

Fitness Toolkit: Protocol & Tools to Optimize Physical Health | Huberman Lab Podcast #94

I describe a fitness protocol that maximizes all the major sought-after aspects of physical fitness, including strength, endurance and flexibility. I discuss fundamentals of resistance training protocols, including repetitions, sets, inter-set and inter-workout rest periods and periodization of intensity and volume to improve strength and hypertrophy. I also explain how to integrate this with endurance training across the week by controlling the duration, timing and intensity of cardiovascular workouts. I also cover science-based protocols on leveraging the mind-body connection, deliberate breathing (during and after exercise), stretching, deliberate heat and cold exposure, and non-sleep deep rest (NSDR) for better workout performance and faster recovery. Further, I tackle a range of real-world issues that can affect a consistent training schedule, such as whether you should train if you are sick, have had a poor night of sleep or had a stressful event and how to start training again after a break and whether you should train in a fasted or fed state. Physical fitness is a key variable for immediate and long-term health. This episode provides a modifiable “foundational” template that can be adjusted based on your current fitness level, goals, time constraints, and access to different types of equipment.

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- Welcome to the Huberman Lab podcast where we discuss science and science-based tools for everyday life. I'm Andrew Huberman and I'm a 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 healthspan. 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 healthspan 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, it 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 Attia, or world renowned Movement specialist Ido Portal, or physiotherapist and strength and conditioning coach, Jeff Cavaliere. We've had all of them as 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 Huberman Lab podcast, I offer mechanism upfront 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, et cetera. 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 haven't eaten and you're hungry? Should you still train? Et cetera, et cetera. We're going to cover all of that, again, in the context of this, what I would call foundational template of fitness. Now, this foundational template of fitness is something that I personally use. In fact, I've used it for over three decades, hard to believe that I'm 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, live in 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 and 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 Huberman Lab podcast has now launched a premium channel.

00:03:35 Huberman Lab Premium

I want to be very clear that the Huberman 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 Huberman Lab podcast and I will answer those questions. Those of course will be recorded. They 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 hubermanlab.com/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 Huberman Lab Premium Channel will go to support scientific research that develops the very sorts of tools that we talk about on the Huberman Lab podcast. The rest of the support for the Huberman Lab Podcast premium channel will go

00:04:35 Tool: Soleus (Calf) Push-Ups, Glucose Utilization & Metabolism

to supporting the regular Huberman Lab podcast. Again, that's hubermanlab.com/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 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 soleus oxidative metabolism improves glucose and lipid regulation." This study was published in iScience, 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 soleus. The soleus 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 soleus sits below that. Now, the soleus 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 lightweight one pound weight or a two pound weight, eventually it would fatigue. You would feel a sort of a burn there. It's a very unusual set of muscles to use repeatedly. But the soleus is an 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, et cetera, you can look those up at hubermanlab.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 chaperone and sequester and use that blood glucose or it's 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 don't 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 otherwise their blood glucose can go so high that it can damage cells and damage organs. It 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, et cetera, et cetera. 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 bloodstream after eating, and they also looked at overall metabolism. For people, get this, that were using just that 1% of muscle, the soleus, by doing what they call a soleus pushup. So the soleus pushup can be described very simply as if you're sitting down with your knee bent at approximately right angle, like a square corner, and pushing up, or 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 in lifting that heel again, lowering the heel, lifting the heel again, each one of those is what they call a soleus pushup. This study had people continuously do soleus pushups 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 looked to be collected 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 a wide range of body mass indices, okay? So this wasn't just super fit people or people that were purely sedentary and not fit. They used a wide variety of ages, time of day, people who tended to walk a lot or not walk a lot. They measured changes in metabolism and blood glucose utilization and people that had done these soleus pushups while seated in the laboratory, and I must say, they had them do these soleus pushups 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 pushups throughout your life. The point is that people who did these soleus pushups 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 pushups, 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 postprandial, that's after a meal, glucose excursion, So 52% less increase in blood glucose and 60%, six zero less hyper insulinemia, 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 turn 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 that'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 how high did they lift the heel and did they contract the muscle very hard or not? 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 they didn't have to go way, way up on their tippy toes or things of that sort. In any event, 270 minutes, four 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, et cetera, 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 the 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, if you're stuck in a meeting or Zooms or class or on a plane, et cetera, 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 peruse the study

00:14:42 InsideTracker, ROKA, Helix Sleep, Momentous Supplements

in more detail, we will provide a link to this paper published in iScience 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. In keeping with that theme, I'd like to thank the sponsors of today's podcast. Our first sponsor is InsideTracker. InsideTracker is a personalized nutrition platform that analyzes data from your blood and DNA to help you better understand your body and help you meet your health goals. Now, I've long been a believer in getting regular blood work done for the simple reason that many of the factors that impact your immediate and long-term health can only be analyzed from a quality blood test. One issue with a lot of blood tests and DNA tests out there, however, is that you get information back about hormones, blood lipids, et cetera, but you don't know what to do with that information. InsideTracker makes understanding all of that very easy and even better points to specific directives, that is things you can do in terms of your lifestyle, your nutrition, supplementation, et cetera, in order to bring those numbers related to metabolic factors, lipids, hormones, et cetera, into the ranges that are optimal for you, your immediate and long-term health. If you'd like to try InsideTracker, you can go to

insidetracker.com/huberman to get 20% off any of InsideTracker plans. That's insidetracker.com/huberman to get 20% off. Today's episode is also brought to us by ROKA. ROKA makes eyeglasses and sunglasses that are the absolute highest quality. The company was founded by two all-American swimmers from Stanford and everything about ROKA eyeglasses and sunglasses were designed with performance in mind. I've spent a lifetime working on the visual system, and I can tell you that your visual system has to contend with an enormous number of challenges in order for you to be able to see clearly. ROKA understands this and has designed their sunglasses and eyeglasses to be worn in any number of different conditions and for you to still be able to see with crystal clarity. Now, I wear eyeglasses at night, when I work or when I drive, and I wear sunglasses during the day. I don't wear sunglasses when I get my morning sunlight viewing, a practice that I'm absolutely religious about every single morning, but throughout the day, I'll wear sunglasses when I drive or if I'm heading into bright sunlight to protect my eyes. ROKA eyeglasses and sunglasses are terrific because they were designed for performance, so they were designed for things like cycling and running, so they won't slip off your face if they get sweaty. They're extremely lightweight. In fact, most of the time I can't even remember that they're on my face, they're so lightweight. However, they also can be worn anywhere, to work, to dinner, et cetera. They have a terrific aesthetics. Unlike a lot of other performance eyeglasses out there that you can only find in designs that really make people look like a cyborg. ROKA makes the cyborg versions, some people like those, but they also make versions of their eyeglasses and sunglasses with frames that you can wear out to dinner, to work, et cetera. If you'd like to try ROKA eyeglasses or sunglasses, go to roka.com. That's R-O-K-A .com and enter the code Huberman to save 20% off your first order. Again, that's roka.com and enter the code Huberman at checkout. Today's episode is also brought to us by Helix Sleep. Helix Sleep makes mattresses and pillows that are customized to your unique sleep needs. Now, sleep is the fundamental layer that is the most important aspect of mental health, physical health and performance. I've said that before on this podcast, and I'm going to be saying it over and over again. If you're sleeping well, everything else is better, and if you're not sleeping well, everything else gets far worse. So sleep is vital, and sleeping on the correct mattress is absolutely vital. Helix understands this, and they have a brief quiz that you can take. So you simply go to their website, you take this quiz, ask you questions such as you tend to run hot or cold during the night, you tend to sleep on your back, your side or your stomach, or maybe you don't know, and they match you to a

mattress that's ideal for your particular sleep needs. For me, that was the Dusk mattress, D-U-S-K. I've been sleeping on a Dusk mattress for well over a year now, and it's the best sleep I've ever had. If you like to try Helix Mattress, you can go to helixsleep.com/huberman. Take that brief two minute sleep quiz and they'll match you to a customized mattress for your sleep needs. You'll get up to \$200 off all mattress orders and two free pillows. Again, if you're interested, you go to helixsleep.com/huberman for up to \$200 off and two free pillows. The Huberman Lab podcast is now partnered with Momentous Supplements. To find the supplements we discuss on the Huberman Lab podcast, you can go to live Momentous spelled O-U-S, livemomentous.com/huberman, and I should just mention that the library

00:18:53 Core Principles of Fitness & Modifiable Variables

of those supplements is constantly expanding. Again, that's livemomentous.com/huberman. 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, et cetera, et cetera 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, 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 a one minute all out cycling on stationary bike, this sort of thing, or endurance that occurs in the kind of 3 to 12 minute total duration range. So that might be sprints or high intensity interval type training. It could be an 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, et cetera. And then endurance that lasts 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 3 to 12 minute 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 sits 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? Again, I'm borrowing directly from the episode with Dr. Andy Galpin. 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, et cetera, et cetera. 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 or 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, et cetera, because that was covered in the podcast with Dr. Andy Galpin and the other podcast 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're 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 onto 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

00:23:37 Day 1: Long Endurance Workout

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 gleaned 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. It's 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 two cardio, people probably have heard of zone two cardio, but if you haven't, that's okay. Zone two cardio is something that you could measure with a heart rate monitor or other device, but you don't need to. Zone two 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 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 or you'd have to pause mid-sentence.

Now, it's near impossible, even with a heart rate monitor, to stay exactly in zone two 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 two. Now of course I like to jog, but that doesn't mean that 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 two 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 two range. Or it could be that they are more low grade hills and I might 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 I'm 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, I mean 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've really started utilizing more recently, and by more recently, I really mean within the last year or so, is I purchased one of these weight vests 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 keep walking ahead of them and running back or running ahead and running back. 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, 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 a 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 Attia 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 in my calves or if I'm wearing the weight vest, sometimes 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 now 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 a longer 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 jog really provides a foundation, a base for endurance that then the other endurance workouts that I'll describe later, 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 in zone two 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, 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 two cardio, because as you may have heard, either in this podcast or from others out there like Dr. Peter Attia, getting 180 to 200 minutes of zone two 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 weight vested hike, or some people might even do what's called a ruck, like you wear a rucksack, that might be too much, in which case certainly start with less and 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 a weight vest, or if you don't want to buy a weight vest or can't afford one, there's 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 a former SEAL team operator, I'll never forget this, and he said, oh yeah, "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 basically gave me a backpack that was loaded with a bunch of stuff and the backpack weighed about 40 pounds. And then we took a hike. So I was thinking lunch, he was thinking weighted backpack, and 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 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 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, workout, 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 get more and more fit, you'll have to move faster and or bring more weight

00:34:38 Day 2: Leg Resistance Training, Strength & Hypertrophy

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, et cetera. 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 7:00 AM or so, I train my legs on Monday, so that includes quadriceps, hamstrings, and calves. Why do I do that workout 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, et cetera, 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 earlier in the week, and it accomplishes another goal, which is that I 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, that 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 legwork, I want to say a 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, 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

00:38:09 Key Principles of Resistance Training

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, et cetera, 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. And 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, et cetera. 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 neurotically attached to this, but about 10 minutes of warming up and then about 50, five zero, 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 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, et cetera. 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, 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 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 warmup. 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 variable is 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 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. For each 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, for the quadriceps, the leg extension is, if the machine is designed right and you're doing it correctly, the peak contraction is largely going to occur 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 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 the hack squat machine. I'll do leg curls and glute-ham raises for hamstrings, and I'll do standing calf raises and seated 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 squats. 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 muscle's brought into that shortened peak contraction position, like leg curls or leg extensions or seated calf raise, and then another exercise for each muscle group where

there's more of an 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 spits in the face of what a lot of people think, but so if you're going to do five sets of five, and I would consider five repetitions 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 leg work. And then for the next month, switch to repetition range that's closer to 8 to 12, maybe even 15 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 second 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 lighter, I would say moderate weight and moderate rep range. That tends to work well for me. It also adheres to a principal that came up during the discussion, again, with Dr. Andy Galpin, that for hypertrophy, you really can use repetition ranges anywhere from 5 to 30, three zero, reps. 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 notice that if I do that for more than four weeks in a row and I don't switch over to training in the 8 to 12, maybe in 15 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 10 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 10 repetition range, but I really try and cluster the low repetition work for about a month, again, across all workouts and all exercises and the slightly higher, I would even say moderate repetition work across to the next month. One thing that you'll notice since we are talking about total fitness programming is that during the months 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, lower repetitions, et cetera, 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 intensity interval training, what you'll notice is during certain months of weight training, when you're training more heavy, those workouts will feel, literally will feel different than they will during the months when you're doing moderate repetition work. I am 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, et cetera, 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 these protocols, in order to say,

00:49:57 Day 3: Heat & Cold Exposure, Recovery

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 in a repeated movement 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. However, 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 we'll provide a citation to, and a reference and a link to, which is the review by Murach and Bagley, which talks about whether or not there's interference between strength and endurance workouts. Really interesting review if you want to peruse 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. And 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. And 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 Huberman Lab podcast about deliberate heat exposure or you listen to our episode of the Huberman 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 saunas, 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 a 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 5 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 and because it's very clear that there are cardiovascular benefits, maybe 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, debris 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 innervate 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. There are 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 them 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 et cetera 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, and we talked 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 one more, it's three to five rounds of 20 minutes of sauna followed by about 5 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 or 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. Okay, 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 in 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 submersion 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

00:59:22 Day 4: Torso & Neck Resistance Training

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. And 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 this 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. But in any case, this is not about training chest or back or shoulders. In fact, it's really about strengthening the muscles of the torso and of course includes the chest and the shoulders and the back. And 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 thinking, oh no, 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, so that's, for you that 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 these 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. I could be for aesthetic reasons, but also for balancing strength and for health of, and the integrity of the joints, et cetera. 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 Wednesday I train 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, in particular, a crowded gym, please don't be one of those people that colonizes 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, oh, 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 go in 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 like cable crossovers for the chest, 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. And he has some terrific videos describing exercise choice and other features of exercise parameters. Again, a peak contraction or shortening of the muscle, peak contraction exercise and a stretching exercise. And so

for the back, one might say, okay, a 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 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 hubermanlab.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. Now 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 who have a large neck are 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. Somebody 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 accident 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... I just bought the car, was my first new car purchased, parked in that car with my mother, my grandfather in the backseat 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 continue to train my neck because I notice 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, is an excellent channel, you can find them on all the social media and standard channels or 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, and 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. And 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 that it allows you to do things like public speaking or have conversations with people

01:08:40 Day 5: Moderate Intensity Cardiovascular Training, Running Alternatives

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 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, et cetera, 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 5 to 10 minutes. That could be jogging, a little bit of light calisthenics, might even be hopping on a stationary bike, although to be honest 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 techy exercise types. But when I think of all out sprint, I think of 100%. And what is that? In my mind that's 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, in 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 ruck 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 3 to 12 minute range and then 30 minutes or 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. So it really cuts a broad swath into multiple categories of endurance. And 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. And if you need to run a little bit further, like maybe in 10 minutes for whatever reason, you can do that. So it's a really kind of all around fitness program and that 35 minute run, again, could be swapped with a 35 minute erg row. 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 'cause 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, right? 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 'cause 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 a 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. And 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. Okay? 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, it's more zone twoish,

even feels like walking at times. Now you can do double unders where you're really jumping and putting the rope under you twice each time or crossovers, et cetera, 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 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, maths as they say in the UK 'cause she's in the UK, maths teacher. I don't know Anna, but I know she skips 'cause she has this amazing Instagram channel called Anna Skips. And 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 essential health protocol. So check out Anna Skips on Instagram, really inspiring

01:15:28 Day 6: High-Intensity Interval Training, Maximum Heart Rate

and made me want to get better at skipping rope. I'm still working at it. Okay, so with that Thursday cardiovascular, let's call it endurance, but cardiovascular training workout done, around roles 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. 'Cause 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 and 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, and 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. Talked about this in the episode with Dr. Andy Galpin. In addition to the benefits of getting 180-200 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 Prefontaine. If you haven't seen the movies "Without Limits" or "Prefontaine," 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. These high intensity interval training for me ideally would be on so-called assault bike or Airdyne bikes. So these bikes that have the fan, which might seem like, oh, 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. And I'll do that 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 the 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 like using that sort of thing, great. But again, Andy Galpin 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 to measure, but it's a good starting place and you can look up other information or see that podcast episode, we provide the link to it in the show note 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 assault bike, the Airdyne bike, or if I'm doing this workout in a place or at a time or because I choose to not use a bike or a rower, 'cause you could also use a rower, 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 nonstop, barely able to recover before sprinting again. And the basis of this workout again is several fold. 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 bike or an Airdyne bike, or using a, for instance, a skier or a 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 dead lifts or leg extensions or 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 it 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 over extension 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 Pfaff, who are excellent sprinting coaches, at some point they were world class sprinting coaches, but I'm not a pro sprinter, I'm not even an amateur sprinter, I'm a fitness sprinter. So the Airdyne or assault bike or the rower is really a safer option for me. And 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. And 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... A number of different ways you could do that. You can look up HIIT, HIIT 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 the time you roll around to that leg workout on, again, on Monday, you've got

01:22:56 Day 7: Arms, Neck & Calves Resistance Training

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 Pavel Tsatsouline said the dip is synonymous with or at least similar to an upper body squat. Excuse me, Pavel 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 lats in the back. Okay, so Saturday is this arm workout that I'll just give an example of a potential workout where you might do a few more exercises and

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 stretch on an incline bench, and then you might finish with two sets of chin ups. So palms facing you, chin ups, or 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 'cause arms day, but also activating strength and hypertrophy in the lats or 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, five zero, to 60 minutes of real work after a warmup 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 sets and longer rest for about a month. And then alternating to more repetitions yet fewer sets, right? Shorter rest intervals and do that for about a month.

01:27:30 Flexibility of Foundational Protocol, Workout Spacing

This carries through for all the resistance training workouts regardless of the day of the week. So we've 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. That is, 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, et cetera. 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, 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 training your calves. And I do, for reasons I 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 grows 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

01:31:49 Tool: Mind-Muscle Contraction, Physiological Sighs

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 Galpin 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, right? 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, et cetera. It's very clear that we can know that not just based on aesthetics, right, but based on deliberate contractibility of those muscles. So 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, chances are you'll 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, et cetera. 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 and et cetera 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. And 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, calm 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, [sighs] and then long full exhale through the mouth. I just did it partially there for the 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 alveoli in 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 accentuate the negative. There's speed and cadence. There are, again, remember, concepts are few, methods are many. And if you're interested in the various methods of eccentrics 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 detail now. But what I describe 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, so called mind muscle link

is going to shift that very same set more toward hypertrophy. I realize I'm painting with a broad brush here,

01:35:57 Safety & Endurance/Cardiovascular Workouts

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 the resistance training, sets, reps, rest intervals, cadence, et cetera, there are also a tremendous number of very important variables for endurance in 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 people 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 Airdyne 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

01:37:18 Tool: Stress or Poor Sleep & Workouts, Recovery & NSDR

compromise 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's 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's sleep. But that's the rare event. More often than not, if I'm not sleeping well, I've had a terrible night's 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, et cetera. 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, but 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 NSDR, 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, but 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 minute non-sleep deep rest. And there's a 10 minute non-sleep deep breath protocol read by me. But it is a non-spiritual, non-mystical, science-supported non-sleep deep breath protocol available on YouTube. You can simply put my name, Huberman, put NSDR, and Virtusan, V-I-R-T-U-S-A-N, into YouTube and you'll find that script. There are other NSDR 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,

01:40:04 Should You Train Fasted or Fed?

and I'll do NSDR, 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 11:00 AM. I don't do any

kind of formal intermittent fasting, but typically my meal schedule somewhere between 11:00 a.m. and my last bite of food is around 8:00 p.m. but I'm not super strict about that. I might eat in as late as 9:00 p.m. and I might eat something at 10:00 a.m. if I wake up really hungry, I might have something before 11:00 a.m., 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, like rice or pasta or something of that sort to make sure that when I do that morning leg workout, I have enough glycogen in the muscles, et cetera. Again, nutrition is a somewhat controversial area. In fact, it can evoke very strong feelings 'cause 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, say, 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 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, am not neurotically attached to training fasted or fed.

01:42:43 Tool: Static Stretching & Flexibility, Irradiation & Resistance Training

For me, fasted is preferred, but if I have to train fed, better to train than to not train at all. We haven't talked so much about flexibility yet, but we did an entire episode of the Huberman 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, et cetera. What you find is that static stretching, that is, holding a stretch and in fact exhaling and relaxing the midsection and 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, so it could be for your 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 hubermanlab.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, et cetera. But 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, et cetera. 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 of 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 relax into the stretch is something has been talked about in martial arts circles and Pavel Tsatsouline 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 innervate muscles and allow for stretch, if you will. Also, the way that the tendons and ligaments are innervated by nerves. The converse is also true. And here, again, this is a principle that Pavel has 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 heavily, we can even say over-represents the fists in the brain. And so how would you apply this to your overall foundational fitness protocol? Well, it turns out that, let's say, you're doing a movement that involves one limb moving and then the other, let's say it's bicep curls, just for sake of example, 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. Now that said, in between sets, I encourage you to do the opposite. To try and completely relax in between sets, combine that with the physiological sigh, and then when the set, the next set commences, employ that very strong grip, both, again, of the weight that's moving and the weight 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 sighs and really concentrate on mentally and physically relaxing, in particular your core and your fists. And if you want to generate force, right, 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, et cetera, very tightly. And you want to contract your core or even fill your body with air as a, say, plug all the leaks, et cetera. 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're grounded in fundamental principles of how the nervous system innervates muscle.

01:47:56 Tool: Hanging from a Bar & Fitness Metric

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 Attia, who is a medical doctor, was a guest on the Huberman 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 Attia. Peter, Dr. Attia, 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 healthspan. 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, et cetera. Please check out Dr. Attia'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 a interesting

01:49:02 Should You Train Sick?, Ramping Training

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're sick. And 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 and 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, like 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 will shorten the total duration of the workout. And I often find that because of the known, yes, peer 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, NSDR, other forms of recovery, good nutrition, et cetera. 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 or 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 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, et cetera. So we've covered a lot of tools and protocols and variables related to fitness,

01:52:19 Tool: Deliberate Slow Breathing & Recovery

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 Galpin when he was on the Huberman 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 slowed 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, in other 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.

01:53:47 Zero-Cost Support, YouTube Feedback, Spotify & Apple Reviews, Sponsors, Momentous Supplements, Huberman Lab Premium, Neural Network Newsletter, Social Media

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, or yes, we could even get bold and call it an optimal fitness protocol. Although 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 will also teach you how to regulate your nervous system up and down. That is to ramp up and focus, mind muscle link, et cetera, and then quickly calm down, physiological sighs, three to five minute decompress breathing at the end of training, et cetera. Really, even though I talked about the protocol that I follow, and again, that we will provide as a newsletter at hubermanlab.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 holy, treat it as a starting point from which you can adapt it to your specific fitness needs. If you're learning from and or enjoying the Huberman Lab podcast, please subscribe to our YouTube channel. That's a terrific zero cost way to support us. In addition, please subscribe to the Huberman 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 comments 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 Huberman Lab podcast. Not so much today, but in many previous episodes of the Huberman 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 Huberman Lab podcast

has partnered with Momentous Supplements. If you like to see the supplements of the Huberman Lab podcast has partnered with Momentous on, you can go to [livemomentous](https://livemomentous.com/huberman), spelled O-U-S, so livemomentous.com/huberman. And there you'll see a number of the supplements that we talk about regularly on the podcast. I should just mention that catalog of supplements is constantly being updated. As mentioned at the beginning of today's episode, the Huberman Lab podcast has now launched a premium channel. That premium channel will feature monthly AMAs or ask me anythings 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 hubermanlab.com/premium. I should mentioned that the proceeds from the premium channel go to support the standard Huberman 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 Huberman Lab podcast. Again, it's hubermanlab.com/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 hubermanlab.com, go to the menu and click on newsletter. Those newsletters include summaries of podcast episodes, lists of tools from the Huberman Lab podcast. And if you'd like to see previous newsletters we've released, you can also just go to hubermanlab.com, click on newsletter in the menu, and you'll see various downloadable PDFs. If you want to sign up for the newsletter, we just ask for your email. We do not share your email with anybody. And again, it's completely zero cost. If you're not already following me on social media, it's [hubermanlab](https://twitter.com/hubermanlab) on Twitter, on Facebook, and on Instagram. And at all three of those places, I cover topics and subject matter that are sometimes overlapping with the information covered on the Huberman Lab podcast, but that's often distinct from information on the Huberman Lab podcast. Again, it's [hubermanlab](https://twitter.com/hubermanlab) on all social media channels. So thank you for joining me today for our discussion about building your optimal toolkit for fitness. And last but certainly not least, thank you for your interest in science.