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 my guest is Jeff Cavaliere. Jeff Cavaliere holds a Master of Science in Physical Therapy and is a certified strength and conditioning specialist. He did his training at the University of Connecticut stores one of the top five programs in the world in physical therapy and sports medicine. I discovered Jeff Cavaliere over 10 years ago from his online content. His online content includes information about how to train for strength, how to train for hypertrophy, which is muscle growth, how to train for endurance, as well as how to rehabilitate injuries to avoid muscular imbalances, nutrition and supplementation. I've always found his content to be incredibly science-based, incredibly clear, sometimes surprising and always incredibly actionable. It is therefore not surprising that he has one of the largest online platforms for fitness, nutrition, supplementation and injury rehabilitation. Jeff has also worked with an enormous number of professional athletes and has served as head physical therapist and assistant strength coach for the New York Metz. Again, the content that Jeff Cavaliere has posted online has been so immensely useful to me over the years. I was absolutely thrilled to get the chance to sit down with him and ask him about everything from how to train in terms of how to split up the body parts that you train across the week, how to integrate strength training and endurance training, when to stretch, how to stretch. Indeed, we talked about nutrition, we talked a bit about supplementation, we talked about how to really avoid creating imbalances in muscle and in neural control over muscle. This is one thing that's really wonderful about Jeff is he really has an understanding of not just how muscles and bones, intendons and ligaments work together, but how the nervous system interfaces with those. We talked about the mental side of training, including when to bring specific concentration to the muscles that you're training and when to think more about how to move weights through space and think more about the movements overall. I'm certain that you'll find the conversation that we held to be immensely useful and informative for your fitness practices and also for how you mentally approach fitness in general and how to set up a lifelong fitness practice. One that will give you the strength that you desire, one that will give you the aesthetic results that you desire, one that will set you up for endurance and cardiovascular health, basically an overall fitness program. I really feel this is where Jeff Cavaliere shines above and beyond so many of the other PT's and fitness so-called influencers that are out there. Again, everything is grounded in science, everything is clear and everything is actionable. And while we do cover an enormous amount of information during today's episode, if you want to dive even deeper into that information, you can go to ATHLEANX.com where you'll find some of Jeff's programs. You can also find him at ATHLEANX on YouTube. There you will find videos for instance like how to repair or heal from lower back pain. Something that I actually followed directly long before I ever met Jeff has over 32 million views and that is not by accident is because the protocols there again are surprising and actionable. They relieved my back pain very quickly without surgery. So I'm immensely grateful for that content and it extends into everything from, again, hypertrophy endurance and straight training and so on. Again, it's ATHLEANX.com as the website, ATHLEANX on YouTube and also ATHLEANX on Instagram. The Uberman Lab podcast is proud to announce that we've partnered with Momentus Supplements. We've done that for several reasons. First of all, the quality of their supplements is exceedingly high. Second of all, we wanted to have a location where you could find all of the supplements discussed on the Uberman Lab podcast in one easy defined place. You can now find that place at livemomentus.com slash Uberman. In addition, Momentus Supplements ship internationally, something that a lot of other supplement companies simply do not do. So that's terrific whether or not you live in the U.S. or you live abroad. Right now, not all of the supplements that we discussed on the Uberman Lab podcast are listed, but that catalog of supplements is being expanded very rapidly and a good number of them that we've talked about, some of the more prominent ones for sleep and focus and other aspects of mental and physical health are already there. Again, you can find them at livemomentus.com slash Uberman. 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. And now, for my discussion with Jeff Cavaliere. Jeff, it's such a pleasure for me to have you here. I'm glad to be here. It's amazing. I've a long time consumer of your content. I've learned a tremendous amount about fitness, both in the weight room, cardio, nutrition, things that I've applied for over a decade. So for me, this is particularly meaningful. And my goal here is really to ask a bunch of questions to which I'm interested in the answers, but also for which I know the audience is really curious about. One of your mantras is, if you want to look like an athlete, train like an athlete. And I think that's something really special that sets aside what you do from a lot of other very well-qualified people do. And in terms of the use of weights and resistance, whether or not it's body weight or weights in the gym or polis versus cardio, in terms of overall health, aesthetics and athleticism, is there a way that you could point to the idea that maybe people should be doing 50% resistance training and 50% cardio, maybe it's 70-30, maybe it's 30-70. And here I'm talking about the typical person who would like to maintain or maybe even add some muscle mass, probably in particular areas for most people, as opposed to just overall mass, although we'll talk about that later. And people want to maintain a relatively low body fat percentage and being good cardiovascular health. What's the sort of contour of a basic program that anybody could think about as a starting place? I think it's like a 60-40 split, which would be leaning towards weight training, strength and then the conditioning aspect would be about 40%. So if you look at it over a course of a training week, I mean five days in a gym would be a great task. Obviously not in the gym, it could be done at home, but three days, strength training, Monday, Wednesday, Friday, conditioning, Tuesday, Thursday, two days. It's a pretty easy roundabout way to split that up, of course, depending upon training goals. And as you said, the aesthetic goals like that will shift dramatically. But if you want to see the benefits of both, that's probably the effective dose for strength training and the effective dose for conditioning at the bare minimum level. Again, being a much better performer and conditioning wise, you're going to want to do more than that. And in terms of the duration of those workouts, what's your suggestion? I've been weight training for about 30 years, running for about 30 years, and mainly for health. And have found that if I work hard in the gym or at resistance training for more than 60 minutes or so, it's very hard for me to recover, start getting colds, I start getting weaker from workout to workout, but amazingly, at least to me, if I keep those workouts to about 10 minutes of warmup and 50, 50 minutes or so of really hard work for resistance training, and I keep the cardiovascular work to about 30 to 45 minutes, I feel great. And I seem to make some progress, at least some place in the workout from workout to workouts. Yeah, I mean, those are good numbers, because those are kind of numbers that we usually preach. We try to keep our workouts to an hour or less, if possible. Now, depending upon the split that you're following, if you're on a total body split, there's just going to be more that has to be done in a given amount of time, that, again, if you're training primarily for strength, that could prolong the workout, because the longer rest times in between sets. But in general, when you're not focused on that one aspect, but the overall health picture, then you can get the job done in under an hour. And again, I always say on top of if you want to look like an athlete training, like an athlete is, you can either train long or you can train hard, but you can't do both. And I really believe that the focus for me, I have a busy life, I have a lot of other things that I do believe are not, and it's like, I want to go hard, and I want to go get out. And I find that my body also responds to that. I think a lot of guys bodies respond to that. And particularly, as you start to get older, I think it's the length of the workout that actually causes more problems than the intensity of what you're doing, particularly if you're warmed up properly, like you said, I found personally that my warmup has had to become more of an integral part of my workout than it ever has before. I could get in the gym when I was 20, and I'm going right over, I'm doing the one set, two sets, I'm ready to go. And I never do another workout, warmup set for any of the other exercises I do the rest of the day. That's not true anymore. And I found that, as long as I'm willing to give myself a little bit of a warmup, the intensity is not what bothers me. I'm very much in control of the weights that I use, and it doesn't bother me. But if I start to go pretty long, I start to feel achy, or I start to have problems. So again, depending upon age, that also plays a factor in the length. But again, I think everybody can achieve on a standard program, can achieve the results that they want within an hour. In terms of splits, you mentioned splits. And so for those who aren't familiar with this term splits, it's really which body parts are you training on which days seems like almost everybody follows a weekly workout schedule, although the body, of course, doesn't care about the week. There's no reason thing that once every seven days or twice every seven days make sense physiologically, just the body doesn't work that, but that's the way life is structured. I've seen you discuss three days a week whole body workouts. I've heard of splits like a pushing one day, pulling another day, legs another day, a day off, repeat. I mean, there's so many variations on this. What are some general themes that we can throw out there? And in order to avoid the huge matrix of possibilities, you have some wonderful content that points those. And we will cap in our caption show notes. We will link out to some of those that different ways to design splits. But in terms of giving people a logic of how to think about splitting up body parts, what's governing the split? What are the rules in the logic that dictate a split? For me, the first rule is, will you stick to it? Right? Because there are split, I don't particularly like full body splits. I was actually talking to Jesse about that the other day. I don't necessarily like to have to train everything. Now, of course, the volumes will come down per muscle group. But if you don't like to do that, and you actually don't look forward to your workout because you're dreading having to do everything and feeling maybe too fatigued by the time you're workouts over. Or the fact that those generally do take a little bit longer and don't fit into your schedule. I don't care how effective the split is. A split not done is not effective. So you need to find one that fit. So maybe you go into an alternative option like a push pull legs, like you mentioned. And that could be done either one cycle through the week on Monday, Wednesday, Friday, split, or it could be twice in a week. So you're actually training six times where you repeat it. You know, pull push legs, pull push legs or, you know, however you want to do it with either a day off and between the three days or at the end of the six days. And again, that actually impacts your schedule. I've broken that down before where it's, you know, if you put it in between the three days, it's good because you're giving yourself an extra rest day in between. But it starts to shift that day off every week as we wrap around. So for those guys that were choosing that seven day schedule out of convenience in our heads, you know, it starts to mess with that off day. So others like to just keep it predictably let's say on a Sunday and train six days in a row. But that's a better way to maybe group similar muscle actions together, which I think I definitely prefer that because if I'm going to be training, you know, pulling movements, at least there's a synergy between them. And I feel like I'm looking to achieve one goal that day. And then I mean, quite honestly, you can go back to the bros split days and there's those still work effectively. There's a reason why they worked in the past. I think that science shows that there's smarter ways to do them these days. Like you can you can come back and hit a related muscle. So you could do let's say biceps on one day and then come back two days later and do back realizing again synergy between the exercises there. And biceps are going to be stimulated again. So you could figure out ways to make that work. But the thing that I think is is effective there is that tends to be one of the ones that people like the most. Because they can go in to get their pump. They feel good. It's pretty solely focused on one muscle group. Is that the definition of a bros split one one. So it's very much geared towards strength and aesthetics really maximizing chest one day. Probably more aesthetics than strength. Yeah, you're just the bro. For the bro name. But again, like, you know, in here, I am a science guy and I could appreciate the benefits of a bros split, especially because again, like what to what end? Who's who's goal are we are we trying to achieve here? There is a or ours, you know, like I mean, if if I'm applying my standards and my goals or even like athletic ideals, but they just want to get in shape, then it's perfectly fine to do a to do a bros split in that instance if you're sticking to it again. And you're seeing the results that you want to see from it, but they're able to, you know, really keep their focus on one muscle they get to focus on, you know, like a lot of times people struggle with the way of an exercise feels until their second or third set, like they don't have that proper set of ability to kind of lock in on exercise. So spending a few not only sets in the same, you know, exercise, but then doing another exercise with same muscle group helps in the dial in a little bit better and get more out of their training. Yeah, that raises a really interesting. I think important question early on when I started resistance train, which was when I was 16 high school. I got in touch with and I was learning from Mike Menser. Mike Menser, right? And Mike was very helpful, very, very helpful. We got to be friendly. I was just read his book. I didn't get a chance to buy some gel. I'm sorry. I back then, no internet. I, you know, I paid by Western Union type thing to send him some money for the back of the American. And then he got on the phone with me and my mother at the time was like, why is this grown man calling the house and he gave me a very straightforward split, which was shoulders arms one day. He had to be taking two days off and then training legs and then two days off and then chest and back, etc. And that's a variation of a pro split to where you're sort of, you know, breaking them down that way, chest and back or chest and buys, you know, yeah, it worked very well for me. I probably would have because of my age, I think, and because it was the I was untrained. I think it, but largely untrained. I think it would have grown on on many different programs, but it worked very well for me. I eventually just just made that in every other day things. Shows arms day off legs day or two off because he hit legs right at least for me. I'm not training the next day. And then I'm not doing much of anything athletic the next day and chest back and repeat and so on. And the reason I found that helpful is I almost always recovered between workouts. And the the six day a week program of push pull legs push pull legs to me seems excruciating from two standpoints. One is at least with my recovery abilities or lack of recovery abilities. I can't imagine coming back feeling fresh. And the other one is if I if I'm in the gym more than four days a week, I really start to fatigue about the whole psychological experience of it. Whereas if I'm in there three or four days a week. In other words, if I put a day off in between each workout, I really want to be there and I get in there with with a lot of fire. And I'm also doing other things on the off days. So I think that I love that you mentioned the split that you'll stick to and that you can bring the intensity to because I think that that's really important. I sometimes hear about two a day training. I've done two a day training twice in my lifetime. Both times I got sick two days later. That's correlation not causation. But is there ever an instance where two a day weight training makes sense for the non drug assisted typical recovery ability person. I actually I think it makes sense in some scenarios, but it doesn't make sense practically for a lot of people's schedule. So like if you could break down, let's say you were going to do even a. You know, some version of a total body session or maybe like you're going to do an upper lower split right you can do an upper workout and do the anterior chain or the pushing portion of that. And one session and then come back and do the pulling session later on at night if you had the opportunity to the thing that you benefit from there is the freshness of focus again like something in my head sacrifice. But at the time you get towards the latter half of whatever workout you're in to the same point you may be for like when you start to approach that 50 minutes an hour. You are you are either losing focus you're losing energy you're losing contract liability you're losing something. And if you're relegating whatever it is the pulling portion of that to the end of that workout something suffer so that OK, and that if you realize that's happening that maybe you switch them up the next time you do the workout where the pulling portion of the upper work out goes first. And then the pushing goes later so you're at least not just continuing that cycle but at the same time if you were able to kind of split them up you got a chance to kind of take a break you can have that freshness of focus again and you can actually get a better effort and because again I think effort drives the results so if the effort is not compromised and you should be able to do that. But systemically is that problem and I think that it is a problem for a lot of people is just hard to hard to read the engine up a lot of times the day you know you warm that thing up once it's like that car in the winter you get it going once you're lucky OK now you got to drive at the rest of the day but you know it you put it in the garage and try to start the next day it's a problem so you know young people can get away with a lot more than older people could you know I've never had a strong recovery quotient but if I stick to this one day off in between. Every once in a while two days in a row training maybe because I have to travel and I want to make sure I get all the workouts in kind of thing I seem to be OK I like your example of warming up the car spoken like a true east coast east coast those of us from the west coast took a moment there but I know I we folks from the east coast of the Midwest get it and certainly from from Europe. In terms of the mixing up of cardio vascular training and resistance training same day different day which one should come first which one should come second if one main goals again everyone listening has different goals are most people like to either maintain or gain some muscle I don't know many people that want to lose muscle maintainer again some muscle usually in specific locations on their body. Most people like to be a bit leaner or a lot leaner there are a few people out there that are either naturally lean or don't want or actually just want to gain weight but assuming that people want to get leaner put on some muscle maintain muscle and want to have a healthy heart and a healthy brain which basically requires a healthy cardiovascular system how would you incorporate. Cardiovascular work into the overall weekly regimen. So again I think that the bare minimum is probably twice a week in terms of cardiovascular if you want to have some semblance of cardiovascular condition but I think most people who actually need it more or want to pursue it more than that are going to need more time to do that so. At some point it can't just be relegated to a day off or a day off from the weight training workouts so at some point it has to occur on the same day you know and in that case I just like to put it if that is you're not your primary goal but you're looking more for the just the overall picture you know the aesthetics you mentioned putting muscle on in certain areas then I would put it at the end of the workout because you don't want to anyway compromise the weight training workout and as we've sort of referenced a couple times already the intensity of those workouts is. And we know there's a strength component to those workouts also that is going to you know have to be a helpful stimulus for growth so the conditioning the cardio that stuff done prior to any training you know straight training workout is likely going to impair your ability to perform at your best so unless it's just done for a quick little warm up in the beginning but then it's not sustained long enough really to be a benefit for cardiovascular conditioning so I just like to you know put that at the end of the day. So I just like to put that at the end realizing that even if my effort level is lower my output is lower if it's still placing a demand on my cardiac output to get that conditioning effect because I'm fatigued it still hasn't demanded my cardiac output so it's still achieving its goal but it didn't interfere with my main goal of being able to increase my performance in the gym. And in terms of the form of cardiovascular training I've seen you do a number of have to say very impressive high intensity interval type work so burpee type work or push ups with you know with crunches mixed into them anyway people can see your videos to I didn't describe those in the best way but rather than on the treadmill or out jogging for 30 45 minutes is that because you prefer higher intensity higher heart rate type training or is it because you're not going to be able to do that. And you don't want to be out jogging on the roads in the middle of winter. I think all the above I mean those are factors you know from a personal level but I think that if if you are if we could blend function across these realms and not have such a delineation between this is my way training and this is my conditioning but figure out a way to blend them together I always think that you've got a better opportunity to get that more well. And I like to kind of mix up that straight conditioning work and also some of the footwork you know drills like we have we have some high expectations for guys that come into our programs like to just do some footwork drills like ladders like ladders or or lion drills or something and you know what happens people become intrigued and interested like I never I haven't tried this since high school you know and maybe come interested in just the challenge of it and as we become almost distracted by the challenge we're now like a lot of people are going to be able to do that. And we're now like finding ourselves conditioning you know and I always think that's an important part that sometimes you got to draw people in to get to show them what they might be interested in and from the output or the effect of it I just think that when you're able to blend some of some you still maintain some of that strength training into the exercise so as you mentioned let's say I'm doing some kind of a push up or a burp you I mean there is there is a little bit of a component to that that is going to be helpful that then rather than just walking or just jogging not just not to say that that isn't an effective means for strict cardiac conditioning it's one of the ways that we've had for you know centuries you know to do it but I just think that if we can blend it then it becomes maybe a little bit more interesting and you get some of those crossover benefits and it doesn't become so segmented in terms of what we're trying to do. I love the idea of bringing some mental challenge and some desire to improve a skill while conditioning that's not something that I've thought of before and it and it's simply because I've overlooked it but it makes sense because my sister who's reasonably fit although I'm always trying to get her to do a bit more she always asked me what should I take and I'm I believe are in supplements some for certain people in certain instances but I keep telling her you know it's the behaviors are going to and nutrition are going to have the greatest outsides positive effect and she loves things like I'm going to do it. I'm going to do things like dance classes and things that or kickboxing these kinds of things which so it makes sense that if you can hook somebody on the conditioning aspect or the skill aspect and kind of trick them into doing more cardio. So to speak that that's terrific. Also the neuroscientist in me just has to say forgive me that anytime you're engaging the you know the two sets of motor neurons ones in your brain the upper motorones and the ones in your spinal cord anytime you're engaging those upper motor neurons which are for deliberate well controlled action. You're doing a great thing for your brain in terms of brain longevity so I'm now I need to incorporate some actual skills into my training. Going back to weight training a bit one of the most important things I learned from you so over the years was that when training to increase muscle size to really think not so much about moving weights but more about challenging muscles. I also heard this from my friend Ben Pekolsky who's a very well accomplished he was a bodybuilder now he's into other aspects of fitness teaches fitness but don't move weights challenge muscles unless you're trying to power lift or something that sort which I'm not immensely helpful. But the other thing that I learned from you that combined with that was this idea that certain muscles will grow better and get stronger much more easily maybe even will recover better because of our ability to contract them. Really hard and this what I call the cavalier test which is. At least if I compare phrase the so for instance if I can. It's always the bicep isn't it let's use the let's use the calf or the bicep if you can if you can flex your bicep to the point where it hurts a little bit like it almost feels like a cramp or a cramp or you can flex your calf to the point where it really cramps up a little bit almost feels like it's nodding up that's a pretty good indication that you're going to be able to stimulate that muscle well under load. If you're doing the movement properly and that's the feeling to actually aim for each repetition maybe even throughout the repetition. For me this completely transformed my results this was I think maybe five six years ago that I first heard this from you body parts that for me lagged behind that I thought maybe genetically weren't going to work for me immediately just started. Growing right and I was getting stronger and stronger and I thought this is really something so much so that I've dedicated a portion of my research along with in collaboration with another group to try and understand what's happening in these upper motor runs in the brain that can engage the muscles even more and that it's not just about progressive overload or putting a pump into the muscle. So that it's really this mind muscle connection is a real thing when it comes to predicting results and that you can get better at it. So forgive me for paraphrasing your incredible content around this made a tremendous difference for me and a number of other people that I passed that along too. But what can you first of all how did you arrive at that because we hear about the mind muscle connection but I really heard it first from you how did you arrive at this kind of cramp test the Cavalier test as I'll call it. It's always weird when people name things after themselves and science but other scientists can say so there is now officially the Cavalier test is whether or not you can cramp the muscle in the absence of load just flexing it to the point where it hurts a little bit that would be it and in a good indication that you could grow that muscle well. How did you come up with this? I mean it just it honestly is something that that made sense to me because during my workouts even as a as a young kid just starting out like I always wanted to know what is it working you know a lot of people ask that question more something you think like what is this supposed to work and a lot and I don't know if you've ever noticed but like when people ask that question if they're if they're being trained by a trainer and the trainer saying well just do this do this exercise and they'll show you how to do it but then they'll say but what is it supposed to work where am I supposed to feel this right people did it just inherently ask that question a lot of people will I was one of those that did that and I asked that question not because I knew what I was doing but just because I don't know I wanted to know what was supposed to be doing the work once you do that and you start to seek that out and say okay well the bicep is what's supposed to be doing the work then I want to make sure the biceps doing the work right so then I would just sort of really like tweak the movement to make it do more work or feel more uncomfortable or get a stronger contraction knowing if that's supposed to do the job it wasn't until PT school that I'm you know learning oh well you know flexion of the elbow is the break the alice and the bias is the bias responsible for supination like you sort of I learned other components of it but all I wanted to know was to bring my arm up in a curl what is supposed to do the job so I would seek out ways to make that happen better and when I was able to do that I could feel the stronger contraction and I just I don't know what I just I was no visionary I just felt like I I knew that that was going to be better for me if the muscle I was trying to grow was being stressed more effectively so when I was attempting to do this across different exercises I would notice that what I could do potentially on a curl with my arm is up you know where you asked me to flex my bicep that position I couldn't do if I was you know doing a concentration curl or I couldn't carry over to a cable curl and that shouldn't really change right because the function is still largely the same there's still elbow flexion there's still supination like why am I not able to do it there and that's when it sort of clued into me that like you're my muscle connection on not just you're mind with one muscle but on every exercise matters and it varies from exercise to exercise and even if you don't gain muscle size from doing that although I think it's very hard not to especially for you not used to doing that there there's a term I like to call muscularity you know which is a difference right it's the level of sort of resting tone in the muscle that improves dramatically you know if you can learn how to just start to engage that muscle better the muscularity the resting tone of that muscle is harder it's more it's more at attention it's just more it's more alive you know and it's all driven from being able to connect better neurologically with the muscle that you that you're trying to train I've talked about a lot inefficiency is really what you're trying to seek in movements when you're trying to create hypertrophy when go when strength is your goal efficiency of the movement is what you're looking for you're looking to have muscles tied together and work well efficiently the chest the shoulders the triceps to get a bar off of your chest during the bench press you're not looking to make it a very inefficient you know leverages for your chest to try to grow your chest in the chest press you're trying to let the whole package come together for a greater output but when you're trying to go and create muscle hypertrophy or even this muscular that talk about you need to seek ways to make it feel more uncomfortable right if you don't feel the discomfort then you're doing something wrong and I struggle to this day on certain muscle groups to still do that even knowing what I'm trying to work and knowing with the goal of everything I'm preaching here it's very difficult for some muscles and for certain people to do this on certain muscles but as you mentioned practice does help and the more you become you know consistent and deliberate with what you're trying to do the more of a result you actually get it's a couple of really poor boys I'd like to to delve into further first of all my hunch was always that the muscle groups that grew easily most easily and that I could contract hardest without any the first time I did the Cavalier test got 10 out of 10 we give it a 10 out of 10 scale you know it could just like cinch isolate those muscles cinch them grow them easily I mean there's certain why parts I want to say which ones because it doesn't really matter that I always felt like if I just did push ups they would grow and these muscles are far away from any of the muscles that are supposed to be involved in push ups even though I like the thing I'm doing push ups correctly you'll tell me if I'm not but some of that I think is genetic and some of that has to do with the sports that I played when I was younger so I swam I played soccer I skateboard and then later I boxed and so the muscles involved in those sports were always very easy to engage later when I went into the gym so I guess a perhaps a call to parents you know having kids do a lot of dynamic activity seems like it might be a good idea the other thing is this issue of muscularity I am so glad you brought that up there are and I have to imagine a large number of listeners who don't want to get bigger they don't want to take up a larger clothing size they don't want to take up more space in fact some of them would like to take up less space but they want that quality that you're describing which is that you know oftentimes you hear more in the here I'm stereotyping a bit but with kindness you know you hear from women who have a certain weight train they say I don't want to get big often sometimes they do but the most most women that I've helped weight train we're talked about weight train say I don't want to get there I only get tone right and I think what they're referring to is this quality of muscularity this idea that at at resting or at close to rest or anytime someone reaches out and grabs a glass that the muscles almost look like they're kind of twitching underneath the skin and yet it's not saran wrap skin anatomy chart type skin so this thing of muscularity or or resting tone you know has a physiological basis I think it's how readily the nerves are communicating with the muscles and you're saying that by learning to engage the muscles more actively the resting tone or muscularity can improve have you seen that both in men and women yeah oh yeah and and do you think this is something that takes upkeep maintenance or that you don't once you develop that in a muscle you can just kind of let it coast so I think like everything it requires upkeep you know user lose it I do believe firmly but like I think that it's the development of the connections can be harder than the maintenance of the connection as I said I still struggle to stay for myself with you know unnamed muscle groups you know also you know but like you know there's just there's there's just certain areas that are harder for your whatever reason to just develop that that connection at that type of level to create create that extra strong contraction but I think that it with proper dedication focus and I'll go right out and say you know calves is one of the areas that I don't I don't necessarily have a great connection with and I also obviously must not care so much because I don't put in the time and effort to create create that connection as I could so I think what might happen is you know yeah there could be a struggle there but then with with struggle comes this interest can you like well screw it on the I'm a calf not I'm not going to do anything about it you know so I think if you put the required effort in the time and repetitions that you will develop that and once you do develop it it's going to stick around a lot longer than it would had you not invested any time into it at all you know not requiring as much of that but I mean I I don't know like you know you mentioned now when you train it's like you're you're just this is part of how you train now like you're going hard you're trying to you know really forcefully contract you're not just moving the weight I say from point A to point B but you're like trying to contract the weight through that range that is a mindset that I try to put into what everything I'm doing unless of course I'm focused on a strength exercise where I'm just trying to lift a greater amount and use all the muscles together but when the goal is in efficiency for hypertrophy I am really trying to create that contraction and it's just part of my training so I guess that you know that for consistency sake as long as I'm training is happening you know is if I get away from training that's not happening at all but you know even there I probably another embarrassing admission probably will you know will mindfully do it throughout the day even with no weight in my hand you know in certain muscle groups whether my abs or my arm or my shoulders or something I'm doing something just to sort of engage the muscles and I do think that some of that sort of a name practice actually helps by the time you go back into the gym you just kind of keep that you keep that that connection going well it certainly obeys all the rules of neuroplasticity you know the the fire together wire together mantra which is the word to my colleague Carla Shatz hold true for all aspects of neural function including nerve to muscle so these flexing throughout the day or the the deliberate isolation of contracting a muscle throughout the day is without question engaging neuroplasticity and if you were to do fewer of those repetitions you're going to get less engagement of the nerve to muscle connection I can say this with with with a smile and with confidence because one of the first things all neuroscience students learn is about the neuromuscular junction because it's a it's a really simple example of where the more times the nerve fires and gets the muscle to contract the stronger that connection get receptors are brought there et cetera et cetera there's a whole bunch of mechanisms for the topic of another podcast but basically that practice throughout the day is makes total sense and works. And there's no there believe me there's no science behind that in terms of you know the application of it you do it when you catch yourself doing it you know time to time you know but it is definitely something that's easily done discreetly and you know you wind up doing I actually I think in a recent video when I I did talk about growing your arms by just improving you know improving the connection not that that connection itself is applying any load or you know resistance that significant to create overload for growth but it's the development of that connection that I then take back with me into the gym at a more effective level that takes every exercise I do there and makes it that's a sharpening the blade yeah so to speak yeah certainly obeys the laws of of nerve to muscle physiology one to just touch on a couple of things if the goal is to challenge muscles and one is dividing their body into let's say you know three or four day a week split or so or maybe up to six how do you know when a muscle is ready to be challenged again I've heard okay every 48 hours is you know protein synthesis increases and then we'll get into this and then it drops off but frankly if I train my legs hard I can get stronger from workout to workout or at least better in some way workout to work out leg workout to leg workout training them once every five to eight days if I train them more often I get worse so that whatever that 48 hour to 72 hour thing is somehow my legs don't obey that but you know or maybe something else is wrong with me but I'm sure there are many things else wrong with me but how do you assess recovery at the local level meaning at the level of the muscles so we'll talk about soreness and getting better stronger or more repetitions etc and then the systemic level the level of the nervous system and I'd love for you to tell us about the the tool that again I learned from you which is actually using a physical scale because it turns out this is that it will let you tell what the tool is but that tool is also actively being used for assessing cognitive decline and cognitive maintenance and cognitive function in people with Alzheimer's and and then it makes a total sense makes total sense I I so regarding the the the first part of the question like you know how do you how would you kind of dictate when a muscles recovered so I do think that what you're experiencing is totally real that different muscles recover at different rates and I've always been so fascinated by this concept I've talked about internally with my team but like I feel like what we really need the holy grail to to training is going to be when we're able to crack the code on an individual basis when a muscle is recovered and that is going to dictate its training schedule and the fact that you might have a bicep that could be trained via via pulling workout or regular bicep that a care workout forget the split at the moment you may have a bicep that's be able to be trained that can be trained again the next day you know and then the next day and then maybe you need a day off after that but like you know in that that can vary from person to person for sure and it can vary from muscle to muscle in that person over the course of time as you mentioned because the systemic recovery is going to impact all those muscles anyway but let's say you're systemically recovering every muscle itself is going to have a recovery rate and I think what's fascinating is that when you talked about before we like to train in this week or we have like the way our mind looks at training well if that was the case with the biceps that bicep is a slave to the rest of your training split you know where it's like well why does it have to be also at the end of every eighth day or you know or whatever when it might be spawn better to something much more frequently and your legs are also being thrown into that mix is a Mike Menser concept where he's like you know training you know one set and be done for 14 days I mean you know there's there's there's such variability between muscle groups and you're you're linking them all together I think that coming back and using muscle soreness as a guideline for that is is one of the only tools we have in terms of the local level you know we don't really have you know being able to measure let's say cpk levels inside of a muscle would be amazing you know at a local level to see how how recovered that muscle is but that becomes fairly invasive at least to my knowledge becomes fairly invasive so what are our tools I mean I think that at the basic level that's the one that most people can relate to and easily identify and then use that as a guideline if you're training when you're really sore it's probably not a great idea and it's probably a good indication that that muscle is not recovered but at least hearing what you and I are saying here might be a comfort to the person to say yeah it is possible that is not recovered just because 48 hours is the recommendation and just because research points to muscle protein synthesis needing a restimulation well maybe not maybe you're not necessarily there yet you're in that and for that muscle you're not there yet so it's all really interesting stuff but as far as the the systemic recovery I think there's a lot of ways you know people talk about resting heart rate measured in the morning all different kinds of you know court temperature and things like that that might become altered in a state of non recovery but grip strength is very very much tied to performance and recovery and when I was at the meds we used to actually take grip strength measurements as a baseline in spring training all the time now obviously the baseball player you're gripping a bat you picture you're gripping a ball like you know having good grip strength is important so if we've noticed we had a very weak grip it's just a good focal point of a specialized training component for the from this every day with those guys now we do in spring training we do sort of a baseline entry level measurement and then we would we would measure it throughout the season maybe once every two weeks or three weeks and and you know the idea there was to to manage you know manage a recover measure the recovery. I just gave away you know there to do the you know to determine overall recovery your grip strength is pretty highly correlated so we have found that well with one of those scales those old fashion bathroom scales at like a that bath and beyond or wherever you can get which by the way almost impossible I believe just in our searching for the last scale to put in that video and we almost couldn't find one because everything is like digital and everything you know this I'm looking at the old fashioned dial controls it's like old Mac and Toshba there's a huge market for them and old phones I had to keep your phones now in 30 years the lane phone now where the lot of you know I wound up finding one and it's a great tool for just squeezing the the the scale with your hands and seeing what type of output you can get. I think we all can relate to this when you just visualize imagine the last time you were sick or that were you or just try this the next time you wake up in the morning when you first wake up in the morning you're still groggy try to squeeze your hand try to make a fist as hard as you can you get set there angry at your fist because it won't contract as hard as you know it can you don't have the ability to just create the output and that is because in that state you're still sleepy you're still fatigued you know you're you're not even awake at the you know the the whole level at this point well that is the that is still an actual phenomenon that happens that you know a lack of recovery or lack of wakefulness or whatever you want to say is is going to lead to a decreased output there so when you start to measure that on a daily basis you can get a pretty good sense of where you're at and I think when people start to see a drop off of 10% or so or even greater of their grip output you really should skip the gym that day because I don't think there's much you're going to do there that's going to be that that beneficial even if it is the day to train legs or whatever day it is. I love this tool it's simple it's low cost if you can find such a scale I guess you could also find one of those grippers that and you do this in a very non quantitative way but better would be a scale where you could actually measure how hard you can squeeze this thing at a given time of day it draws to mind just a little neuroscience factor in the world of circadian neurobiology one of the consistent findings is that in the middle of your night time you know the weight people up and they'll say do this test in the laboratory they use a different apparatus was essentially the same thing and in the middle of the night grip strength is very very low and you know mid morning grip strength is high and as the body temperature goes up into the afternoon grip strength goes higher and higher and higher and then drops off there's a circadian rhythm and grip temperature so you probably want to do this more less the same time each day you can use it but I think it's brilliant and in its simplicity and its directness to these upper mode of neurons because that's really what it's assessing your ability again it's about the ability to contract the muscles hard if you can't do that you're not going to get an effective work. Yeah they also I mean they're certainly are more sophisticated tools to as a PT that we have a hand grip dynamometers and we can we can measure one side at a time to you I'm not really I'm getting a little bit blinded by the fact that both hands are squeezing into that scale and I don't get really a left right comparison but even at that level that could give you a little bit more detail but that comes from the outside of pretty expensive devices but if it's listen if you were an athlete you know the the 200 300 bucks it cost to have one of those would be well worth you know the added investment well and I'm sure some of our listeners will want one too because there are a lot of tech geeks out there not tech industry geeks but people like like tech gear what's it called again as a hand grip dynamometer grip gun and that said I said by Jeff with the with the great East Coast action by me in a terrible botched at West Coast version thank you will we'll put that in the show notes also. I think recovery is key we always hear about sleep grow when you sleep and incidentally your brain you stimulate learning when you're awake obviously but the reordering of neural connections happens in sleep this is why sleep is the way to get smarter provided you're also doing the learning part the way to get stronger fight you're also doing the training part you've got some really and you've put out interesting content over the years in terms of even sleep position one of the major changes that I made to my sleep behavior is to not have the sheets tucked in at the end of the day and I'll tell you this had a profound impact on several things first of all my feet have always been the existence broke them a bunch skateboarding they and I noticed when I'd run I'd get shin splint and and then I started to notice that my feet sort of you're the PT they're kind of floppy and the you know as if I was pointing my toes slightly all the time at rest if I was and I realized that based on listening to you previously that my sheets were wrapped tight not hotel tight right right right thing in the hotel's get a feed in and I started releasing the sheets at the end of the bed yeah and I also started doing some tibialis work yeah front of shins work essentially changed everything my back pain from running my shins once disappeared my posture improved although I my audience will tell me that it still needs improvement there always five or 10 people that wants it up straight I've actually had chairs sent our mailing address very nice chairs right so I'm trying my I'm trying there but this is fascinating right on the position that one sleeps in I fortunately have never had a shoulder issues knock on wood but maybe could just talk talk to us a little bit about sleep and sleep position for sake of waking position in movement is this I think is a very unique and very powerful way to think about sleep this podcast has done a lot of episodes about keeping the room cool getting sunlight in your eyes it's how to get into sleep but you talked about physically what positions might be better to sleep in so please please in riches yeah I mean first of all that you know some people's opinions of of that type of content is that you know you sleep in the cut the position that's most comfortable so you ensure that you're sleeping great I understand that we all want to sleep that's the goal we put our head on the pillow is to actually fall asleep and wake up in the morning and not know what that'll happen unless you had a dream but you know beyond that there are certainly physical components to sleep that that is why a lot of times people wake up and say like that you can incur pretty serious injuries and sleep people wake up and have like a shoulder that did not bother them at all be humming the next day or even for weeks after because of the one sleep position they put themselves in a prolonged way and they happen to have a deep sleep even through the discomfort that can do actually some some some damage so it's understandable that the body can incur some strain and stress if you're sleeping in the wrong way one of the things I say right off the bad is sleeping on your stomach does doesn't really have many benefits you know you're you're putting yourself into a position that is depending upon the orientation of your mattress or how many pillows you're using but you're basically putting yourselves into excessive extension a lumbar spine which for most people isn't very good if you're if you're a disc patient I guess that might be helpful you know for for relocating the disc but I mean for the most part your hands are then usually not at your sides but they're up under your arm so you've got them into sort of in term rotation up over elevation your head it's just not a great position you also have to crank your neck for one side of the other in order to breathe or you're going to be your face down straight into the pillow so I would skip that one there's some people that are total belly sleepers and I and I would just say listen I don't think that is the most healthful long term way for you to sleep try to adopt a different position sleeping on your side oftentimes is is also brought along with that the legs needs coming up towards the chest prolonged hip flexion listen we're doing enough of that during the day we don't need to do it right now we don't need to do it like 10 hours or 8 hours or something at night like that you know and it just is reinforcing you know and as we said to you you know let's say you trained that day you're just reinforcing muscle shortening overnight you know where the body is healing and trying to create some you know changes in your body one of the reasons why I recommend stretching or static stretching prior to going to bed let people don't really want to do it at that point because it could take 10 minutes five 10 minutes depending upon how many muscles you have to stretch but you know it's good to sort of try to establish this longer length temporarily prior to going into a state where you're going to be not moving and recovering and creating new changes in the muscles so you know that kind of I don't say it doesn't rule out the side sleep or the side sleeper could be very very helpful for somebody that has apnea or you know other other conditions so again it's not at all or nothing approach but it just it's something that you need to pay attention to when you are on your back like you were in your feet are wedged underneath a tight sheets at the end of the bed and most of us unless we consciously are pulling them up don't prefer our beds to have really loose sheets at the end of the bed harder make the bed in the morning right so it's like you you you're going to want to have you know them tight well I'm saying as you experienced you know you're going to have these these you know prolonged planar flexion that's going to likely lead to shorter you know calves over time because you're lacking all that length for that long period of time that you could have if you just loosened up the sheets and allowed your feet to just you know hang out where they are now the resting position of the ankle is not endorse the flexion is going to be still in some planar flexion but not being driven down and pulled down into that position and I think what happens actually is people who get uncomfortable that way even in their sleep will shift away from that by turning either onto their side of the stomach so there's definitely an impact of the body position in sleep and figuring out the best way that you can still sleep of course and get your rest but have a mindful eye towards what is doing to your body and choose the one that's least you know abrasive to your body is the way you should go. It's terrific and again it's really helped me and I'm a big believer based on good science out of Stanford and elsewhere that you know as much as we can be nasal breathers in sleep we probably should be I don't know if you've done any content yet about you're taping the mouth shut with some medical tape but you know that the the benefits of nasal breathing and sleep are pretty tremendous but it takes a little bit of training what people do and the training is very simple it's a little piece of medical tape so again a topic for another time I'm glad you mentioned stretching I was going to ask about stretching a little bit later but let's talk about stretching when's the best time to stretch for particular types of results and maybe you could define some of the different types of stretching so you just mention a little bit of what you call light stretching or okay I'm completely naive here on stretching so let me just say I can think of stretching where I hold the stretch and really trying to make lengthen in air quotes folks I don't want the PT's jumping all over I don't know what it is but nutrition and the PT's online are really they've got pitch forks in both hands that's a recent that's a recent evolution I think for sure and not the nutrition as much but the PT's have become a little bit angry these days I see well I always say with feelings of powerlessness comes aggression remember that folks so in any in any case they're stretching where I'm trying to consciously lengthen again in air quotes the muscle I'm not yanking on the limb or bobbing up and down maybe you could define the different types of stretching for people maybe give us some rough guidelines about whether or not to do it cold or warm before training after training etc so yeah there's obviously there's a lot of different types of stretching they could get even to you know PNF stretching and things that are a little bit more you know niche but like in general the two basic form of stretching are active stretching and passive stretching and your you know your dynamic work and your passive stretching is done with the goal of trying to create an increase in the flexibility of the muscle so whether you're actually increasing the length of that muscle well you know more so what you're doing is increase in the resistance or decrease in the resistance of that muscle to want to stay at a certain level of flexibility so when we can sort of take the breaks off and allow that muscle to allow us more range of motion we're inherently increasing flexibility without necessarily having to increase the length of that muscle that is usually done at a time far away from your workout because they have shown where this type of stretching done prior to an activity and it could be like a structured activity like like lifting or it could be a little bit less structured like competing in a sport in a spontaneous type way that there is a period of recalibration that is needed after doing this because you're disrupting the length and relationship of the muscle that causes you to not necessarily be able to rely on these I've talked about before stored motor angrioms in your mind in terms of this is the pattern for how I swing a golf club say you know and now introducing a little bit of flexibility or added flexibility or range because of the stretching I did before it takes maybe a whole or two or three to match up again oh this is the this is what he's trying to do that golf swing thing I remember it again like it's not remembering that every component like I have to bend my right wrist back 10 degrees and then I have to bend my elbow and I have to break like your body stores these patterns for motor efficiency so and when I have to start matching up that stored pattern with what's feeling new because of the increased range I can impair performance and again it could happen even a gym workout where you're talking about your first second set third set where maybe the repercussions aren't as big because I'll just do a few extra sets but in performance if you screw up your first three rounds you play on a tour and you shoot you know you're six over after three or you're done you know so I think it matters there as far as the dynamic you know so we so we relegate that as I mentioned sort of towards the end of the day when it's not going to impact performance but even maybe have the additional benefit of creating the the feeling of length or the increase or decrease in resistance to this length at a time when I know my body is going to try to tend to heal and heal shorter never longer but heal shorter so if I can introduce a little bit of that extra length or or decreased resistance to that length it's a better time to do it so I think it promotes a better recovery if I want to start to interrupt stretching later in the day because I'm intrigued by this concept of heal shorter so part of the healing and recovery process means a shortening of the muscles this is the tensing up and sleep could you elaborate just a bit on that and then sorry to break your flow but then just basically you know what's been shown is that when when the repair process muscular repair from let's say strength training during the day the repair process usually results in a muscle that is slightly shorter rather than increased in length you know it's just it's you know muscles prefer to sort of you know ratchet their way down into that that contraction and then you know maintain that that that more comfortable length tension relationship so when you're sleeping it tends to you know air on the side of shorter rather than longer when ideally we don't really want that we want to maintain is much of that length because with more length we actually have more leverage right that muscle has more leverage to contract if it was all the way contracted you know you really can't obviously we know generate much force in a muscle that's already maximally contracted so I think we we want to do something that we whatever we can whatever little weapons we have in our arsenal that could allow us to do this prior to sleep and again it's just making a conscious choice to do it at a time of the day that makes a little bit more sense dynamic stretching is really not done for that purpose of trying to create any type of of feeling of act or increasing the potential length as you said of the muscle but more so the readiness of the muscle to perform and increasing you know exploring the ends of that range of motion in a more dynamic way so you're not hanging out there and disrupting that length tension relationship was just sort of touching the ends of those barriers so that when you feel movement again it feels looser it feels more ready and obviously the same time warming up blood flow all the benefits we get from just warming up in general so like you know that's that's the series you've probably seen a bunch of times but like you know leg swings and you know butt kicks and you know lunge walking lunges and all type of touches toe touches all those kind of drills those active stretching drills or you know lunging with rotations of the upper body to try to get some of the thoracic spine involved to those are the drills that people will do prior to training that are both excitatory in terms of just the nervous system but also helpful for just the general warm up the body because the blood flow but from a muscle ready in this standpoint not impairing the performance while at the same time exploring the increased ranges because as you know the first toe touch you do is not as high as the last toe touch you do for me it doesn't even glue the toe right the shin touch the touch attempt right so like you know those those are going to improve with each subsequent rep and some people actually like you when you can see those those actual changes from rep one to rep seven you just feel ready you feel more alert and ready to go on your workout so the dynamic type of stretching and I mentioned earlier on you know like what I've had to do to sort of increase my warm up focus you know I think that's more of what I try to do these days I try to be a little bit more alert to the fact that you know body is not ready when I was when Antonio Brown I remember like he would spend 20 minutes 30 minutes on all dynamic work and I've never seen anybody spend that long on their dynamic work but like he said he just didn't feel right and ready to go unless he did a lot of that and I mean you know his his dynamic stretching routine would be a workout for most everybody you know it's crazy how much he did these pro athletes are amazing and you've had the great fortune of working with and improving their their abilities but I can only imagine because I also imagine he's pretty strong in the gym also. I mean you know it's always it always amazes me the guys that make it to that level no matter what sport they do they're so gifted in everything you know like David Wright used to make me laugh all the time with the meds because no matter what I ping pong you know like anything he because of his hand I coordination like anything you know great at jump rope I remember he hadn't done a lot of jump rope and I think jump rope is one of the best things you could do from a conditioning standpoint it's actually fairly interesting it's not just you know it's not too harsh on the joints depending you know even though it's a ballistic move and he wasn't I have to admit I you know if you listen to this he's going to want to kill me but I was better at him than jump rope when the only things I could do and then I gave him about five days and he completely blew me out of the corner I could never keep up with him anymore he made it look effortless it's like that's the where the athlete in someone comes out no matter what they pick up they're good at it and I think that when you see guys like this in the gym like their strength levels tend to be pretty damn good and their and their abilities their coordination they're they're everything just tends to sort of be good at that level you know and it's sort of amazing why those guys can go pick up a golf club you know and go shoot 72 you know and and having never really played you they're just they're just naturally good at whatever they do yeah I have a couple I'm smiling because I've a couple really close friends who did a number of years some several decades in the SEAL teams and I don't know that their skill level at everything is so high as you're describing for athletes but their level of competitiveness is beyond I ocean swam with one there's no chance that I'm gonna you know out swim Pat ever ever he actually goes back and forth sometimes just to check out on me which I appreciate thank you Pat I'm in the round yet but the but in addition to that you know we could play horseshoes and it's like this switch that just clips on like he's gonna murder a very nice guy right in general they tend to be very nice but but the level of competitiveness well they're they're fun real they're trying to beat themselves and I'm trying to beat you that's right I'm not even in the competition you're not even there yeah exactly no thank you no it feels bad or worse it's true it's it's a remarkable thing I'm glad you mentioned jump roping I used to skip rope for warm up for boxing yeah yeah it was three three three-minute rounds or something like that but I I'm glad you brought it up because skipping rope is something that obviously has a cardiovascular component there's the conditioning component there's timing and and it is kind of interesting right you can it's frustrating when you don't get it especially a whipsy on the air if you're using proper rope I'm just curious if you could just give us a quick skipping rope one-on-one do you like to see people jumping with both feet and toes we'll we'll link to a video of if there was one and I missed it do you like to see people doing high knees you like people basically like shuffling you want to see people doing double dutch what do you want to see people doing over time all of the above maybe not double dutch but all all the above I mean I think that that's the cool thing about it right like once we sort of master the skill because for all of us that first jump with the two feet going together is a challenge because you just got time that rope you got time your jump and then we get bored as we often do as humans we get bored with what we can do and want to take on new challenges so then it becomes one leg at a time where then it becomes side to side hops right and all of those things are beneficial I believe neurologically to enhancing the ability to do the skill as a whole but also just because I'm such a believer in training and all three planes so like just doing straight up and down versus now I can do frontal plane side to side motion and then I can even do small little twists or corkscrews you call them it requires a different you would know more about it better than I do they requires different neurological patterns to be able to coordinate that because you're changing the orientation of your body in space so it's not just that I'm changing the exercise but I'm changing how my body interprets that exercise because what's happened into my body in space so I I love you know whatever people wind up doing but I am amazed there are people I just started following this young woman on Instagram who is like I'll give her a plug out I think it's like anuskips or something and she is ridiculous like I watch her and I'm like mesmerized at what she can do with the rope you know it's like it's an extremely athletic endeavor believe when it gets to be at that level in the speed in the precision in the you know in and you know I think one of the goals that you want to be able to have is to where you're feeling as if you're almost effortlessly dancing without a rope like where you're just bouncing off of the ball of your foot and it's an important skill to learn too whether you go back to run or you know or even even jog right just like you know more casual running learning how to land is so important one of the drills that people should try is like try to jump on your heels so just stand up pull your toes off the ground right and just jump from your heels and land on your heels you'll feel it in your jaw you'll literally feel your jaw rattle when you land on your heels there is no shock absorption capabilities through your heels meantime a lot of people land on their heels a lot when they when they run and you're just your body is not built to absorb the forces like the ball of your foot could it's really built as a spring and the in the foot is up to me as a physical therapist the foot has always been one of the most made you know you talk about having bad feet I have flat feet it looks like I got flippers if I took my if I took my shoes off like I like love when wearing scuba fins there is no there is no adaptability of that foot to the surface you know when you when it's completely cave then flatten like that the job of this of the foot is to be adaptable well there is maybe there is some adaptability because it's so floppy but at the same time at some point that critical junction when you're going to then step through and you need to be able to push off the foot has to actually changes in the mid foot itself to become a rigid lever as they call it you're you're going from a mobile adapter to a rigid lever that rigid lever literally locks up the mid-tarsle joint to become solid so that you can push off of it with leverage if you lack that capability all those stresses that are supposed to be born by the foot go up into the ankle into the knee into the hip into the low back so learning how to land and start to train your your body to to experience ground reaction forces the right way is so critical to all other function and all their disability of the can I chain and jumping rope is like one of the best ways to learn how to do that great I I own a jump rope I love doing it in the morning while I get sunlight in my eyes it's actually a protocol I picked up from Tim Ferris who mentioned because you know listeners of my podcast you know I'm like a broken record with get sunlight in your eyes even through cloud cover it's just sets your sleep rhythms and your waking rhythms the yada on and on but sometimes they be kind of boring for people and I want to get them off their phone so jumping rope is also just a great way to wake up so jumping rope can be a the cardio workout the 15 or 30 minutes definitely I mean there's sort of that hybrid that we're talking about before of like no you're not you're not necessarily dropping down on the ground and doing burpees but I just look at it as a more athletic endeavor because of the coordination involved then just simply walking or jogging yeah and you it's not much of a equipment requirement very minimal cost you could even use a rope or or something if you although we we even instruct people that he used no rope and just pretend you know and just move the arms right and just really zero cost you're never going to hit the rope which is good but you know at the same time so you're never going to know if you're doing it wrong but at least you can you can move through the and get the same benefits through the feet I love it I love it I told myself before sitting down with you today that I wasn't going to focus on specific exercises because there's such a wealth of incredible content that you put out there that people could just put into YouTube or elsewhere and arrive at the proper way to do a chin or a dip or for whatever purpose but there's one exercise in one particular motion that I'd like to discuss for a moment because I believe that learning about this cautionary note from you is one of the reasons that I've maintained steady training for 30 years with no major injury knock on wood and that's the upright row you know one thing that whether or not be weight trainer or not I'm sure this podcast and in a sense we beat this out or no are you do you get beef about that night you know what I we always get beef and any social media platform wherever put out but like now I guess I get some from it but I'm I'm I'm fully prepared to defend myself so the but here here's the reason for asking about this I never really cared much for upright rows it's not an exercise I tend to do but one thing that's apparent in all my colleagues in every child I see and every adult I see is that almost everybody is an inward rotation now so folks think if you stay I think I learned this from you also if you stand up straight and then you just point your thumbs out like a like a thumbs up but you're just point your hands are down you're point your thumbs straight out ideally they would go straight out yeah most people the thumbs are going to be pointing toward one another because most people are starting to look somewhere between a a non-human primate and a melted candle yeah you know bent at the hips etc from too much sitting we're all sitting we're an inward rotation but I learned from you that the upright road compromises some important aspects of our shoulder mechanics and can be actually sort of a dangerous movement in some ways I'm sure there's a safe way for people to do it but so I've always made it a point now on the basis of this advice to a not do upright rows but I wasn't doing them before but to really strive for external rotation on things like bench dips on on a number of different things whenever I can I try and go into external rotation and provide that you know without looking like an idiot walking out with my palms facing outward please tell us about internal external rotation the upright row is one aspect of that but why this is so important not just for weight training but as it terms of posture and mechanics and not looking like a melted candle or partially melted candle um I actually love it I I I'm happy to talk about it because I love I love the shoulder as a joint I think PT's tend to fall in love with certain areas and the shoulders one of the cool areas for me it's like the foot is but like the shoulder has the most mobility in the body of any of any joint but it's also got the least stability right there's always that tradeoff of mobility and stability so your stability comes from you know certain muscle groups and one of the ones that the only muscle group that actually externally rotates the shoulder is going to be the rotator cuff okay and unless you're devoted to training through external rotation and exercises that are going to externally rotate the shoulder you're not training that function and it's so easy for us in everyday life especially those that aren't training to not ever really undergo any of those stresses that could be beneficial to counteracting what happens freely and naturally which is internal rotation so when you think about the imbalance created just by nature and how we live our lives internal rotation far far far outweighs external rotation so you need to address it and the reason why you need to address it is because you need to normalize those biomechanics as a shoulder if you want their long-term health and one of the functions of the shoulder is to raise our arm up over our head and with we do that from an internally rotated position we're going to have a higher likelihood of creating stress inside that joint funny thing is I talked about before my PT brethren can be somewhat angry these days I don't know what happened but fairly angry you know they want to they want to discredit the existence of something like shoulder impingement which I don't know how I mean certain study look at we both we all read studies and we we studies will say one thing one day potentially conflict entirely in a different direction some studies will point to the non-existence of a of a of a shoulder impingement meanwhile we have thankfully digital motion x-rays that will literally show the impingement occur in real time in real function and that's one of the limitations I'm off on a tangent here but like those types of x-rays are that type of floraoscopy that we have nowadays like gives us such insight that we never have before because we're taking static x-rays or someone laying down on a table you know when I want to see what happens when he actually raised my arm up over my head in function and they in the tools now exist to do that we see that the problems occurring because in order to get normal mechanics and free up the joint maximally inside you need to externally rotate as you raise the arm up so if your muscles aren't firing and they're not necessarily as strong as the internal rotation bias that pulls them in you're asking for trouble every time you do that well this exercise is literally putting you in elevation in internal rotation and if you were to walk into a PT office and someone said I think he's got impingement will you diagnose him there's a test called the Hawkins Kennedy test and I would put you in the position I know we're not visible at this point through the podcast but I'll put you in this position here where I have your arm elevated and your hand pretty much under your chin pushing downward on that to create that internal shoulder rotation pretty much the exact position that we're in when we're holding a bar in an upright row some will say we'll just don't go so high go only up to the level of the chest but you're still in this internally rotated position the the thing that I think frustrates me the most about the exercise is that I have an alternative and the alternative does the same thing in terms of helping the muscles grow by simply fixing the biomechanics to the exercise but just allowing the hands to go higher than the elbows so instead of the elbows being higher than the hand which drives you into the internal rotation if the elbow is lower than the hand the hand being higher here I'm an external rotation and I could do something called a high pull and still get the same abduction of the arm and still get the same benefits of the shoulders the delts and the traps without having to undergo any of the stresses that would come from the somewhat awkward movement of an upright row and for those listening we'll put a link to a short clip of what this looks like but basically what Jeff is doing and tell me if I'm describing this incorrectly or correctly Jeff is taking your two thumbs and pointing behind you and you know so elbows up kind of near the chin and pointing behind you like go ahead of that way like somebody directing the airplane like come back come back come back yeah I forget what they call that I think it's called semaphore and is the action of like where they direct the planes or something the flags or whatever someone of course tell me I'm wrong about that too which is why I say these things because I like I like being told what the correct answer is in any case so this replaces the upright row and it probably does a number of other important things as well yeah well again I listen I when I without naming names or programs or anything that when I got involved and when I got involved in in athlete next and I first started you know my online presence there was a very very very popular program that was out there that I just for fun I wanted to as a PT this is the the nerdy things we do but I wanted to evaluate the the workout structure and I went and I looked at every rep over a course of a week and there was something like you know 890 repetitions or something done and zero of them were dedicated external rotation of the shoulder so if you think about I mean yeah it was a very popular program that was done by a lot of people there is no there was no focus at all no dedicated focus towards creating a balance to an action that is so predominant and remember it's not just because we sit with that posture but the fact that our chest can internally rotate our lats can internally rotate there's like muscle other big muscles that participate in things that we do every day that will further internally rotate the shoulder the only weapons we have for external rotation are those little rotator cuff muscles and three of them actually three of the four and the job is to sort of actively and consciously train them to really the boring exercises right like you've seen them with the band you you you anchor a band to a pole you stand with the band in the opposite hand so if it's anchored to the pole on my left side I've got the band on my right side and you see people where they kind of rotate their hand towards the back again kind of what you're saying but at a lower elevation taking the back of my hand to trying to point it to somebody behind me well you know that that is that is one of the ways to train the muscle it's just of one function of the shoulder external rotation of the shoulder and you need to do it and again it's not that if somebody was doing more external rotation work could they absorb the upright row better probably because as they elevated the arm they probably have a little bit more of a contribution from the rotator cuff to what one of the functions is to centralize the head of the humorous inside of the glenoid you know the capsule so as it rises up it stays central as opposed to migrating up because the deltoid likes to pull up so if the rotator cuff has some ability to counteract the upward pull of the delt then it can maintain a more healthy relationship with overhead movement so just realizing that that that that functions only gained through doing these exercises you know we we would probably dedicate more time there but the rotate the upright row might be better absorbed by that person because they have a little bit more strain but again why because if you have an exercise that does the same thing for what you're trying to do musculally to build the muscles that it affects why wouldn't you just do it where you can still see actually actually pick up more repetitions of external rotation you know so you're getting none of the harm all the benefits I see zero reason to ever do the upright row and people will argue this is the way they argue that I've done this for 30 years and I've never hurt myself and I always say yeah yeah like I listen the goal is to not hurt yourself ever so even if you it's sort of like you know the championship game you know you might play the game of your life but if you lose you lost and when you get into the end of the you know the record books you're still lost so even if you had the game your life you lost I don't care if you do it for 30 years no pain you're still doing it and there's no pain I'm giving you an option that's gonna give you the same results and the exercise that you're seeking that's why you're doing the exercise without the possibility of having the you know the the bad outcome come from it so you know I get a little bit you know defensive of the of the of the mood but I feel like it's like why would you do that you know it makes it makes it's being able to train for a long period of time and feel good you know know I'm proud to say you know and I don't have the kind of genetics well like we don't have a lot of impressive athletes in our family tree or anything there's you know some fit individuals some less fit individuals but I really believe it's about putting in the work consistently over time and the the more the more often you can wake up not in pain the better um and so you know I think that being an external rotation has often as possible as good this is actually a good friend who's a yoga teacher told me this is also a problem with the yogis you know a lot of all the downward dog stuff for those listening um you can think of inward rotation as like thumbs down just like thumbs down and rotation isn't bad but less thumbs down more thumbs up as external rotation so for for those just listening maybe that gives a a visual the more exercise you can do in external rotation the better it seems on average um I'd love to chat with you just a little bit more about biomechanics um and uh and this is a personal thing that I that again your contact really help solve for me one is I thought I had lower back pain that I had sciatica so badly that on a few trips I uh worked trips years ago when I was doing a lot more international travel I mean it was hard to stand up sometimes I mean like excruciating pain I didn't want to take medication I wanted to back surgery um in the end turns out it wasn't a back injury at all um and one of the things that helped fix it was this just learning about this thing called the medial glute yeah and you uh had a video that said fixed back pain and then you um quite accurately say that some back pain isn't really about the back at all and um and had me do an exercise or allowed me to try and exercise where I lay on my side and essentially pointing my um my toe down the top toe down almost like pointing a toe down and then would slowly lift the the leg up while pointing the toe down I'm maybe I got it the fracture then holding that and there's a there's a muscle that sort of sits at the top of the glute it kind of peaks out every once in a while you can feel it there with your thumb which is I think it you had push back on it yeah a bit creating that mind muscle link again and um and there with proprioception the actual feeling of a muscle literally with it with a limb we know for the based on the neural circuits for movement that that enhances the contract availability of a muscle so like if you touch your bicep you literally can contract it more more strongly and this makes total sense based on um uh neuro muscular physiology so having to do that repeatedly and I started doing that in my hotel room and the pain started to disappear and then it came back again the afternoon so I did it again in the afternoon so this is something I did for three or four days and lo and behold a back pain's gone I handed this off to my father because he like me has a slightly lower right shoulder I think our gate is probably thrown off by this is probably genetic and who knows he handed it off to somebody you know it turns out that we don't suffer from back pain and in fact now I don't suffer from rain pain because I I was doing this exercise which I think is helping my low my medial glute two reasons why I raised this one I know a lot of guys who have those right side sciatica because people to keep the wallet there is one idea or left side sciatica there are a lot of people male and female who think they have back pain when they don't actually have back pain and the other thing is that is about a general question about biomechanics or statement about biomechanics I had a fulfilling that a lot of what people think is back pain or knee pain or neck pain or headache or shoulder pain is actually uh the consequence of something that's happening above or below that side of pain right and um this is a whole landscape of stuff related to PT and and recovery and pain management but maybe you just educate us a bit on this and why this works what is the medial glute why did it make my so-called back pain disappear and um how should people think about pain and I'd like to use this as a way to get into a little bit deeper discussion about pain and recovery sure so there this is definitely like a uh uh uh big cornucopia PT stuff here but like I and this is what I love so first of all that video that is it's my proudest video that I have and the reason being is that I it's helped so many people like we get comments on that video every day um I don't even know how many of you just got an out 30 some on million or it's there's a lot of news and and and quite honestly it was a little bit of an afterthought video in terms of the it's it's uh it's origin I think that that day maybe Jesse was having some problems or something like that a little bit of low back pain and and I showed him and it helped right away and I was like well you know we can make a video on it because this this will help people you know not not everybody you know if you have a real disc problem it's not gonna help you know because you're not changing the structural problem that's there but as you said a lot of people don't you know and even disc issues you know a lot of them are not operatives so you'd want to try these things first um as far as what you sort of experience sometimes that glute media is really tightens down and that's that's again from poor biomechanics up and down the cana chain it can actually press on the sciatic nerve and give you what they call pseudosciedica you know where it it's not like you're you're making it up it's not like you're not feeling that pain over that same sciatic distribution but it's not caused from a disc it's not caused from something mechanical there it's caused by the fact that this glute medias has has posturally become a problem for you or weak you know because you don't train it and you need to address it so like unlike not unlike any other muscle in the body there are common trigger points in common areas where the muscle will become tightened or painful or spasms and you can basically apply pressure to these areas to and then sort of thread that muscle through the pressure by pushing down through there and then contracting the muscle which is why you go through that action of you know what we I think we call it toe stabber but like stabbing down and lifting up and stabbing down and lifting up taking that that glute medias through its function so that is basically kind of working underneath the downward pressure of the finger and that tends to help you to almost you know need out what might be the that trigger point and that's why people can see immediate relief there because once the trigger point let's go it feels like and that's the what the comments are in that video like my god I literally I couldn't walk I've been on my hotel floor I did this and I'm fixed and meanwhile then you know it could come back because your body is like way I like being more like this this is how I've been you know in in in grain to be so it might come back but then when you do another round of it and another round of it and then finally it starts to say all right I'm not going to do that anymore kind of eases up and you can relieve yourself of those of those trigger points you can do that up and down the back there's other people that get that and that sort of inside their shoulder blade you know that that same type of cramping in another area but but once that takes place well then the job that I think people have is like become educated that you know the glute medius is different than the glute maximus you know like their functions are are different you know you have to work on not just extending the hip but also abduction of the hip external rotation of the hip same thing is in the in the shoulder and this actually segway is nicely into what into the whole concept you were talking about like the body is like a mirror image the hip is like the shoulder right the ankle is the wrist the foot is the hand like they're they're they're they're the knee is the elbow their two hinge joints they function that way well with the shoulder you've got that mobility that comes from having all that freedom of motion but the stability is lacking well the same thing with the hip like you've got mobility but if you don't fully stabilize it by training all the muscles of the hip and if you don't strengthen the external rotation of the hip then you know you've you're you're going to have issues like it's not biomechanically going to work the same way if you think of the body as a series of you know bands you know pulling in different directions at different levels of tension you know you're being pulled into one direction of the other just by the balance of tension from one weak area to one dominantly tight area and you need to make sure that you can sort of balance this out in order to eliminate some of the adaptations and compensations that happen so what I say when we look at sort of the the the the body as a whole most often wherever you're feeling the pain is absolutely not to blame there's not blame it is somewhere above or below as you hinted at you know you're talking about the the knee is my favorite example of it whenever you have knee pain tele10a night is which I I have forever I've had a you know bad bad cases of tele10a night is where squatting is very difficult for me it's not the knee the knee is the knee is literally a hinge joint that that you know there's a there's a minor rotation capabilities in the knee but it's a hinge joint and it's being impacted by the hip and the ankle and in the foot as I said before how critical the foot is if you thought of the of the knee being the like the middle of a train track where the femur down your thigh and your shin down below your knee where the train track what would happen if the foot collapses at the bottom all of a sudden that train track on the bottom gets torqued just a little bit well who's going to feel that the most the area where it's torquing which is at the knee so the stresses are going to be felt there meanwhile the problems the foot or the problem is the ankle people that are chronic ankle sprainers you are almost always going to wind up having back pain because the ankle sprain causes weakness and mal adaptations in the ankle that then gets connected through the chain because now once I distort the ankle and the shin now the knee is trying to maintain its ability to hinge smoothly so it torques on the femur to do that well the femur is now inside the hip joint pulling on the pelvis and the pelvis is at a whack so it's really it's really is fascinating like it's one of my favorite things about how the body works is like how it interconnected it is and how one little thing somewhere causes repercussions somewhere else and the easiest way to find out what your problem is is to say okay I know where my symptom is but I got to find someone who can help me find the source somewhere else because it is going to be usually either above or below mostly usually below because it usually translates up to kinetic chain but usually it's going to be below where the real source is so people with low back pain usually have hip issues weaknesses tightness is flexibility issues it's almost always below when you get into really high performance athletics though it almost works the other way like where we have pictures who can't I mean I'm always fascinated by guys that have Tommy John issues the only in their elbow right pictures like if you can't externally rotate the shoulder that we talked about again the ability to get your shoulder back and external rotation well your arm has to get to a certain position for release of the baseball and if it can't get there because you can't externally rotate the shoulder to get there then the elbow has to sort of torque more in order to allow the arm to get back further and it will try to take some of that motion from a joint that's not really again another you know the hinge joint really capable of doing that so it starts to stress that media elbow ligament to get a little bit further back because the shoulder is not working and that just ultimately places stride in the elbow so when you see a guy that has pain that floats around a picture that floats around their arm all that is is sort of this balance of compensation once his shoulder elbow starts hurting then he can't do the get the range you know the range from the elbow so he tries to dig a little bit further back into external rotation and then the rotator cuff gets inflamed and then he feels that's inflamed so in a by the way during that time period it takes some of the strain off the elbows so the elbow feels better then he decides okay now I got the external rotation but I'm getting too much of that so now I start straining the elbow again and it keeps going through this cycle so your body is very smart and it's going to compensate every single time it's going to find the compensation but there's no guarantee that that compensation doesn't leave you with a whole host of other issues yeah it's fascinating in another lifetime I would have gone and been a PT although it sounds like the community of among PT's online I don't know what they listen they're people but it's like yeah scientists and neuroscientists can get into pretty intense battles you know in coming from the academic community you know the etiquette is so different online because I always say you know I think in person people would probably behave a bit differently yeah they say hello yeah they say hello and and there's also look I'll just be very direct about this there are a lot of people online for whom their only content is pointing out the misunderstandings or alleged flaws of other people this like the it where it's like that bulk of their identities which to me is sort of a sad existence but you know there's always more to gain by thinking about what's possible and what's new and what's good yeah but you know teach their own demise or when I mean question questioning what's out there it's healthy normal it's great it actually sparse conversation but as you said some people's existence is solely to find things to you know nag about and not actually with the goal being to advance anything but rather just to yeah yeah in the world of science being skeptical but not cynical is encouraged but I would say that the longer that somebody's in a career path it's certainly in science or medicine and they realize how hard it is to you know to do various studies once they publish a few studies generally they they sort of get a better understanding of how how the various things are done in any case another along the lines of pain and pain relief and misunderstandings about the origins of pain in the body one of the great tools that I I picked up from your content which is benefit I know a huge number of people is I think I used to hold weights sometimes in the in the tips of my fingers as opposed to in the meat of the palm of my hands and I had elbow pain and I always thought that I felt it most on tricep exercises and pushing exercises and I thought I was doing those exercises wrong turns out I at toward the end of my pull ups or my bicep work I was letting the weight or the bar drift into my fingertips and the mere shift to making sure that my knuckles were well over the bar or that the weight was really in the meat of my palms because completely ameliorated that for reasons that you point out and maybe you could just share with us why that is you have this kind of finger pull exercise usually when someone says pull my finger it's like that middle school or elementary school joke but you're this will say push your finger right right you know yeah this is fascinating like this is because it just shows again how intricate the body is and how responsive or over responsive it can be to something so little and you know what you're talking about is that when you grip a bar where there be through a curl or where there be through and this is mostly pulling exercises because the tendency for the bar is going to be to fall out of your hand not like with the pushing exercise where it's kind of you're you're pushing your hand into the bar so on a bench press say that bar can drift just by gravity we're doing its thing or fatigue of the the hand grip strength can start to drift further away towards the the distal digits right through those through those last couple knuckles that we have on our hands and though our hand can still hold it there the muscles are not equipped to handle those types of loads and that can start at a very I'm not going to say light but like you know it could start it you know dumbbell weight you know 40 pounds 30 pounds you know even 25 pounds for some depending upon the overall strength levels but then when you start to apply it to something like your body weight with a chin up right because that's natural for the bar to somewhat kind of float down towards your fingertips and it actually is a little bit easier to perform the exercise with that sort of like false script little hook grip at the end because you're not going to engage the forms into the exercise you're not going to start pulling down but at the same time while it could help you to perform them better by getting the back more activated if you have weakness in these muscles because not it's not a thing that happens to ever is not one of those upright row type things where I think this is happening to everybody this is happening to people that have these inherent weaknesses in this in this in this in these muscles you or or having done enough of the gripping in the for in the in the meat of the hand you know for long enough but it starts to put that stress on these muscles that are ill equipped to do this and to handle this and it starts to is particularly on that fourth finger you know which is part of the muscle we call the FDS the flexor digital term that is just too much for the handle and that comes all the way down and meets right at the medial elbow right on that spot that you can say feels like someone's knifeing you right in the middle in that medial elbow and in medial epicondylitis or they call it golfer's elbow is something that a lot of us deal with in the gym it's one of the most common inflammatory conditions people get from the gym and it all comes from this positioning of the dumbbell or barbell or hand on a pull-up bar over time so the easiest thing to do is just grip deeper so that what you're doing is you're using you know more leverage from the palm to encapsulate the bar or the dumbbell or whatever and you're not putting that pressure really distantly right on that last digit because that's where the that FDS muscle is most strained so you you're just almost eliminating that from the equation and and and it's one of those exercises that the load can exceed its capacity pretty quickly so that like you know it maybe it's only capable of handling 30 pounds and then when you're doing a chin up and it goes and it drifts so far that it's now you know let's say you're a 200 pound guy you've got let's say a hundred pounds through one arm and a hundred pounds this is simple simplified math that obviously is offset by other muscles but hundred pounds to one arm hundred pounds to the other one a hundred pounds off of a muscle that can handle 30 it's not going to take many repetitions to strain it and you're going to feel that maybe by the time that sets over or certainly by the time that workouts over or the next day you wake up you've got that notable stabbing pain whenever someone feels that the best thing would be to determine okay what exercise is what I do that we're pulling and where the bar could have drifted deeper they're into further from the meat of my palm into my fingers and figure out a way that deepen that grip when that happens though the best thing to do with most of these inflammatory conditions is not do any of that stuff for a little while not ever just for a little while there's always things that you can do around it I'm not saying ever do I say like don't go to the gym or don't find something you can do but I'm saying that particular exercise that you feel the pain on while you're doing it never a smart idea to do that exercise when it's inflamed if you were doing exercise and it hurts you probably shouldn't do the exercise because another you know you know reason uh for the variability of exercises there there's so many other options that you can do that will train similar muscles or even the same motion and not cause that stress so I mean a cable a cable curl would be much easier to do that on then let's say a chin up where you don't have the control over the weight like you do by moving a pin on a stack so you know I think that that that is a common thing that people find and the best thing to do is just figure out how deep are you gripping that bar you're going to find that oh my god I didn't realize that because it was just even though you might start to set in a good position and then it drifts away as you go yeah I think that's what was happening me and I'm very conscious of this now again for me it's complete I haven't had this elbow pain at all so that's great you know very fortunate so again a dead a gratitude to you never I thought there's somewhere on my elbow basically um and I thought maybe it was tennis elbow I don't even play tennis and so there you go um other aspects of recovery and variables for recovery uh I think you and I both put out content about the use of cold and I think we can summarize it by saying yeah it does seem like cold water immersion immediately after hypertrophy or strength workouts might be a problem but a cold shower is probably not a problem what about heat um do you do you personally use heat and cold uh sauna's hot you know hot baths hot compresses um you and by you I mean you personally and and athletes um that you coach or people that you coach um what are your thoughts on the use of heat and or cold um well I think you know it might just be an inherited practice from the days of you know trainers of uh you know since uh Babe Ruth you know what we in baseball we used a lot of cold following performance you know just because the the idea would be there there is some especially pictures you know there is some inflammation uh that is abnormal you know the arm is not really designed to do what they do especially at the at the speed that they move it and everything else so we would use you know ice as a pretty standard practice after that um but not not a lot of heat you know when I don't really use a lot of heat and of course from the recovery or the the healing aspect that actually becomes rather uh personal preference they've found now after let's say the first 12 to 24 hours you know where you're really trying to control inflammation of what you know might be an injury but then it then it can kind of shift the personal preference because the heat can bring blood to the area also and then the you know the the cold has its sort of anti uh inflammatory effects so like there's a there's a balance between which one's working better for you so there's really no standard anymore for heat or cold in that way but from a standpoint of like post workout healthy status um I haven't used much heat or cold in terms of what we do you know we cover the topic of the cold showers and to try to dispel the myth of the um you know even people saying that there's giant testosterone releases and you know all kinds of stuff that you know listen we hear all kinds of things because people like like I think the idea just turn in the water cold and being in it for 30 seconds and then all of a sudden magically growing three times your size isn't treating a lot of people and they and that's why they ask these questions because they're like that would be a hell of a lot easier than going to the gym and training hard but like I'm always fascinated by some of the stuff that that you talk about fact we started to talk about some of the stuff in terms of cooling and what it can do on performance and that was you know like there there's some untapped territory there that I think you're you're finding out about yeah well we fun would be to bring the cool myth technology from Stanford this is Craig hella my colleague Craig hella's lab at Stanford's done really important and amazing work in this area but then it moved on to some other things he's also working on down syndrome and he works on a number of other really important topics that scientists often do uh but I have access to this cool myth technology no relationship to the company by the way we'd love to come out to your facility and and we can do the blind type studies like a blue blocker test yeah exactly exactly and and see how that goes in with somebody advanced as advanced trained as you that's probably the best thing to do so content for the future yeah I think heat and cold are kind of staples in the PT world and I does see my people use them slightly differently but they are they are kind of the macro nutrients of recovery there along along with sleep um I what I do have a question about precision of record keeping do you keep a training journal do you recommend people keep training journals are you neuratically fixed to you know cadence of movement and are you looking at the do you have a buzzer going off for night when it's 90 seconds rascis at 90 seconds rascis I confess I have my slow workouts and my faster workouts yeah um and they scale with whether I'm training heavier with longer rest yeah or whether or not maybe midway through a workout I'll shift over to doing higher repetition lower rest this is kind of uh my you know crude way of of keeping time but I'm not you know we'll be just to kind of watch the clock but I'm not neuratically fixed to the buzzer nor am I on social media during my workouts which is actually a way to really improve workouts is to just not be on social media yeah I can't claim that I'm not guilty of that sometimes I am on social media but sometimes I'm trying to post something well that's different it's your profession it's your profession but I mean I I um I I'm not I'm not uh necessarily uh chain to some sort of protocol in terms of how I do I think by this point I've been doing this a long time and not only is it something I've done for a long time but it's it's a passion of mine something I really enjoy so I probably inherently have the ability to stick to these these guidelines in terms of rest time um to know what I lifted you know even six months ago on a lift and and and how it felt without journaling it but I recognize the value it has to a lot of people it goes back to that whole my muscle connection idea that we talked about in the beginning like there's a lack of awareness for all aspects of training especially maybe isn't like your interest level and we're talking you and I from a position of interest like this is what we do we we enjoy just how our bodies work and understanding how they work some people don't care they just want the end result but journaling and keeping track of that raises awareness to we're like oh my god I have been on you know uh Instagram for the last seven minutes and I was supposed to be back at my next set in 90 seconds like there is a training effect of that you know like you you know if you're training for metabolic overload you've blown that opportunity because you have you know your rest time was very uh was very important to that protocol working as it should if you were training for strength maybe the extra few minutes doesn't matter so much when you get back on the bar you might find I mean you might find that it's a better response for your body to rest even longer than you've been told three four minutes five minutes um and so that way maybe it helps but I think that anything you can do to increase your awareness of your performance and also give yourself some objective goal whenever we have an objective goal it's a lot easier to actually obtain it when you're just there to get a pump and you're just there to lift how you feel that day um you have to be incredibly disciplined in all other aspects of your workout in order to make that effective you know and I and I've done that too I've actually been able to do that too but again the level of repetitions I've accumulated over the course of my life in the in the amount that I that I you know read about this stuff and I'm I think I'm able to get away with that but um but I think more often than not what I'm doing is not journaling but journal journaling in my head exactly what I think people should be doing and that is getting a specific effect from what you're trying to do it's not so haphazard you know you want to get a specific effect just like any other experiment that you're doing you're doing an experiment on your own body with your own weights which to me is one of the most empowering things someone can ever do when they get bitten by the bug for you know exercising in in training and I like to use word training either rather than exercise because there's a purpose behind it but when they get bitten by that training bug and they start to see actual changes and results you know empowering that is because we can't we can't really control that many things in our life unfortunately and so there's some things that happen to us that we really wish never happened um and those are not something that we can do anything about but this is one thing that we can do our best to we can't avoid disease entirely we can't predict when we're going to die we can't you know do those things but we can certainly decide to show up into the gym that day and get a workout in or go for a run or do something and by doing that you're giving yourself I think a better chance of a higher quality of life so anything you can do to increase your awareness of it and keep you on track with that is like I'm endorsing fully couldn't agree more I could not agree more the there's a topic it's sort of a dreaded topic but I think it's an important one and that's the topic of nutrition and rather than again to specific meal programs which would you know take take hours and probably wouldn't even manage to scratch the surface even with hours um we could talk about principles around nutrition um what are sort of the themes that you think people should keep in mind uh in when thinking about how to eat generally um and pre training and post training are two um particularly sensitive times for most or times that people want to know a lot about you know what should they before training or can they train fastage what should they eat afterwards but just in general what do you think are some some axioms of of nutrition that that really hold and I ask this I uh because not because there's a lot of debate about about this but because you've been around this space a long time and you've seen what works for you obviously but for other people too you know what tends to work what tends not to work and um now should we think about nutrition I mean look you you've touched on a bit but like you know nutrition can be a touchy subject for people and and I understand where that comes from I I've talked about before the there's a dogmatic tendency to to nutrition and there's a reason for it because it's an area that people struggle with more than anything else and the reason why people struggle with nutrition is because the commitment is extremely high you know you could start a workout program and actually get to the gym three to five times a week that's five hours based on how you and I were discussing it before well what about the other 23 hours of each of those days there's opportunity to eat incorrectly or unhealthily every one of those hours people wake up in the middle of the night to go eat you know like there are there are things that you can do that can cause amazing amounts of damage um to your longevity in the 23 hours not the one hour the 23 hours so when people finally figure out a way to make that work for them it's very passionate and I understand their passion I do like I put out so my approach my approach is like I've always been sort of a low sugar lower fat guy I made the mistake of going no fat years ago and I paid for it I was like in college and you know back in the day we were the same age you know we read the all the magazines and that was what we have we have internet then so we were we were reading magazines and the recommended path was to go low fat um it helps you to become hypocaloric very easily because the density of the calories you know in a gram of fat versus a gram of carbohydrates or protein is nine versus four for the carbs and protein so if you're cutting out grams of fat on a daily basis you're quickly cutting out calories that allows you to get leaner well of course as everything I mean I a little is good then a lot is better so I would cut all of them out or almost all of them and at the age of 22 21 I'm like standing at a stop at a university Connecticut waiting for the tram to come and bring me to campus and I couldn't even open my eyes because the light was blinding to me it was normal sunlight it was blinding to me the photo sensitivity I had you know learning later on after a few more courses that I took there in biology you know how how you know necessary fat was for the development of healthy you know cells I I realized what was going on um then nothing made other stuff skim was bad hair was falling out all kinds of stuff so I I think that the approach to decreasing fat so it's not excessive you know because again how calorically dense it could be in having lower sugar I don't I'm a firm believer in the sugar is really pretty toxic and um something that we would all do better getting rid of a lot of it um that is the best approach for I believe again in my opinion personally for the overall big picture because though the people can take exclusionary approaches to nutrition and taking carbs out or you know you know eating only fats and proteins or again I'm not saying it doesn't work for you and if it's the first thing that actually allowed you to gain control of your nutrition to the point where you actually sub results and got to a healthier weight then I always say then do it then do it but just make sure something you can do forever and doesn't bring upon other repercussions but I think that non-exclusionary approaches to diets are the the most sustainable for the rest of your life and when I and all I'm interested in from a nutrition standpoint is something that's sustainable so when I preach what I preach I've been doing this since I was 15 14 you know people say like how's he get so ripped how's he get I have been doing this for fort since for how many years 30 30 years 30 clean low sugar yeah 30 years you know and in the beginning it was a slow shift I had to make whereas like I went from the worst diet in the whole world I was even when I was 14 years old my breakfast was I talked about this many times but like enamins I would eat enamins you know donuts and those long road yeah and I even took the whole out of the donut yeah exactly why would you why would you delete the middle of the donut there's you know the crumb the crumb donut there I would eat I can taste it in my I don't like sugar very much but over the years I've lost my appetite for sugar right but as you talk about the end of instance I can literally smell and taste the frosting and to me now it's disgusting but back then it might have been appetizing you would probably have like really good information on this but like my ability to actually remember I know and they've said smell is very uh evoking of memories right yeah so there's a smell is unlike the other senses because there's a direct line literally from our sense of smell to the memory centers of the brain it doesn't have to go through any intermediate station okay so you know my ability to actually recall exact taste of all the stuff that used to love is enough to satisfy me to not and to not engage in those things now it's crazy that is I like I almost get my fill through remembering because these strong senses of memory of what it was like is odd I used to taste so good okay that's good I had it so fantastic yeah that's well that's that's we know the neuromodulator there that's dopamine yeah your ability to get the the dopamine release from the thought of something yeah most people when they get that dopamine release it causes a triggering of the desire for more right people think of dopamine is pleasure dopamine that there's a book great book called the molecule of more I didn't write the book unfortunately but someone else did and it's a great book and it's really about how dopamine we think it's about pleasure but it establishes craving okay so you're able to satisfy that and it's a very adaptive thing for you because you are indeed very lean yeah and that's one of your kind of hallmark things and you know as a professional who does this in the public space that's important you know when people are out there talking about getting lean and you look at them and you're like you know maybe you need to do the protocols it's a huge advantage but yeah I think that it sounds like you cultivated practices around avoiding certain things yes yeah I mean but not you know avoiding certain things that I think are easily avoided if you realize that there I mean I think that we have enough science and literature out there to prove that the the altered path is a better path you know you know I mean like I feel like if I if I was just doing it because I wanted to be lean I'm not quite sure it would have held for so long yeah well and we have a guest that whose episode has been recorded for this podcast who runs an eating disorder clinic at the University of Pennsylvania medical school studies binge eating disorders anorexia OCD and and he will go on record and obesity and he will go on record saying that these very highly palatable processed high sugar foods of the sort that we're talking about donuts and so forth that they are actually dangerous right that there are elements of the way that they engage neural circuitry he's a neurosurgeon that reshape the brain in dangerous ways and those are his words and I thank animals yeah it's not just animals I mean I think I'm not just animals right yeah they're coming out for us with with what with donuts yeah they can't catch us right in any case so in terms of what you do eat how do you structure that in terms of when you look down at a plate you've done these yeah describe this before but I think it's just a beautifully simple description because I think a lot of people don't want to do calorie counting and all this and you know how should people think about what to eat so yeah I have what I like what I call plate method and it's just it's just simple because it works for me you know and and again if you're struggling with with real eating issues these these mechanisms become admittedly less effective because you're having maybe you have emotionally triggered eating and you can't stop at one plate I mean that you could get the plate right but if the portions are out of control plate all right plate has a dimensionality of high or multiple plates you know like second and third or plate right or plate right like then I you know all these things could be challenged but what I would I say is when you have your plate then you just simply look at it as like a like a clock right and if you just make a 920 on the clock so one arm goes over to the 9 and one of the arms goes over to 20 well then you're basically you're going to take the the second largest portion you know of that because you think you're going to make a line towards 12 o'clock too and the largest portion is going to be your fiber's carbohydrate so that's the the you know the green vegetables all right so whether it be broccoli or brussels sprouts or asparagus or you know you know pick your pick your favorites you know like those are the ones that give us a lot of the micronutrients we need they're the ones that are generally you know accepted as more healthy and they're also going to provide the fiber that's going to be both beneficial in terms of its impact on insulin and also just through filling you up right and then I take the next largest portion of that and I devote that towards protein and I think it's really important especially for anybody active the more active you are the more you embark on trying to build muscle you're going to need to have protein every meal so I have that and again you know we're talking cleaner sources of protein but like I am you'll never find like boiled chicken on my plate like I ditch those days when I was 16 or 15 or 16 like I realized after reading those bodybuilding magazines that maybe the low fat things stuck for too long but the or the no fat things stuck for too long but the boiled chicken and and you know a steam broccoli thing that ended quickly for me because I really I'm not going to eat this forever so I'll have some sort of fish or chicken and but I don't it will be it will be cooked in a way that's that's like you know it's got maybe some sauce on it or it's got some maybe tomato sauce anything that just make it a little bit more palatable and interesting without blowing the value of the meal and then that last portion is where I put my starchy carbohydrates and again that's the part that some people say exclude them entirely because they're not healthier they don't work for you or they're not you know beneficial long-term for me it's been a godsend and I do think I'm like most people my body craves those carbohydrates I choose things like sweet potatoes which is my favorite you know or I'll have rice or I'll have pasta I'm an Italian so like pasta and I like I will have those things I'm not excluding them but I don't put them in the portions that you would generally find um you know my wife and I will go out and we'll go to the restaurant sometimes like because we travel quite a bit or used to at least with baseball too there's a cheesecake factory everywhere you went and I love cheesecake factory but like the way they structure meals is it's all rice on the bottom and a little bit chicken on top and I mean it's a plate full of rice that you wouldn't find me make a plate that way I'm going to just devote that portion of the plate to the starchy carbohydrate and so it gives me a little bit more responsibility in terms of portion control because those are the foods um again probably you know dopamine driven that are most easily overeating I always ask the question how was the last time you ate 10 chicken breast at a meal like you're getting sick of it after maybe two or three but you could eat a whole hell of a lot of carbohydrates starchy carbohydrates because the they're just so satisfying and I think those triggers as you said they want more like that's what happens right you just keep you even when you're feeling full you want more um and that's the biggest danger to carbohydrate so if you can develop some sort of discipline around them um then you can still enjoy them if you can't develop that discipline um for whatever reason then maybe they do become something that you have to work yourself around or adopt a different eating style and as I said I'm never to the point where I'm not trying to be dogmatic in my approach I'm always trying to say this is how I do it and I'm and I'm a believer in it just like everyone else is believer in their method but I'm open to the idea that something that works for you and gets you to a a healthier weight and a sustainability like that is good that's that's good for me you know provided doesn't introduce other other issues you know yeah something one can do consistently that's something I picked up from you uh over the years you know what can you do consistently and for me that also meant what when and how can I eat what can I eat consistently that will also allow me to be alert after lunch so I can actually get some work done yeah uh or eat I like to train fasted in the morning but I don't do any long term fasting it just so happens that I'm fine doing uh water and caffeine in the morning and uh training in the morning and then I eat my first meal afterwards it's just but I get carbohydrates at night so my glycogen is restored I think carbohydrates are wonderful I just don't eat them in excess right so to me it's I I feel like when what you describe is a very rational literally balanced approach um and obviously there will be variations for people who are dealing with obesity or diabetes or you know I I've got friends that are on the pure carnivore thing I have friends that are vegan and um it's always impressive to me when somebody can stick to anything consistently these uh except when they're sticking to just poor behavior because that's there's nothing impressive about that uh why I think that that's very helpful um because I think there's a for the typical listener of this podcast you know that the online content that people see the battles are very confusing they're distracting yeah because people really think oh there's a right way and a wrong way and it's it sounds like the way that one can um eat consistently over time that's healthy um certainly fewer processed and sugary foods I think almost everybody almost yeah almost everyone agrees on that right so I think it is it's it's a it's calorie manipulation through some other method right so even even intermittent fasting like you know like you said like that could be it's it's for people that are grazers like if you are a grazer and your real problem is portion control over the course of the day but you can respond to a rule that says no uh you're eating between here and here that you can obey that rule well you're not going to be able to graze during the times that you might be doing additional damage so um sure there's there's there's there's other hormonal benefits that people will talk about from that approach but from a longevity standpoint and habit forming standpoint if it's fixing the habit that you're breaking too often by eating throughout whenever you feel like you walk by food um yeah it's good you know and it works and again it's it's it's you know people can will tell you you can probably eat whatever you want to eat as long as you're eating within those that window but I think the more responsible people who are practitioners of that will say no you still want to avoid process sugar and and things like that so um and that's just a mechanism of eating not really a diet right but like it's it's I think that people I hate this I hate to be as like as basic as as it sounds with that but it's for the exact reason that if it's that 23 hour day phenomenon that's like you know you said you're impressed it is impressive you know it's so hard to control all of our behaviors and food being one of the hardest you know the biggest temptations for people you know learn how to control that for so long and then do it day after day after day whatever that mechanism is that works for you is is impressive and I'm a I'm I'm a I'm a believer in it you know I think that's the that's how I feel I just feel like people need to be able to be given some reins to be able to to to find what works for them well I love to eat and one of the beauties of weight training is I feel like I can eat plenty for my age and I'm not as lean as you are but I'm I'm happy with where I'm at I could always do better you know with each year act shag getting better um probably because I'm eating cleaner probably because I also have someone to cook for me now and and we like and we like I have that I have that too we like healthy food and so we're I'm very fortunate I don't think we have any packaged food in our home we even started making sourcrout at home well I don't make it yeah she makes it well my my wife actually you know she she turned me on to a tip that I actually shared with with the whole channel which was like you can you can go to we have a student Leonard's around our big grocery store chain around us and they have a catering department and you know they're often used for catering big parties and you know big tubs of of of of grilled chicken but like really good grilled chicken again not the boiled chicken but a big tubs of sweet potatoes and we'll you know we'll get a bunch of those and show go over and show again I'm then she'll sort of arrange you know them on plates and put the plates in and like I'm okay with repetitive eating I think more people are probably okay with repetitive eating than they think I think that when you actually break down how many different breakfast variety like variations do you have three two or two or three yeah so like I think when people do there's more variety for dinner probably but like even there you're probably eat five different types of dinners you know over the course of you know a week or a month well you know if you have that ability to identify the things that you like and again no plan is going to work if you're eating stuff you don't like it's not going to work forever nothing will you have to really enjoy what you're eating as long as these these variations of this meal or something you really enjoy and there are limited versions of them their reproducibility of that is simple you know it will take some time but if you're fortunate enough in our case to have somebody who can prepare it for you now that's even part out of the equation you know and it's it's it's like it just makes it very simple but I do think when you tally up all the costs of medical care that are that are that are spiked by having poor nutrition and you then offset that by what it might cost you to invest in a faster strategy like this catering trick or whatever it might be you'd be best off figuring out a way to maybe reallocate some of your money to preparing this because you know how how important it is to your long term health and longevity if you can figure out your nutrition issues if everyone listens to this podcast can figure out their nutrition issues this whole world would be different that is like we want one of the largest sources of disease and and pain and discomfort because people really struggle with nutrition yeah and it's a it's a huge problem yeah I mean the obc it is an epidemic in this country it's a very very serious also a lot of highly processed foods are are more expensive than healthier foods when you're when you really break it down even not even the better sourced high quality foods are right there on par less than the processed foods for sure but a couple other questions as it relates to training because I think that one one thing that a lot of people wonder about and maybe we could do this in kind of a true false method first just to get through some of these 50 all get it right at least exactly men and women should train differently the science of it will say false um the and again not not to generalize but kind of the point you touched on earlier today I do find that casually interested women in training will migrate more towards certain types of fitness like kickboxing like dancing like you know low-rest circuit type yeah yeah yeah and I think again whatever is that you're going to engage in regularly is what you should do physiologically no and I think if if if we can get more women to feel more comfortable in the gym performing the same exercises and the same uh in receiving the same strain training benefits and working on progressive overload and like yeah we've hit the holy grail but I think that um it's a it's a it's a big bridge that has to be gapped still because um you know there's just some reality to listen there there are very my wife is a perfect example this leaving living a very complicated busy life um we have two young boys their their twins and her her attention and focus is there you know and it's like she she doesn't do this for a living like I do and if she can get a decent workout and she's happy you know but she's not necessarily working on her deadlift PR you know and so I think that that would help her and serve her in the long term to work on increasing her her PRs and different lifts and building her strength progressively but I you know in in her life right now it's not necessarily in the cards to have the time to focus on that so would you then discourage you know this other thing that she might find interesting like some uh boxing you know uh there there's a little uh um I remember the brand but like one of those punchable boxing uh stand up things you know and she enjoys it you know and um you know like anything to get to get you moving is going to be preferable but I don't think that necessarily physiologically there's a there's a there's a difference you start weight training pretty young yeah um yeah I I messed around with you know with my brother because he was older he was four years older so I was kind of messing around with ways probably 12 or 13 with a five pound dumbbell okay yeah you hear that uh young kids shouldn't work out with the weights I don't know what the going as standard is now they say you know shuts down long bone growth or um growth plates you know at this sort of thing uh you've got two young boys adorable kids by the way yeah I wanted that one of the things that is is very heartwarming is to see you're in great shape you're extremely bright you know your craft you loved your craft uh your work with Jesse who we'll talk about as well um thanks great you know which is great you know that there's a camaraderie there having great teammates as part of a business or to work out with is just makes life better let's just be honest I'm grateful to have great teammates for the podcast in my lab of course as well um but um to see your boys and your dogs and the whole picture you know it's it's a you know I'm sure it has a lot of contours and complexity that we don't know about it and shouldn't know about but it's a beautiful picture and um and will they weight train I've seen the videos of uh one or both of them hanging from the bars kids are natural so I'm telling you that I don't I wonder where they get it I don't even I you know I don't even encourage it I'm not going to be the dad who's sitting there saying let's go somewhere yeah right yeah we got our two days you know I'm not gonna not gonna do that but they they have a a natural interest in the gym they just sometimes like to be out with daddy so they'll come out there and you know I I of the two of us my wife and I will be the one who has a little bit more of a longer leash to let them explore things because I was a dummy at times too and figured out best through the mistakes on the injury right in neuroscience we call that one trial learning. There you go one these guys are going to be masters of one trial learning because you know they'll go grab uh you know the the the bars of my the handles of my jammer they're that's there because it's at a lower level to them and they're swinging around they're doing pull-ups on it naturally uncode nothing from me one will walk out to a dead live bar stand over it naturally never saw me do it stands over there and this goes errrr easy I'm gonna try to pull it so there's a there's a definitely an inclination to liking the gym and I will so fully support that but of course uh you know bodyweight will be good for quite a while. So what age you think is reasonable for kids to start exploring a non bodyweight uh like I think around 13 you know I think around 13 once puberty I think it's okay to start to um you know because there's so much I would even say for people that are like later in age who are just starting out learn with your own bodyweight first there's plenty of resistance to be had by learning how to command your body in space so if you have never trained before you're gonna get very stimulated by doing lunging and reverse lunging even learning some of the proprioception around movement through space pull-ups chin ups pull-ups and chin ups are challenging for even people that have had 20 30 years of experience in the gym so there's a lot of stimulus to be had by bodyweight and jumping straight to dumbbells or barbells is actually doing yourself a disservice you can learn better command of your body in space so that when you go back to the bigger lives um you're gonna have an easier time sort of progressively loading them and building up that foundation of strength I'm not saying that you have to become a master calisthenics athlete before you can touch a barbell that's not even true I'm just saying there's so much capacity kids are gonna be doing this anyway and really just if you look at general play they are jumping they are lunging they are climbing they are pulling like that's what they do you know so um why I don't know where the avoidance of like structured training is for younger kids again provide other using bodyweight maybe you know less ballistic movements or something like that you know things that are you know they're certainly overloaded movements I think we should encourage kids to do more there's a lot of obesity and and kids on the rise also and that is incredibly you know disconcerting to me so I think in and I hope it doesn't come from the advice of some that say well wait until you're older to start doing something like that's a way worse trade off than then then engaging in something smart now we used to get kicked out of the house when we were kids totally my mom would kick us out right I don't know I had a huge pack of boys that lived on my street you know we but we'd get kicked out side like literally you're not allowed in the right no television right there were video games and of course but we were we were kicked out of the house we had to go play for us to escape boarding soccer and then we you know we'd find our trouble yeah but to post training nutrition we're the same age years ago I was sort of neurotic about the idea that I had to ingest a certain amount of carbohydrates and proteins within two hours then it was 90 minutes of of training I confess I get if I train hard so I'm talking about the resistance training not the running but the resistance training you know 60 to 90 minutes later I'm really hungry but there have been days when I just skip and then the hunger passes and then later I eat more on my eat twice as much later I you know that that's just the way sometimes schedules go but what are your thoughts in terms of the the nutrition science the train the training related effects of the post training meal is it something that you try to to get is it something that you think people should pay attention to um so that that science has actually probably been the what the one that's changed the most in my lifetime honestly because I I again we're the same age and I was falling for the same uh trap you know where I would really be focused on like I'm I'm risking speeding tickets driving home from the gym yeah you're like I'm in a ball like window you know like I did all that I really did I'm you know but um thankfully that's been sort of debunked in in your body it isn't just rushing through you know these certain periods of time to utilize the nutrients in our body but are able to partition them and use them over a long much greater duration up to now they're saying you know three to four hours after training five hours after training you can still see the you know the benefits of replenishment a lot of that is just you know I think there's a consistency element to it um that just utilizing a post workout window or a post workout meal even if it's within two hours or one hour is just engraving the habit of saying listen I just did this activity and now I want to replenish some of what I lost the energy that I used to to perform you know the exercises that I did and just getting into the routine knowing that the the engine is ultimately fed by what we put in it and the concept of replenishing the fuel lost is still a concept that I think again different in mechanism but still important in terms of fueling the overall performance so you know the the pre workout period of time gives us a chance to actually have a longer window because if that if those nutrients are obtained pre workout it's not like they're gone in that hour that you've trained they're still there and available for your body to use so you know I think it's important to get one of the two you know right or at least make sure you're you're consistently uh uh having one or the two or you might risk going through all these periods of having no nutrition to support your efforts not only where your workouts potentially suffer in terms of the output but then you're also not providing your body any ability to capitalize on on an opportunity to feed it and refuel and recover so I'm not very dogmatic about what specifically to to eat pre or post you know workout but I do think you should have protein surrounding your your training whether that be ahead of time or after protein could be a little bit hard to digest for some people so if you do that pre workout and then you're finding your workouts slogging because you don't feel good then suddenly you put that after your meal but this whole concept of the urgency of time has thankfully been removed and we can just learn to eat a little bit more uh you know responsibly and drive more responsibly so we're not you know trying to rush home from the gym and risk you know killing people on the way you know I think I think it's uh but I think it's great because I think that that was something that it just showcases a belief that people had for so long that has since been proven to be not that important and there's a there's a there's a tip of the cap towards research in a good way where it's like all right I think we could all agree that this isn't necessarily true anymore um and look at yourself and say oh my god I did that so off you know like I I bit that one hookline and sinker but um but then realize okay but we could always make a change and the good thing about nutrition is those changes can happen the very next time you go to eat you know and you'll start to see the benefits of that so um uh I'm I'm not a big believer in that strict approach to pre or post workout um I mean even as far as pre workout supplements um a lot of people don't take them a lot of people don't like them they don't take them they don't like they're not necessarily even being used as the new nutritive side of the pre workout they're just more new used to fuel the workout um skim for me it's uh water and um some form of caffeine yeah I mean it's it whatever you know again I think it's important I do think it's important to maintain a high level of output so if your pre workout nutrition requires a stimulant in order to help you do that or if your pre workout new nutrition is causing you to have a harder time to train because you're feeling full or stomach ache or something else then that that's not achieving what you're trying to do the ultimate goal is to still be able to perform at the highest level so whatever your nutrition is required to allow you to still do that that is probably the most important factor of all of it great I love the very clear and rational approach don't ingest anything right before your workout or near your workout that's going to make your workout worse so yeah so simple and yet you don't hear this because I think people will think oh they must have a pre workout they must have a post workout again like even if there are the benefits that are to be had from whatever's being suggested is going to be easily offset by the fact that you can't perform at an output capable of driving any change yeah so that that would pretty much negate the fact that there you know there's no you're not outweighing those benefits of whatever nutritive approach you took and it's struggling through your workout now for me the best pre workout is a good night's sleep hydration caffeine music yeah there you go I mean it's it works it works and then post where I do I do find I get quite hungry and want to eat quite a bit more and well as a natural response the body is going to and most people want to do that and I think it should be fed I work out as you know again a lot of my postings on Instagram will happen at 10 o'clock at night 10 30 at night 11 at night because I am actually training there and that's where I'm taking those little breaks in between sets to actually film or post something but like I then go inside a dinner so I'm eating at 11 o'clock at night you know it's not necessarily ideal I'm not recommending that as a tool for anybody I think it dispels one thing I've never been a believer in kidney carbs after six yeah that makes no sense to me zero based on all the new all the science of metabolism that I've seen right so I think as long as you can sort of like napping I talked to Matt Walker one of the great sleep researchers wrote why we sleep etc you know and has his own podcast about sleep tremendous researcher public communicator about sleep and he said you know naps are fine provided they don't interrupt your ability to sleep well at night right simple right so many will sleep from eight to nine pm and then go to bed at midnight and not a problem other people they take a 30 minute nap after lunch and they can't sleep at night right same thing with caffeine is a little different because Matt would argue the architecture of sleep can be disrupted etc but if you can eat dinner late meat carbohydrates late I actually need carbohydrates at night in order to be able to sleep whenever I've done a low carbohydrate type regimen in the evening I have a hard time falling asleep I'm just too alert yeah and so I eat carbohydrates in in the evening to restore glycogen but also in order to make sure that I can fall asleep I I actually can again obviously it's already late at night by the time I'm done eating but like I can fall asleep within five ten minutes of finishing my meal you know because I I do think that they have that same effect on me but I'm never like I don't I'm not bothered by the feeling of fullness I'm not I'm not unable to sleep because of feeling of fullness but I do like I do like the fact that I'm I feel as if I'm at least replenishing what was lost through my hard training and I do like to back it up with a dinner I don't need to eat smaller amounts some people can't have that much I will say after a hard leg workout I don't have the same appetite that I do after let's say you know an upper body workout it can really disrupt my my whole feeling of of well-being you want to eat less after you train your legs I do yeah I'm the opposite no I know because I just feel like I could feel sick to my stomach you know you're clearly training harder I've seen the way you train you do train very intensely yeah yeah yeah I think it's important I mean I think that again it's that trade-off between if you're not going to train for a long period of time then you're going to want to train harder and again I I actually feel like contrary to what people might think as you age you're better off training harder for shorter period of time you know it it's always within the the realm of of safe training I mean I think that's what I like to think that's what I bring to the table like an approach that's smarter so I can train harder you know like not doing the dumb things I did when I was a kid and with that you know trade-off being a harder trainer I think I get the results that I want because I'm able to really push it and then back off and and again the the meal feels like a almost a physiological reward for the hard effort I put in the gym knowing that I'm also replenishing and and setting the stage for the next day to be another successful day of training you know or maybe not depending on how many times a week I train you know but yeah I I think that it's it's a lot less it's a lot I hate to say but it's a lot less scientific than we want to make it and as it seems to be coming back oftentimes like the thing that works for you is really the most important thing because ultimately getting your ass in there and doing what you do is really the thing that provides the best benefit absolutely and you know there are many things that I would say are hallmarks of Jeff Cavaliere but one of one of them is certainly consistency you make it happen one way or another huge I mean consistency really is the the determinant and I and I know that that is the hardest part for people that are and why people tend to look for the shortcut because consistency is the part that you know that becomes the biggest challenge but um um if you could find if you could find the I'm a you know through what I've been trying to encourage here is like if you could find the nutrition approach if you could find the training approach if you could try find the training split if you could try all those things that encourage you to want to go to the gym like you're locked in at the point where you said you actually look forward at going and doing your work out I love it right I look forward to I mean it's it's you know actually this morning one of our one of our teammates for the podcast I got work out and halfway through I just turn them and I said I'll never figure out why that feels so good but it feels so good I just I really enjoy it and it lets and I love to eat and it lets me and I love the way it makes you feel afterward yeah I don't understand this concept of not enjoying the gym cardio is a little different I I always love the first 10 or 20 minutes of the jog I mildly love the middle third and by the end I think this is the greatest thing ever why don't you do it all the time and then that feeling evaporates before the next time I do it yeah of course you don't even remember either next time you get it again exactly yeah I I think if people could if if we had one gift we could give to everybody it would be the love of fitness right if they could be bestowed the love of fitness it would change the entire world you know but I think when you hear things like this that like hey that will work and that will work too and that this will work too you know rather than the dogmatic one way only approach which could be to come discouraging for people um then I think it becomes a little bit uplifting like well I've never tried that I've actually never tried a total body split or I've never tried you know that style of eating like it becomes encouraging you might want to explore and then you might finally get locked in and say I really like this and then you're often running let's uh what I so enjoy about your content I we would be remiss if we didn't um just briefly discuss uh Jesse um one of the great pleasures for me in in watching your content and learning from it over the years is that you took on uh you decide to mentor somebody um Jesse and there's uh there's some poking fun back and forth between the two of you which is very amusing but I have to say it inspired me to do something uh early on in developing this podcast as I have a a young intern who um has helped me with some of the research and he's a budding he's interested in science he's about to go off to college but he also got really into fitness so we would watch the videos of you guys he was helping me get the Instagram content out early on and one thing that was just it was it's such a pleasure to be able to pass along knowledge and and of course I'm learning from him this is always the way it works we learn from teaching and we learn from students um but it's been great to see Jesse's progress it's amazing I've gotten to meet him in person uh just now and uh he's he has grown he's changed physically and and I think that you mentioned a love of fitness I think that in a one of the best ways to be consistent is to take on the responsibility of teaching others once one has proficiency in something so um maybe you just tell us a little bit about how that's going how how is Jesse doing and um where where where does he need a little more work where is he thriving um I'm impressed by the progress well we have uh I mean physically we can obviously see the the the changes you know the list of things to work on or is immense it's so long for him to continue to improve but now actually you know in reality Jesse the story of Jesse was that I knew Jesse prior to starting even Athlean X in the matter of fact I think the funny thing is the very first video that was ever posted on my channel was a video that he shot as I don't know a 13-year-old or something and I said he did just film this for a second I was over there you know training uh members of the family so um he then off went off to college went into film realized he had much uh greener pastures at Athlean X instead of uh becoming the next to Scorsese or something and he decided to come work with me and and you know the expectations in the beginning were just to edit videos or just to um you know help with various aspects of like my day to day that I don't think I was you know equipped to really handle and grow the business anymore so um then you know look at by by virtue of being in that environment there's an interest I think if I worked in a gym I might become interested in working out and though that might as not a commercial gym is sitting right behind my office you know uh window um there became an interest in wanting to work out a little bit and it wasn't even an intentional experiment you know to put Jesse there I just thought that he's a very likable person he has a very funny personality he's also the every man you know in some ways you know as I'm sure maybe you experience sometimes like I'm the guy that this comes naturally for me is what people will say like this is what you do for a living like this is what you like there's that there's an element of disconnect in terms of the relatability because I do do this for a living I can't deny that I do work with professional athletes select there's a level of interest in this above and beyond but for him he's just the kid who wants to train maybe if he rolls out of bed before 11 a.m uh and you know doesn't have a date on Friday night but that's the guy everybody can relate to and watching him transform um and I love the fact that even the interest level uh you know uh was up and down like it wasn't consistent for him because he was like you know part interested in then maybe not interested for three months and then interested in that and I never pushed it on him as this is again this was no orchestrated experiment for me it was just like if you want to do this then do this and also from a standpoint of like um lending my help or expertise to him like I said with my son I'm not gonna force it on anybody I don't want to do that to anybody I don't think that that's ever gonna spark that desire for long term you know adoption so he got more interested he started to learn more about it he was just the videos that were filming he films the videos that were filming and he's learning through what I'm saying he's becoming more of a student of the field and I have to say his knowledge in the field has grown with the the growth of his physique and he's put into practice some of the things that I say he's putting practice some things he hears other places and he winds up you know improving as he goes and he winds up starting to love this like he you know never thought he would um but it's great to see anybody grow and whether that be physically or that be emotionally or whether it be you know just in in their career it's great to see somebody grow and I I like to tease him um funny admission here there are times when the jab is that I will throw at him or something that we might know ahead of time of what I'm going to say to him um people will say you're so mean to him I can't believe it you're you know that's so abusive yeah like dude honestly we laugh after it's over it's good we're good you know so you know of course but like but there's tougher than he looks is what you're saying he's definitely looks believe he looks believe he's got the big beard he's got he's looks more manly than I do I can't grow a beard I don't yeah I mean believe me he's he's totally alpha and I'm like you know quickly becoming you know the second the second star of this show but like you know he's definitely um uh contributed and people enjoy his presence for sure yeah I certainly do and I think that you as you point out he's a kind of a proxy and a template for for everybody we can relate to him because even though I've trained for many years you know it's it's been a struggle you know through graduate school post-doc you know it made it happen one way or another but with more or less attention and admittedly through what you know waxing waning levels of motivation although I am fortunate that I do enjoy it what I think is nice about it too is that it's it's a realistic expectation that we set I think you know there was your your showcasing what the journey actually looks like and he's been on the journey for again you know devoted leave for let's say the last year and a half but on the journey for five years if I could make the gains that he did starting when I started training at you know 14 15 and you're saying hi by 20 you're gonna have the strength levels he does the physique that he does the knowledge that you've gained like that seems like a blink of an eye now looking back you know at 46 years old I'm like holy cow like I I think it took me 20 years you know 15 20 years so you know to just even start to get into a groove for him to do it at in a period of five years it doesn't seem long whereas there's people that will criticize his journey like oh it's just taking so long it's so like there's such an instant gratification you know that people seek luckily that's the minority most people are like this is amazing you know but I think that it becomes very uplifting because not only is it relatable but the journey is real and people can and people can appreciate that like this is what will happen if you actually put in consistent hard work and you'll watch him transform go back and watch the videos like you look at we like to oftentimes throw back to videos where he appeared as you know smaller Jesse but also shy Jesse arms crossed head down not making eye contact with the camera you know to where now he's got his own skits and intros you know it's like it's it's it's funny because the confidence with the with the growth of physique came confidence too which is great so it's a pretty soon it'll be his world and we're all living in it does like say well on behalf of myself and all the listeners I really want to thank you first of all for the discussion today I learned an immense amount even though I thought I knew your content well I still learned an immense amount many things we could deploy from when to stretch how to stretch the skipping rope talked about nutrition we talked about heat cold training regimens and what I love about all of this now that you've given us is that there's a there's a backbone of logic you know and some consistent themes indeed about consistency and but the the logical backbone I think is what will enable people to really show up to the table and stay there for training consistently over time and as you said the gift of fitness is an immense gift I can't thank you enough I know you're an incredibly busy human being with kids and dogs and a and a marriage and a pleasure I was I'm happy I was able to make it work because I really I've been watching your stuff for a while and I really I love the science of it I like the way you think and it's just you know it was a I'm just really fortunate that I was able to do it well I feel very gratified in hearing that and and honored to have you here so thank you so much thank you thank you for joining me for my discussion with Jeff Cavalier I hope you found it as interesting and as actionable as I did if you're learning from and are enjoying this podcast please subscribe to our YouTube channel that's the best zero cost way to support us in addition please subscribe to the podcast on Spotify and on Apple that's also a terrific way to support us and on both Spotify and Apple you can leave us up to a five star review if you have comments and feedback the best place to leave that is at the comment section on the YouTube channel there if you have suggestions about specific episodes or you have specific questions or you have suggestions about guests that you'd like us to interview on the Hubertman Lab podcast we read those comments and indeed we take them to heart when developing future content in addition please check out the sponsors mentioned at the beginning of today's podcast that's the best way to support this podcast and for those of you that are interested in supplements discuss today or on previous episodes of the Hubertman Lab podcast again we partnered with momentous supplements you can find the supplements related to this podcast at live momentous.com slash Hubertman if you're not already following us on social media please do so we are Hubertman Lab on both Twitter and Instagram there 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lists out all the things you can do to enhance your sleep it lists out this so-called neural plasticity super protocol for enhancing learning and teaching and so on again that's the neural network newsletter at Hubertman Lab.com and last but certainly not least thank you for your interesting silence.