heat can help accelerate that or improve that. And so I'm doing that to improve cardiovascular function, improve brain health. And then the cold contrast provides a sort of accelerator on that or an amplifier, I think is the better way to phrase it, on that process because in the cold you get vasoconstriction and then in the heat you get vasodilation. And so you're maximizing that process, which is actually a neural process. Nerves actually innovate the blood vessels and capillaries and even the arteries in order to allow that constriction and dilation process to occur. So Tuesday is really about recovery. But my recovery day isn't necessarily about just laying around and not doing anything. I might still also take some walks that day. Remember I want to try and get that 200 minutes of zone two cardio across the week. And sometimes not often, but sometimes I'll get in a few minutes or more of walking quickly that day. But generally I'm working a lot on Tuesday as I do on Monday and I'm a little bit tired and maybe even a little bit sore from my leg workout the previous day Monday. So I try and get that hot cold contrast. For other benefits to hot and cold contrast, we have a description of the different protocols for hot and for cold and their contrast. At our Huberman Lab newsletter, you can find that by going to HubermanLab.com, go to the newsletter tab under the menu and you can sign up. You can actually download those protocols very easily without even signing up if you just want to access straight off. So Tuesday is really about recovery and about getting some additional cardiovascular benefits from heat cold contrast. One other thing that's built into the rationale for doing a lot of heat and cold on one day, as opposed to doing it every day. Well, in addition to it being a little bit more convenient because certainly some people don't have access to heat and cold, sauna and cold dunks, etc. every day. So maybe getting to do that one day is more accessible or feasible. But in addition to that, it's very clear that while there are benefits to doing sauna often, we talk about this in the deliberate heat episode and the episode with Dr. Rhonda Patrick when she was a guest on this podcast. It's also clear that if you do sauna seldom, that is once a week, but you do a lot of it on one day. So in this case, it's an hour. If it's, remember, it's, or more. It's three to five rounds of 20 minutes of sauna followed by about five minutes of cold or so. By doing that all on one day, the peer reviewed research that's covered in the episode on deliberate heat, this is a study out of Finland, showed that you get massive, even 16 fold increases in growth hormone, which are extremely beneficial for metabolism and for recovery. So these massive increases in growth hormone are seen when you are doing these sessions of sauna that are repeated on the same day and you're only doing that about once a week, whereas if you do sauna more often, there are certainly benefits to that, but it's time consuming and you need access to sauna more often than one day a week if you're doing it more than one day a week. But if you do it one day a week and you're doing a lot of sessions within that day, as I've detailed here, you see these massive increases in growth hormone that are not observed if you're doing sauna more often for the other benefits of sauna. Now the effects of cold are many. It's not just vasoconstriction, but the effects of cold are also counterbalanced by some of the problems with deliberate cold exposure that maybe you've heard about on this podcast and a lot of other podcasts and seem to be a kind of a buzz theme on Twitter and elsewhere. And the point is this, there are a number of quality studies showing that if you do deliberate cold exposure in particular ice baths are getting into very cold water immediately after an endurance training session or a strength and hypertrophy session, it can indeed, yes, it can disrupt or prevent some of the adaptations that you are seeking with strength and hypertrophy and endurance workouts. So you heard that right and I believe that to be true based on now several quality peer reviewed studies. So by doing your deliberate cold exposure on Tuesday, you're not going to get those effects. That is the blocking of hypertrophy or the blocking of strength improvement or the blocking or prevention of improvements and endurance that would occur if you immediately got into the ice bath after a hypertrophy strength or endurance workout. Now, the caveat to that is if you are somebody who likes to do cold showers, I am not aware of any data that says that cold showers cannot be performed after a strength hypertrophy or endurance workout. Cold showers are different than submerge in up to the neck in an ice bath or another cold body of water for a number of different reasons. In fact, they tap into different aspects of the nervous system entirely. We don't have time to go into that now. It's covered in the episode on deliberate cold exposure, but the simple point is by doing your heat and cold contrast or, hey, listen, if you're somebody who doesn't have access to sauna or you don't like hot baths and you just do some deliberate cold exposure on Tuesday, you are doing that separate from your strength and hypertrophy and endurance workouts such that it will not impede the benefits of those workouts. Okay, so long endurance on Sunday, leg resistance training on Monday and on Tuesday, heat cold contrast. That brings us to Wednesday and on Wednesday, we get back to a resistance training workout. The resistance training workout that I emphasize on Wednesday is one in which you train your torso. Yes, literally your torso. I know this is counter to the so-called bro science of bro splits. I don't know who originated that term. It's a terrible term. It essentially alienates anyone who's not a bro or considers themselves a bro. In any case, this is not about training chest or back or shoulders. In fact, it's really about strengthening the muscles of this torso and of course includes the chest and the shoulders and the back. I'm sure as I say this, a number of people out there who are obsessed with hypertrophy and muscle growth and filling out their shirts or whatever, it may be, are they, oh, no, you know, this is just kind of all around fitness, but no. The point is on Wednesday, you train your torso and that's going to involve some pushing. That's good for you. It might include some training of things like bench presses or incline presses as well as shoulder presses or lateral raises, things for the shoulders as well as for the back. Some pulling exercises. These could be bent over rows or chin ups or pull ups. Again, there are enormous number of exercise for each and every one of these muscle groups. Now, I believe there's a clear benefit to training all these muscle groups together on the same day because much in the same way that training legs all on one day can lead to the systemic effects because they're large muscle groups, working both the pushing muscles and the pulling muscles of the torso on one day, at least in the context of this program is very time efficient and tends to wick out into a number of different dimensions of health that at least I'm interested in and I think a lot of other people are interested in. What are those? Well, let's think again, I want to be strong in not just my legs, but my upper body. I also may want, may want to engage some hypertrophy, to grow certain muscle groups in order to create a sense of balance that could be for aesthetic reasons, but also for balancing strength and for health and the integrity of the joints, etc. And in addition to that, by training a bunch of different muscle groups together, you have the opportunity to get the more systemic hormonal effects and metabolic effects that occur when you're not just training one muscle group and isolating that one muscle group, but rather training a bunch of muscle groups together. So when say a trained torso and I do that in push pull fashion just for kind of time efficiency, sometimes that means doing a pushing exercise and then a pulling exercise. Sometimes it might even mean doing a set of pushing and then a set of pulling and going back and forth. However, if you're in a gym and a particular crowded gym, please don't be one of those people that colonize as multiple pieces of equipment and says I'm working there, I'm working there and that can be quite a dance and it can be hard to orchestrate a workout like that. So sometimes it will be starting off with a set of shoulder presses and then doing all your sets of those and then moving to your chin ups and then moving perhaps back to shoulders and realizing, ah, someone's on the machine that I wanted or using the equipment that I wanted. So I'll just finish up the pulling. I'll finish up the back work and then going to the push. I don't obsess over the alternation in any kind of strict way. I really just try and get the muscles of the torso trained. And again, it's two exercises per muscle group and one of those exercises is going to be something where there's, I realize this isn't physiologically accurate, but a shortening of the muscle or where they, at the end of the movement, the muscle is under maximal contraction. I could throw out some names of exercises just for purpose of understanding. So this would be, you know, like cable crossovers for the chest, the, the, the peak contraction is at the end, whereas something like an incline press, there's more of a stretch provided it's done over a full range of motion at the beginning of the movement. So again, something where there's a stretch and something where there's a peak contraction for the shoulders. It's a little bit harder to do, although there are ways to do that. And Jeff Cavaliere has excellent workouts available, zero cost on YouTube. He also has excellent programs on his ATHLEANX.com site, but certainly has a lot of excellent protocols on his YouTube and Instagram, but on YouTube, you can put in his name and any muscle group that you want to train to have some terrific videos describing exercise, choice and other features of exercise parameters. And then a peak contraction or shortening of the muscle peak contraction exercise and a stretching exercise. And so for the back, one might say, okay, I seated row or a bent over row or a dumbbell row where the elbow is brought behind the torso for a peak contraction movement. And then for more of a stretching movement, it might be something like a chin up or a pull up. And as I say this, I understand that stretching and peak contraction aren't the exact terms that one would use if they were a physiotherapist or a strength and conditioning coach, but I think for the typical person who's trying to generate strength and hypertrophy in those muscles or maintain strength and hypertrophy in those muscles, this kind of nomenclature way of describing it at least should be clear and even efficient. And just to remind you, as with the leg workout, the total duration of the torso workout is going to be 50 to 60 minutes after a brief warmup. The sets and repetitions are going to be dictated in the same way that I described earlier. So for about a month, it's going to be more sets. So anywhere from three to five sets in the lower repetition range, so four to eight repetitions. So that's going to be heavier weights and longer rest as I described earlier, the rest intervals. And then for the next month, it's going to be moderate repetitions, fewer sets, the same way I described earlier. And if you want more details on all of that, you can find that in the newsletter related to the optimal or foundational fitness protocol that you can access at HubertmanLab.com. One thing I should note about the Wednesday torso workout is that I am a big believer in training. The, what I believe is the highly avoided or at least overlooked, but vitally important aspect of total body stability, strength and safety, really, safety, which is the neck. And I realize a lot of people don't want a large neck and I totally understand for aesthetic reasons why they don't want that. It's kind of interesting, actually, if you think about it, that people have a large neck or often told they have no neck, people say that guy has no neck or they have no neck when, in fact, they're referring to the fact that they have a very large neck. I don't know how that came to be. Someone you put in the comments, why that is. How come when people have a big neck, they refer to it as no neck? So why do I train the neck? I train the neck for a couple of reasons. One is years ago I had an accent where I actually fell off a roof and I'd been training my neck at that time for a sport that I was involved in and I walked away from it with a sore neck, but not a broken neck. And I thought, wow, it's really great that I have been training my neck. In addition to that, I was once in a car accident where I was parked and just bought the car. It's my first new car purchase. Parked in that car with my mother and my grandfather in the back seat at the red light and someone rammed into us at full speed. Now fortunately none of us were hurt, we were all rattled. And once again, I was very sore in my back and in my neck, but I think one of the reasons why I was able to essentially walk away from that, I didn't have any sustained damage was because I trained my neck. But I started training my neck for sport and I continued to train my neck because I noticed when I don't train my neck, I start getting shoulder issues. And if you talk to an excellent physiologist like Dr. Kelly Starrett of the Ready State, as an excellent channel, you'll find them on all the social media and standard channels where you talk to anyone out there who really understands the strength of the torso and the upper body and even the back. What you learn is that of course being the upper portion of the spine, stabilizing your neck is very important. Now training the neck can be a little bit detailed and specific and even dangerous if you do it wrong. Again Jeff Cavaliere has a terrific set of videos on training the neck properly. I know a lot of people out there might think neck bridges and I used to do neck bridges. I occasionally still sneak in a neck bridge here or there, although I don't recommend it because in discussions with Jeff, he will tell you and it's true that the discs eventually go and you can run into serious issues from doing bridges and it doesn't happen gradually so you can't notice it happening. It just happens suddenly. So I might occasionally do a neck bridge but in general I'll train neck by wrapping a plate in a towel so that I don't end up with an imprint of the weight value on my head or face and then moving the neck from side to side or front or back. Again, we'll provide a link to those videos. It's a terrific set of videos that describe how to train your neck properly and safely. So even if you're not trying to grow your neck, you definitely want to make sure that you use some light weights to make sure that your neck is stable and upright. I say stable and upright because it's very clear that for reasons related to texting and staring down at computers and related to weak neck relative to the rest of the muscles that stabilize the spine, a lot of people, their default stance or their default posture is with chin forward and that's not good. Not only is it aesthetically not good but it also can create all sorts of issues related to back pain and headaches and things of that sort. This is a real thing. Training your neck allows you to stand upright, sit upright. I even believe it allows you to do things like public speaking or have conversations with you on the street in a way where you are front facing as opposed to looking down. So Wednesday is torso and neck and then comes Thursday and that means another cardiovascular exercise session. Although it's a brief one. Unlike the endurance training on Sunday, the cardiovascular session on Thursday, and again for me it falls on Thursday but for you it could fall on a different day depending on when you started this protocol, is going to be about, again about 35 minutes of for me running, although it could be rowing or it could be cycling, it could be something of that sort. The goal of this workout is what's important. The goal of this workout is to tap into, remember that long list that we talked about earlier where you've got skill and speed and power and strength and hypertrophy, etc. A different forms of endurance is to get into that range of endurance where your heart rate is elevated quite a bit more than zone two, but that you're not really going all out sprint. So what that means for me is warming up for about five to ten minutes. That could be jogging, a little bit of light calisthenics might even be hopping on a stationary bike, although to be as I loathe the stationary bike. And then setting a timer and doing about 30 but ideally 35 minutes of what I call 75 to 80% of all out. Okay. Now I realize this spits in the face of all you heart rate monitor wearing super techie exercise types. But when I think of all out sprint, I think of 100%. And what is that? In my mind that somebody is chasing me with a needle full of poison and I am sprinting away at maximal speed. That for me is 100%. So after a brief warm up, what I'm going to do is go out typically outside, although sometimes it has to be on a treadmill if I'm traveling and move run for about 30 to 35 minutes at about 75 or 80% of that all out. What that means is that I'm striving to keep a steady pace, but in reality, I don't. I sometimes have to stop at a stoplight. There are cars. Please don't run into traffic. Just to maintain that speed and that timing. That would be terribly antagonistic to fitness and particular lifespan. That running tends to be running in which I'm breathing hard. So I'm not able to restrict myself to purely nasal breathing. And I should have mentioned earlier on the Sunday long, rock or weighted hike or jog. If I'm alone, I try and do pure nasal breathing. If I'm with other people or I'm talking, obviously, I'm not going to do pure nasal breathing because I'm talking. Although I'm sure that sometimes they wish I was doing pure nasal breathing. That Thursday workout accomplishes a number of things. First of all, it really gets my heart rate up and it improves multiple aspects of endurance because as you recall earlier, the different bins of endurance that include muscular endurance anaerobic, that three to 12 minute range and then 30 minutes are longer. None of them really precisely match what's accomplished in this 35 minute or so cardiovascular session where I'm pushing hard, but not all out. But that's exactly the reason to do it, which is that it taps into multiple fuel systems for the muscle and multiple aspects of the heart and capillaries and arteries and veins that are involved in generating that movement. It really cuts a broad swath into multiple categories of endurance. Also just keep in mind what this foundational or optimal fitness protocol is really designed to do. In my mind, a foundational fitness protocol is one that leaves you or has you in a state where if you need to walk really far and carry a bunch of weight, you can do it. If you need to lift a heavy object with your legs, you can do it. If you need to run really fast for two minutes, you can do it. If you need to run a little bit further, maybe in 10 minutes for whatever reason, you can do that. It's a really all around fitness program and that 35 minute run again could be swapped with a 35 minute urgro or sometimes if you only have access to a stationary bike, you could do that. I suppose if you didn't have access to any equipment and running is not your thing, one thing that I have done, especially if I've been stuck in a hotel because I arrived late someplace and I really want to get this workout in, you could do the dreaded burpee. I know there are a lot of opinions out there. Some people think burpees are downright dangerous. Other people love burpees. You could do that or you could do really fast but full jumping jacks. I know that's a little PE class, physical education class ish, but sometimes if I need to get the workout in, what I'll do in a hotel if I've arrived late, in particular day of travel is I will find the stairwell, the fire stairwell. I'll make sure by the way that I can get back into the building because I've been locked in those stairwells before and I will simply walk really fast up the stairwell as many flights of stairs as there are or maybe even jog it, not quite sprint, but maybe run up those stairs over and over and over again in order to get that 35 minutes of 75 to 80% of max output cardiovascular work done. If I'm really just restricted to my hotel room, I'll just do jumping jacks for 30, 35 minutes, sometimes while watching something on TV and believe me, if you're doing full jumping jacks, like really extending your legs, really getting arms overhead and really doing the full movement, by the time you hit five or six minutes, you are going to be sweating and your heart rate is really going to be up. I also sometimes will travel with a jump rope. I always try and travel with a jump rope and skip rope, much to the dismay of the people who are housed below me in the hotel room. Skipping rope I should mention can be a very effective way of getting cardiovascular training while you're on the road. But in all seriousness, if you're in a hotel room or an apartment and you can't really jump high and you're very good at jumping rope, what you'll find is it's not going to get you into that higher elevated heart rate zone. It can be great for zone two type training, but if you're really good at skipping rope, and I wouldn't say I'm really good at it, but I've done enough skipping rope that I can just kind of cruise and talk and it's more zone two-ish. You can feel like walking at times. Now you can do double unders where you're really jumping and putting the rope under your twice each time or crossovers, etc. depending on your skill level. But again, if you're in an apartment or you're in a hotel, that's going to be harder to do. And because of there's some skill involved, sometimes you're stopping more often than you're continuing. By the way, and I just have to mention this, a really terrific Instagram channel is Anna Skips. This is a teacher, a science teacher, or I believe it's a math, math as they say in the UK, because she's in the UK, math teacher. I don't know Anna, but I know she skips because she has this amazing Instagram channel called Anna Skips. What's really cool about her Instagram is she shows you her progression from not being able to skip rope at all to the absolutely incredible types of rope skipping that she's doing each morning while getting sunlight, which of course is an essential health protocol. So check out Anna Skips on Instagram, really inspiring and made me want to get better at skipping rope. I'm still working on it. Okay, so with that Thursday cardiovascular, let's call it endurance, but cardiovascular training workout done around rolls Friday. And on Friday, I'm going to do another cardiovascular training session. And I alluded to this earlier, but this cardiovascular training session is also designed to tap into some of the ability of hard, I should say high intensity interval training to tap into strength and hypertrophy increases for the legs. Because remember, we train legs on Monday. And what the science tells us is that protein synthesis in a muscle group can be stimulated about every 42 to 72 hours. And so we've had Tuesday, off, Wednesday, off, and Thursday, off. And you don't want to lose progress that you made from that terrific Monday leg workout. But in order to make sure that you can do the other things that follow in this program and pick back up on Monday with another leg workout, at least for me with my recovery abilities in my work schedule, I'm not going to do an entire other leg workout because it's going to set the whole thing out of whack. That is, I won't be able to consistently do the same workouts on the same days of each week. Now, with that said, a little bit later, I'll explain what happens if you have to miss a workout and how you can combine days, et cetera. But I really strive to get certain workouts done on certain days consistently, at least as best I can. So Friday is high intensity interval training. That can take a variety of different forms. For me, the ideal thing to do for me, again, you could do something completely different. Exercise choice, again, should be governed by what you can do safely so you don't injure yourself and that you can perform effectively and that gets you or provides you the stimulus that you want. And what I'm trying to do on Friday is get my heart rate way, way up. Talk about this in the episode with Dr. Andy Galpin. In addition to the benefits of getting 180 to 200 minutes of zone two cardio per week, minimum, it's a really good idea. To get up to that max or near max heart rate at least once a week. And you're not going to do that for very long periods of time. You're not going to do that for 30 minutes. You can't sprint all out for 30 minutes unless you're Steve Prifontane. If you haven't seen the movies without limits or pre-fontane, you should absolutely see those. He was able to go out and run 12 laps, what seemed to be an all out sprint or close to it. Incredible. But most people are not going to do that or going to be carried away on a stretcher if they try. This high intensity interval training for me ideally would be on so-called assault bike or airdine bike. So these are bikes that have the fan, which might seem like, oh, you know, just cools you off. But actually, there's a lot of resistance there. So what I will typically do is a 20 to 30 second all out sprint using arms and legs. And then 10 seconds rest. And then repeat all out sprint for 20 to 30 seconds. 10 seconds rest. Repeat. So that's not for anywhere from 8 to 12 rounds, which trust me, even if you start out a little bit less or I should say not all out intensity or effort by time you hit the fifth or sixth one, you will be certainly headed into if not near your maximum heart rate. Now what is your maximum heart rate? Do you need a heart rate monitor? No. If you'd like using that sort of thing, great. But again, Andy Galbin beautifully supplied us with the information. He said, if you take the number 220 and you subtract your age, that for most people, most is going to be your maximum heart rate. Although for certain people who are very fit or certain ages, that's not going to apply. So it's a little bit too crude a measure, but it's a good starting place and you can look up other information or see that podcast episode. We probably have to link to it in the show no captions. If you want to get more details on that, I don't use a heart rate monitor. What I'm trying to do is get to that point where I quote unquote feel like I want to die. Now I don't want to die and please don't die, right? If you're not in good cardiovascular health, do not just jump right into this fitness protocol. But I want to get to the point where I really feel like I could not pedal any faster or pull any faster on the on the assault bike, the paradigm bike, or if I'm doing this work out in a place or at a time or because I choose to not use a bike or a row or because you could all see a row or I will simply do sprint jog intervals. I will sprint for 20 or 30 seconds, then jog for 10 seconds, sprint for 20 or 30 seconds and then jog for 10 seconds and just repeat. I used to have a big field next to my laboratory, my old laboratory, and I used to bring my bulldog Costello out there. He was really good at the first sprint part and then he would just lie down and watch. He didn't even do the jog part. I would just go back and forth, back and forth, back and forth, panting like a bulldog non-stop, barely able to recover before sprinting again. And the basis of this workout again is several. But first of all, it's to get the heart rate really high up towards maximum heart rate, at least once a week, so you accomplish that this Friday. Also, if you are sprinting and then jogging or you are really pushing hard on an assault byter or an air dyne bike or using a, for instance, a skier or the skier machine or any number of different cardiovascular training tools, you are going to get activation of the legs. Of course, not to the same degree as you would with squats or deadlifts or leg extensions and leg curls. That's simply not the case. But you're going to trigger strength and hypertrophy and other types of adaptations in those muscle groups. So this for me also represents the second leg workout of the week where I'm not touching any weights. One important point that I don't think I've heard mentioned anywhere else, but that I hope to have Dr. Kelly Starrett on the podcast to discuss and that I've discussed with him one on one, which is be careful with all out sprints or all out anything cardiovascular exercise. You can get injured doing those. So for instance, if you go out and you just sprint across a field all out 20 or 30 seconds and then walk back and can do it again and again, don't be surprised if the next day you have some sciatica or even some pelvic floor pain. I don't recommend going all out on any movement that you can't perform with perfect form. Okay. So for me, I really try and stay away from all out sprints. I'll sprint at about 95% of what I can do because I find if I go all out sprint, I don't know what the reason is, but it might be an overextension of a limb or something like that. I'm not a sprinter. I'm not a sprinting coach. I do hope to get Stu McMillan on here or Dan Faff. They were excellent sprinting coaches at some point. They're world class sprinting coaches, but I'm not a pro sprinter. I'm not even a amateur sprinter. I'm a fitness sprinter. So the aerodiner assault bike or the roer is really a safer option for me. If I'm running or I'm doing some sort of movement where I'm unconstrained, really in terms of how far my stride is, I mean, I'm obviously constrained by the musculature, I'm really careful to not overextend or do something like that. The only way to do that is to not go all out. So again, the goal for this Friday workout is to really get the heart rate high, do high intensity interval training or a number of different ways you could do that. You can look up H-I-I-T, hit workouts online, find the one that's best for you and really pick something that's safe that you can do consistently. And I believe that ideally will also trigger a bit of either strength and hypertrophy and speed power maintenance or even give you a little bit of a stimulus so that by time you roll around to that leg workout on again on Monday, you've got a little bit of an additional boost to your leg strength hypertrophy, speed and power. So we've covered Sunday through Friday and then Saturday rolls around. And Saturday is when you train arms, calves and neck. So this may sound as if you're training a bunch of small muscle groups, biceps, triceps, necks and calves. And that's true, but I should mention that you are also training your torso a second time and you're doing it indirectly or sometimes not indirectly. Why do I say this? Well, keep in mind again that for strength and hypertrophy, you're going for that once about every 48 to 72 hours, you want to stimulate that on Wednesday is when you train your torso, right? Chest shoulders back and neck. You've had Thursday to rest, Friday to rest. I know a lot of people are going to want to emphasize those body parts and they're going to think, oh, you have to train it twice a week. But if you have modest recovery ability or low recovery ability, such as I do and you're doing these other cardiovascular training sessions, et cetera, well, then on Saturday is when you will train arms, calves and neck directly, but included in that, remember, two exercises per muscle group, one with a peak contraction, one with somewhat of a stretch in there, included in that. I suggest doing some sort of dip movement, which I think it was povlsat soulins that the dip is synonymous with or at least similar to an upper body squat. Excuse me, povls, if I got that wrong, maybe it wasn't you that said that, but big admirer of his work. And certainly the dip is a great exercise to hit multiple muscle groups, chest shoulders and triceps, maybe even some back to some extent, depending on how you do it. So doing some dipping movement will indirectly stimulate strength hypertrophy, et cetera, in the chest and shoulders, and including some sort of pulling movement for the bicep, like a chin up or palms facing movement, pulling up from to the bar, especially if it's a close grip type movement, but even if it's a wide grip type movement, will of course trigger strength and hypertrophy maintenance or improvements in the biceps, but will also trigger strength hypertrophy in the lat in the back. Okay? So Saturday is this arm workout with that. I'll just give an example of a potential workout where you might do a few more exercises, maybe not just two, but maybe three to make sure you get the torso indirect stimulation. So what would this look like? Well, this might be your sort of classic dumbbell curls for the bicep and maybe incline curl for the bicep because it has more of a stretcher on an incline bench. And then you might finish with two sets of chin ups. So palms facing you, chin ups are three sets of chin ups, depending on whether or not you're in a heavier load month or a more moderate weight month. Again, activating the biceps muscles, because arm's day, but also activating strength and hypertrophy in the lats are at least maintaining it so that because you're not training those torso muscles again until Wednesday, you're not allowing the hypertrophy and strength gains that you generated on Wednesday to atrophy to disappear. Then thinking about triceps, it might be some sort of triceps isolation or peak contraction movement. So that could be tricep kickback or some overhead extension would be more of a stretch type movement than a kickback, but then also doing regular old dips. You might even start with dips, which again are going to activate those torso muscles and the triceps. And then calf work in the same way that you did on Monday and neck work. Again, I am a believer in training neck multiple times per week. And if you are able to finish all of that in 45 or 50 minutes, great. Most people will find when you're doing a lot of small muscle groups, it actually takes longer because you have to go around to more exercises. But again, just adhere to the same principles we talked about before, about 50, 5, 0 to 60 minutes of real work after a warm up with an asterisk next to that that if someone's on the equipment or you can't find the dumbbells you need, et cetera, then maybe 75 minutes max. But really trying to not extend that workout too long, making sure that you activate the arms directly, but also activating the torso muscles indirectly. And again, I won't repeat it this time again, but following the same weight and repetition and rest interval scheme that we talked about earlier, a bit heavier, lower reps, more reps, sets, and longer rest for about a month. And then alternating to more repetitions, yet fewer sets, shorter rest intervals and do that for about a month. This carries through for all the resistance training workouts, regardless of the day or the week. So we completed the total arc across the week and we can summarize it as saying Sunday is, let's just say long endurance. Monday is leg resistance training. Tuesday, heat cold contrast Wednesday, torso training plus neck, Thursday, I would call it moderate intensity cardiovascular exercise, so that 35 minute, moderate intensity cardiovascular exercise, Friday high intensity interval training of sprinting or some variation thereof. And Saturday, arms, calves, neck, and torso indirect work. That's the total structure, but I want to emphasize again, you do not need to start this on Sunday. You could make the long endurance work start on Tuesday and then just fill in the rest as described before. It's really up to you. There's another important point I want to make, which is that neither I nor anyone is going to be successful in doing the exact workouts on the exact same days of every week because of travel, work, illness, other demands, etc. The thing about the schedule that I like so much that I do believe that will benefit you as well is that you have some flexibility there. What's the flexibility? Well, let's say you train your typical Sunday workout of endurance, then you train legs on Monday and then you don't manage to do your heat cold contrast on Tuesday for whatever reason. Well, you can put it on Wednesday, just make sure that if you're going to do the cold stimulus that you don't do it too close, not within four ideally eight hours after the training of torso, but you could do it before or you could do it just heat and skip the cold that particular week, all right, not ideal, but better than not doing anything. Let's say, for instance, the leg workout was particularly brutal. You don't sleep that well on Monday night or Tuesday night. Well, then should you do the torso workout on Wednesday? Well, I would say why not move the heat cold contrast to Wednesday and then push that torso workout to Thursday and maybe also try and do that 35 minute run on Thursday, every once in a while, rather than lose the total control of the program and let everything shuffle forward. Here's the basic principle. I do believe that any one of these workouts, whether it's for endurance or resistance training, can be shifted either one day forward or one day back, right? You could delay it by a day or you could accelerate it by a day in order to make sure that you get everything done across the week. In fact, I would say the best way to think about this foundational fitness program is not from the details up, but from the top down, from the big picture down to the details and say to yourself, once a week, you're going to get some long endurance in. Another day during the week, you're going to make sure that you get a kind of moderate, faster endurance workout in. And then one other day during the week, you're going to get an all out sprint high intensity cardiovascular exercise workout in. You're going to get those three workouts in somehow. And then in addition to that, you will also do resistance training for every muscle group in your body. And that means doing your legs hard at least once a week, your torso hard at least once a week, and your arms hard at least once a week. And of course, you are also paying attention to train your calves. And I do, for reasons I've described before, believe that you want to train your neck, at least to keep it strong, you may not want to generate hypertrophy there. People vary in terms of how quickly their neck grows. Some people go very, very fast. Other people for the life of them, they can't get much hypertrophy in their neck. But keeping that neck strong, at least through some very light work to moderate weight work, very, very important for reasons I stated earlier. If you set out those goals, then the specific days that you do each workout isn't as critical, but the specific spacing is. So for instance, you're not going to want to do your high-intensity interval training the day after you train your legs. Because if you're doing that high-intensity interval training correctly, you're going to be taxing your legs and eating into their recovery. And so you want to space them out by two or three days. So I think you'll notice that the point is really to optimize everything on the whole, rather than any one specific aspect of training or adaptation. Now that said, I do realize that some people might be hyper-focused on things like strength and hypertrophy and the aesthetics that come with it. A key point about strength hypertrophy and weight training. And this is something that has been covered on multiple podcasts. Certainly the one with Jeff Cavaliere and with Dr. Andy Galbin and the one that I did on building muscle strength and hypertrophy, the solo episode. And that is the following. It is the rare individual who has perfectly balanced musculature. Most people can be a bit quad dominant or hamstring dominant or they have trouble activating their glutes or somebody has a terrible time trying to activate their chest muscles but they're very strong in the back, etc. It's very clear that we can know that not just based on aesthetics, but based on deliberate contractability of those muscles. I don't want to get into this in too much detail for sake of time, but this is something that has peer-reviewed research to support it and was also discussed extensively with Jeff Cavaliere when he was a guest. And that actually he's really popularized this notion and it's absolutely true, which is that if you can contract a muscle very hard to the point where it almost feels like it's cramping, if you can do that even when there's no weight in your hand or there's no resistance against it, so you're just using your mind muscle connection to contract that muscle hard and isolate it. This is our, you will be able to generate hypertrophy and strength gains pretty easily in that muscle compared to muscles that you have a harder time activating. So during all resistance training, that mind muscle link is really important. So much so that some people will even try and emphasize contraction of the muscles in between sets, etc. I personally, because I'm not somebody who likes a mirror when I work out and I'm not somebody who wants to spend time in between sets flexing muscles, etc. For whatever reason, I want to actually rest between sets and I'm more concerned with performance during those sets and really putting my mind into the muscle during the set. I really try and emphasize deep relaxation between sets. So here's a tool that again is built out of science and I should say peer reviewed studies, some of which are being done in my lab, but other labs as well, which is that in between sets, what I really strive to do is to bring my heart rate down as much as possible, call myself down as much as possible. And I'll do the so-called physiological sigh in order to do that. That's two inhales through the nose, back to back. And then long full exhale through the mouth. I just did it partially there for a sake of time again. So a big deep inhale through the nose and then sneak in a little bit more on a second inhale to maximally inflate the lungs and the avioli, the lungs and then a full exhale of all your air via the mouth to empty your lungs. That's the fastest way that we are aware of to calm your nervous system down. And really in between sets, you can use that to calm yourself down and conserve energy, but then as you move into the weight training set, you really want to ratchet up your focus and attention to the muscles that you're going to be using. Now I'd like to acknowledge that there's a huge range of parameters in terms of how to actually perform during the set. You can focus on a particular muscle and try and really isolate from the beginning of the movement. Some people will really try and isolate it only during the peak contraction. Some people will accentuate the negative, their speed and cadence. There are again, remember concepts are few. Methods are many. And if you're interested in the various methods of eccentric and concentrics and all the different ways of changing up cadence and so forth during sets, there's an enormous amount of quality information out there far too much for us to get into into detail. Now, but what I described the general principles of how to set your mind, if you will, during the set, you should be focused on the muscles that you're using and or moving the weight. If movement of the weight is more important, you can either focus on moving the weight or challenging muscles, right? You can either try and isolate muscles and make specific muscles, do the work or simply moving the weight. Moving the weight is going to be more geared towards strength, improvements, but focusing on the muscle is so called my muscle link. It's going to shift that very same set more toward hypertrophy. I realize I'm painting with a broad brush here, but nonetheless, this is grounded in the way that the nervous system governs muscular contraction. And while I think most people are familiar with the number of different variables associated with resistance training, you know, sets, reps, rest intervals, cadence, etc. There are also a tremendous number of very important variables for endurance and any kind of cardiovascular training. And there are a lot of excellent resources out there about that. I think the most important one, in fact, I will go on record saying what I believe to be the most important variable for any endurance or cardiovascular training is that because it's a repetitive movement, that you are able to complete the movement safely, meaning you're not putting your body into range of motion or into positions that can damage joints or put you in any kind of compromised state. And some of you might think, well, that seems kind of silly. But if you've ever set the, for instance, the seat too high on a stationary bike and then done, you know, airdine or assault bike type interval training sprints, if it's set too high and you're over striding as it were, the next day you can really pay the price in terms of some back pain or sciatica. And sometimes that pain can extend for quite a while. So of course, you don't want to approach any exercise with so much caution that it's neurotic and preventive. And yet you don't want to approach any exercise in any way that's so cavalier, forgive the pun, Jeff, that you're also going to compromise your, the integrity of your joints and musculature and connective tissue. Let's talk about some real world practical variables. For instance, let's say you get a poor to terrible night sleep. Should you train the next day or not? Well, that really depends. I can honestly say I've had some of the best training sessions, resistance training or endurance training sessions after a really poor night sleep. But that's the rare event. More often than not, if I'm not sleeping well, I've had a terrible night sleep. The next day, I will just skip training that day. I know that will shock a number of you out there or perhaps you're already calling me names, weak, etc. But I find that if I've slept really poorly or I've had a very stressful event the day before and I don't sleep well, training the next day sets me up for getting ill and getting ill sets me up for not being able to train for multiple days. So it is my preference in that case to skip a day and really focus on recovery. And then, as I mentioned earlier, slide that workout to the next day and rarely double that workout up with another workout, but then just slide the schedule forward by a day. But I really try and strive that is, I really try to double up at least some workouts later in the week in that case so that I can get back on schedule of starting the seven day protocol again on the same day. I don't want to be excessively vague there. What I'm trying to say is I try and adhere to the same schedule. And if I get a poor night's sleep, I'll just simply skip the workout the next day, slide the workout forward. There is one exception to that and it's an important exception which is there are times when I've not slept well or I've had some particularly stressful event the day before and haven't slept well. But I'm able to do so-called NSTR non-sleep deep rest the next day. So there have been times when I've only got three or four hours of sleep the night before and I'm feeling really behind the ball the next morning. I really want to get my workout in so instead what I will do is a 10 but ideally in that case a 30 or even 60 minutes non-sleep deep rest and there's a 10 minute non-sleep deep rest protocol read by me. But it is a non-spiritual non-mystical science supported non-sleep deep rest protocol available on YouTube. You can simply put my name, Huberman put NSTR and VirtuSan, VIRTUSAN into YouTube and you'll find that script. There are other NSTR scripts that you can find now on Spotify and on YouTube and if you fall asleep during those non-sleep deep rest scripts that's great and if you don't you will also find that it will restore your ability to perform mental and physical work. So there are times when I haven't gotten as much sleep as I would like or I'm feeling a bit more stressed for whatever reason and I'll do NSTR and then I will go train and that often works fabulously well for me and then I don't have to skip a workout entirely just because I didn't get a good night's sleep. A lot of people ask whether or not you should train fasted or fed and this is a very controversial area. I personally prefer to do my cardiovascular work not having eaten anything in the previous 3 to 10 hours and typically that's because I wake up and I'll do the cardiovascular training within about an hour of waking up. Sometimes later because my first meal generally falls generally not always falls around 11am. I don't do any kind of formal intermittent fasting but typically my meal schedule somewhere between 11am and my last bite of food is around 8pm but I'm not super strict about that. I might eat as late as 9pm and I might eat something at 10am if I wake up really hungry and I might have something before 11am. I'm not neurotic about it but in terms of training I like to train fasted and that includes the resistance training workouts and those come early in the day for me and typically if I'm going to train legs on Monday for instance which is when I train legs I'll make sure that the night before I'm ingesting some starch, some carbohydrate, rice or pasta or something in that sort to make sure that when I do that morning leg workout I have enough glycogen in the muscles etc. Again nutrition is a somewhat controversial area. In fact it can evoke very strong feelings because I know we've got vegans and we've got omnivores and we've got carnivores and people who are keto. This isn't really the format for us to get into all of that. I think the rule to follow is figure out what optimizes your training for your particular training goals. For me that most often means training fasted and then eating pretty soon after I train and if it's a high intensity resistance training workout and frankly all of my resistance training workouts are pretty high intensity I'm not going to failure on every set but at least a about 30% of those sets I'm going to failure and the other sets I'm working very hard nonetheless. Well then I eat some starches after I train and I also ingest some protein in the form of a protein drink or a meal that includes some protein food. But I don't like to eat before I do resistance training or not or at least not within the hour or two before I do resistance training. There are exceptions to that and I should say that the same basically applies to endurance work if I'm going to head out for a run typically I don't want my belly full of food or any food at all but there are times where I wake up hungry and I very much need to eat something or I have something scheduled socially like a breakfast and I'll have that breakfast and then an hour or 90 minutes later I'll do my workout because I want to make sure that I finish the workout. I again I'm not neurotically attached to training fasted or fed for me fasted is preferred but if I have to train fed better to train then to not train at all. We haven't talked so much about flexibility yet but we did an entire episode of the Hubertman Lab podcast on flexibility and I encourage you to check out that episode if you're interested in increasing your flexibility but the basic takeaway from that episode is that if you look at what I like to call the center of mass of the research that is most of the studies and what the conclusions of most of the quality studies point to so not the exceptions but the kind of general rules that have been gleaned over time from multiple labs over multiple decades etc. What you find is that static stretching that is holding a stretch and in fact exhaling and relaxing the midsection in torso and relaxing into the stretch as opposed to staying full of air and tense but mentally and physically relaxing into the stretch but not stretching maximally that is not extending as far as you possibly can go but more like 60% or even less and then holding those static stretches for anywhere from 30 to 60 seconds and then repeating. Doing that two or three times throughout the week for multiple muscle groups could be for quadriceps, could be for hamstrings, for your lats, there are protocols out there. In fact we have a newsletter that is focused entirely on protocols for flexibility and stretching. You can find that again by going Hubertmanlab.com. You don't even need to sign up for the newsletter although we invite you to if you like but you can simply go there, scroll down to the flexibility newsletter and all the protocols are there for each of the muscle groups etc. What I typically try and do is some stretching in the evening because I train in the morning as I'm perhaps getting ready for bed or if the TV is on which in our house doesn't typically go on because we don't have a TV but of course there are computers and people are on their computers etc. Well I'll try and do some stretching while I do that. I also have a standing desk so during the day at work regardless of whether or not I train that morning or not or I'm going to train in the afternoon I'll try and do some static stretching for my hamstrings, my quads, my lats, my shoulders, my back. Really doesn't take much time and I really try to space that out throughout the week which if you look at the peer reviewed research matches well to what's known to be most effective which are going to be short repeated sessions ideally every day but truth told I fail. I categorically fail. I was about to think whether or not I ever stretch every day. I fail to do it every day but I get about three or so stretching sessions in per week and again it's just static hold trying to really relax into the stretch. Now the relaxing to the stretch is something that's been talked about in martial art circles and Pavlesa Tsuolin has an excellent book on stretching we can provide a link to that. Talks about this has a lot to do with relaxation of the nervous system and the way that the nerves innovate muscles and allow for stretch if you will also the way that the tendons and ligaments are are innervated by nerves. The converse is also true and here again this is a principle that Pavles put forth. I believe he calls it irradiation meaning irradiating out or emanating out from a source which is that while exhaling and relaxing the torso the midsection some people call it the core although some people don't like that term can facilitate relaxation and stretching through a larger range of motion. So too can contracting the core the midsection or gripping very tightly with the fist can facilitate muscular contraction because of the way that the nervous system rever heavily we can even say over represents the fists in the brain and so how would you apply this to your overall a foundational fitness protocol. Well it turns out that let's say you're doing movement that involves one limb moving and then the other let's say it's bicep curls just for sake of example. It turns out that you will actually be stronger in moving that dumbbell with the arm that happens to be moving if you grip the handle very tightly but also grip the handle of the opposite dumbbell very tightly. That said in between sets I encourage you to do the opposite to try and completely relax in between sets combined that with the physiological side and then when the set the next set commences employ that very strong grip both again of the of the way that's moving and the way that at that moment might be stationary or in isometric position. So the nervous system of course is what controls muscles and that operates in both directions. If you want to relax try and use long exhales maybe even physiological size and really concentrate on mentally and physically relaxing in particular your core and your fists and if you want to generate force you want to move a heavy barbell or dumbbell you want to do a chin up with the maximal force that's when you can employ the opposite which would be to grip the bar or dumbbell etc very tightly and you want to contract your core even fill your body with air as a plug all the leaks etc. So this gets into kind of form and movement which is an extensive near infinite landscape of discussion again that we don't have time to go into. I just want to mention those two nervous system related tips because I suppose as a neuroscientist they appeal to me because they are grounded in fundamental principles of how the nervous system integrates muscle and I know that they will benefit you the first time you use them and every time. Speaking of grip and nervous system and fitness and longevity Dr. Peter Atia who is a medical doctor was a guest on the human lab podcast and provided an enormous wealth of information on that podcast episode I really encourage you to check it out when you have time and of course has his own spectacular podcast the drive with Peter Atia. Peter Dr. Atia I should say often talks about certain movements or exercises that you should perform not just to improve your fitness but also to touch into or measure how fit you are and how well you are progressing toward a long lifespan and health span and one of those includes the ability to hang from a bar for a minute or longer and there are a number of different expectations that one can have of how long they should be able to hang from a bar depending on their age and their fitness level etc. Please check out Dr. Atia's podcast and his various social media sites to get more information on that. But what I can tell you is that if you're going to hang from a bar and you want to hang from that bar as long as possible which turns out to be an interesting and important metric of your health then gripping the bar very tightly will actually help earlier we talked about whether or not to train if you're sleep deprived and how to recover from what I would say is moderate sleep deprivation by doing NSDR as opposed to total sleep deprivation like being up all night or having a truly miserable night which case I think you should just skip training the next day and slide it forward. Now a similar issue comes up from time to time where people wonder whether or not they should train or not if they are sick. Here there's all sorts of crazy gym lore and sport specific lore for instance I used to hear this when I ran cross country there was this adage that if the symptoms were from the neck up you could still train that is if you were really congested and you had a headache you could still run whereas if it was in your chest in your lungs you couldn't run. I don't think there's any data whatsoever to support whether or not that's true or whether it's not true for myself and because my general goal is to be training and fit over time but also to include general health in the fitness equation that is to not be sick or chronically sick and certainly not to get other people sick. If I have a little tiny sniffle I think I might be getting sick. Even then I'm a little cautious in the sense that I'm not going to do my typical workout. I might stop at about 15 minutes earlier and I would do that not by neglecting any body parts or anything of that sort if it's a weight training workout by simply reducing the total number of sets. I probably wouldn't do any sets to failure if I did I might reduce the total number or percentage of sets to failure from about 30% of sets to maybe closer to 10% of sets something like that and if it was endurance work I might throttle back by 10 or 20% and I was short in the total duration of the workout and I often find that because of the known yes pure reviewed known immune system enhancing effects of exercise sometimes that alone will allow me to avoid getting sick but of course I'm also careful to get home take a hot shower not stress myself out if I can avoid getting myself stressed out and focus on sleep and SDR other forms of recovery good nutrition etc. If however I have a real sniffle a cold I'm not feeling well or I think I might be coming down with a flu I absolutely do not train and I don't get back into training of any kind until I'm completely recovered. So what I'm basically saying is that no I don't believe you should train if you're sick and perhaps equally importantly when you come back from a layoff of any kind whether not because of illness or for whatever reason I do believe that because your body is a bit untrained it's not ideal to jump right back into maximal training and to take one maybe two weeks of ramping up to the to the full duration and intensity of workouts that then I would continue on going for however many cycles I can complete before I hit another sickness or I hit another gap in my schedule due to family obligations or other obligations etc. So we've covered a lot of tools and protocols and variables related to fitness but we have by no means covered all the available tools and protocols and variables. Before we wrap up I do want to emphasize one tool it's a very easy in fact zero cost very low time commitment tool and this was one that was provided again by Dr. Andy Gelpin when he was on the Hubertman lab podcast and it's a tool that there is excellent research to support the effectiveness of and that I do believe should come at the end of every training session and that's to do three to five minutes of deliberately slow breathing. It sounds so simple three to five minutes of deliberately slowed breathing so this could be while you're in the shower or when you arrive at your car you might sit in your car quietly and do that if you have time or maybe even while you're driving back to or onto your next destination just to really slow down your breathing to really look at the recovery period that has to follow each training session and of course during which the adaptations the changes that make you more fit than you were going into the exercise occur and that three to five minutes of deliberately slowed breathing has been shown in Andy's group and in related experiments not exactly the same but related experiments in our laboratory and another laboratories to really so called downshift the nervous system and really set you up for maximal recovery rapid recovery and allow you to lean into the next training session with full intensity when that training session eventually arrives so it's a very simple tool but a very potent tool for your overall fitness. So thank you for joining me for this discussion of what I'm calling a foundational. All right, we guess we could even get bold and call it an optimal fitness protocol though the word optimal is a tricky one. There's no real optimal fitness protocol and today what I've really tried to focus on is this foundational protocol because it does allow you to check off most if not all the boxes related to strength endurance hypertrophy speed power flexibility. It also teaches you how to regulate your nervous system up and down that is to ramp up and focus mind muscle link, etc. And then quickly calm down physiological size three to five minute decompressed breathing at the end of training, etc. Really even though I talked about the protocol that I follow and again that we will provide as a newsletter at HubertmanLive.com if you want to look at it in more detail. Even though we talked about it in the context of what I do again I really want to emphasize that this protocol and the description of this protocol and all its variables is really for you and for you to tailor to your specific needs. So please take the protocol into consideration but do not treat it as wholly treated as a starting point from which you can adapt it to your specific fitness needs. If you're learning from and are enjoying the Hubertman Lab podcast please subscribe to our YouTube channel. That's a terrific zero cost way to support us. In addition please subscribe to the Hubertman Lab podcast on Spotify and Apple and on both Spotify and Apple you also have the opportunity to leave us up to a five star review. If you have questions for us or comments about the information we've covered or suggestions about future guests please put those in the comment section on YouTube we do read all the comments. Please also check out the sponsors mentioned at the beginning of today's episode that's the best way to support the Hubertman Lab podcast. Not so much today but in many previous episodes of the Hubertman Lab podcast we talk about supplements while supplements aren't necessary for everybody. Many people derive tremendous benefit from them for things like enhancing sleep and focus and hormone optimization. The Hubertman Lab podcast has partnered with Momentus Supplements. If you'd like to see the supplements of the Hubertman Lab podcast has partnered with Momentus on you can go to live momentus spelled O-U-S so live momentus dot com slash Hubertman and there you'll see a number of the supplements that we talk about regularly on the podcast. I should just mention that that catalog of supplements is constantly being updated. As mentioned at the beginning of today's episode the Hubertman Lab podcast has now launched a premium channel. That premium channel will feature monthly AMAs or ask me anything where I answer your questions in depth as well as other premium resources. If you'd like to subscribe to the premium channel you can simply go to HubertmanLab.com slash premium. I should mention that the proceeds from the premium channel go to support the standard Hubertman Lab podcast which will continue to be released every Monday per usual as well as supporting various research projects done on humans to create the sorts of tools for mental health, physical health and performance that you hear about on the Hubertman Lab podcast. Again, it's HubertmanLab.com slash premium to subscribe. It's $10 a month or $100 per year. If you haven't already subscribed to our zero cost newsletter we have what is called the neural network newsletter. You can subscribe by going to HubertmanLab.com go to the menu and click on newsletter. 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