# Paleo Solution - 242

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Robb Wolf: Howdy folks? Robb Wolf here. Another edition of the paleo solution podcast. I am incredibly excited. I was actually just describing myself as a small dog penned in a room running in circles peeing on itself because I'm so excited to have mom, wife, bio mechanist and author of move your DNA Katy Bowman back on the show. Katy, how are you doing?

Katy Bowman: I'm so good. I'm a little wet from being peed but, you spraying me in your circles but I'm good. Other than that I'm great.

Robb Wolf: I retrain the knee humping so I did that have that boundary so.

Katy Bowman: Small victory. Small victories--

Robb Wolf: Small victory.

Katy Bowman: -- for me.

Robb Wolf: So Katy, when you were on the show before, it was one of the most commented upon most beloved episode that we've had so far. So I am incredibly excited to have you back on the show. Give folks a little overview of what you've had going on. You've had a project with the Sisson and in addition to the release of Move Your DNA , which Move Your DNA is out on what day was it released?

Katy Bowman: It was released – well it was – I think it's officially released tomorrow or tomorrow from recording this October 15th. But we were shipping since September.

Robb Wolf: Got you. Okay. Fantastic. Well give folks a little overview of what you've had going on and then we'll jump into the book.

Katy Bowman: Uh-hum. Well Move Your DNA , which we'll talk about today is like it's the cumulative version of my work. You know, it's kind of putting out there these ideas of nutritious movement and what I mean by that and the diseases of captivity, the difference between exercise and movement, all these big ideas that I've kind of boiled down into a readable book , which we'll talk about but then also some of these spinoff projects that I'm doing are things like okay here is this broad idea of exercises and movement and we need. But yeah we need movement and so I wrote

Don't Just Sit There , which is now that you've read this bigger idea here's a hundred separate pages just for you trapped in your cubicle at work. Like what are some ways to increase your wellness there. How do we apply this notion of movement while we're still stationary because you can. There's like movement is broader than moving your whole body around relative to the ground and then touring. I just got back from six weeks in Europe touring for Move Your DNA , which was epic. I literally moved my DNA and the DNA of my two children under the age of 3 with me.

Robb Wolf: Uh-hum.

Katy Bowman: That was great. That was fun.

Robb Wolf: How are your adrenals after that? Mine would probably be like brazen left out in the sun for a month so.

Katy Bowman: It was good. We did a lot of self-care. We actually, we came back from Amsterdam back to Seattle where I live via Iceland.

Robb Wolf: Oh nice.

Katy Bowman: And so we broke up this ten-hour flight home you know, , which is very stressful, you know, very anxiety making travel can be by stopping at the geothermal pools in Iceland.

Robb Wolf: Oh nice.

Katy Bowman: And that seemed to be the thing and Iceland Air allows you to hop off the plane for up to 4 days at no charge so you can just get a plane via Iceland, get off, and my three-year-old son was telling some of his teachers that he went to Iceland where there's volcanoes and it was, it was erupting while we were there.

Robb Wolf: Right.

Katy Bowman: And then that we stopped and then we just took a bus. We just took a bus to this giant volcano pool and we hung out for a whole day submerged you know, and they have a green smoothie bar and a little place to get this mud and put it all over your body. We just floated around and by the time we got home, we slept on the way home including the littles. We were totally chill from that huge trip. So that was great.

Robb Wolf: That's awesome. My next European trip I'm going to do a heading over in Iceland for --

Katy Bowman: You have to. You have too.

Robb Wolf: That's awesome.

Katy Bowman: Yeah.

Robb Wolf: That is so cool. Well before we started rolling with the actual recording here, I was talking to Katie and I had just said that I have so many kind of personal notes and questions. I've read, Move Your DNA twice. I'm actually going to read another novel in between this and just ruminate on what I've been learning in Move Your DNA and then I'm going to take a crack at it a third time because there's so much great material in here. But I literally can fill up probably about three or four shows with questions I have from chapter 1 alone. And so I don't know how beneficial that will be for everybody but I've got some ideas about how to go deeper on this stuff. But were going to do kind of a big overview of the book and some of the material in here and I'll sneak in a a few of my own personal questions because I want to get a few of those answered.

Katy, just tell folks about what –you know, this whole concept of nutritious movement and diseases of captivity, that's chapter 1.

**[0:05:04]**

Katy Bowman: All right. So chapter 1 would be this concept that in the same way you have nutrient requirements, food nutrients that there's just a broad spectrum of nutrients that you must intake that are essential that would go into the essential category. You have that same requirement as far as movement goes. But that movement is really a broad category like food. So I can't just say hey Robb, you need more food. I have to speak specifically to the nutrient that you may be missing. You do that all the daylong and twice on Tuesdays right? You are constantly reading over someone's set of symptoms or you're reading literature and you're able to see okay well what we know in hindsight right. It's always you're always reverse engineering when someone is missing nutrient X here are the symptoms that we see come along with it. So therefore we start to use food as medicine. Right?

So you'll say that you have symptoms X so I know that you can replace this nutrient to get these symptoms to go away. Because food really is a medicine. It's like a baseline. We're talking baseline. We're talking about what are the essentials that you're missing. Same goes for movement.

What I'm proposing here is that the category of movement is just as broad as food and just to tell someone that they need to move more or to think that you need to move more while correct mathematically the things that we can put in that you need more of would go into the category of food. They're not really specific enough because if we break down movement into loads , which I do in the book so I'm trying to [Audio cut out]

Robb Wolf: If --

Katy Bowman: I don't know where I dropped off.

Robb Wolf: Sorry folks we're back. We had a – the internet gods hate us today. This information is so important they are trying to shut it down. We mentioned movement loads.

Katy Bowman: Oh right. So movement loads are the equivalent. They're the effects. They're the cellular they're effects. They're all the ways that your sales are squishes and deformed, twisted and banged up based on the way that you're moving. Those themselves your load profile if you will or load profiles would have an equivalent in this nutrition metaphor. So that there are a spectrum of loads that you require baseline for just basic biological function. So that's what I mean by this nutritious movement and then diseases of captivity would be what are all the loads that you're missing because your environment is not allowing those to happen? How is our environment specifically the house that you're in, the surface, the shape of the surfaces that you walk in? I'm talking about your mechanical environment.

Robb Wolf: Uh-hum.

Katy Bowman: The forces that are the byproduct of the way that you move, the shoes on your feet, the chairs that you sit in. And then the frequency with , which you do all of those things, even the distances that you look with your eyes, all of those, our environment is very similar to a zoo like environment for an animal compared to the environment in , which that animal would live in in nature. But it's not just what's around you. It's how you move through it. So it's the invisible stuff. It's the invisible effects of the environment that I'm talking about. So those are the two big theses of the book is that we have requirements and we're not getting them and here's why.

Robb Wolf: And you used a great example of an orca in captivity. May be you could mention you know like I never – you never think about you know, this

organism evolved to go very, very deep under the ocean and deal with the stresses of increasing aquatic pressure and then decompression and that those stresses are actually you know, baked into the cake and part of what is necessary for that organism's nutritious movement. And the lack of that ends up manifesting in pathology and I found that just fascinating.

Katy Bowman: Right. We just don't we just don't ever really think about we don't think about the invisible. It's the invisible stuff like the forces that are created. So with the whales you know you're looking at an orca and if you're like well what's the environment of an orca, and if you're thinking water. Okay that's one environment but I'm a bio mechanist so I'm always thinking of what's the force environment, what's the mechanical environment. Water can create all sorts of different forces depending on how you're moving through it.

**[0:10:00]**

So we look at you know, if you watch that documentary black fish right?

Robb Wolf: Uh-hum.

Katy Bowman: That was the horribly, the horribly sad documentary but sea world is like they're in water. They're swimming at the end so therefore I've got these giant Venn diagrams of water and swimming and we've met the whale's requirement not looking at well the whale would normally be moving 100 miles a day you know, forward through the environment. So --

Robb Wolf: Except going in circles and --

Katy Bowman: Going in circles and then all of the things I listed in the book, like a lot, high frequency of time at the surface when biology is not just what you do that creates a mechanical environment. It's also what you don't do. You have to consider that your structure is adapting to both of those things. So yes like the orca and like many other organisms that are usually studied within zoos, we have movement nutrition that when we're missing it we have a hard time performing basic biological functions. , Which is why species struggle you know, in zoos. That's why they don't procreate well, they don't have a very successful live birth. You know, those births don't tend to – the babies don't tend to live as long. There's many more infections. Like all the same stuff that we have as a species now except that we're all in the tank together. So I've tried to say you know, if all of the whales in the future lived in a tank, we wouldn't necessarily have this visual confirmation of the difference between a whale in nature and a whale in captivity.

So all humans for the most part that you see that you're seeing your research papers are in the tank with you. So your mechanical environment isn't going to be something that you're going to consider so much when you research because it's outside of your cultural construct. Right? Isn't everyone like this, isn't everyone doing these things? Doesn't everyone use furniture? Doesn't everyone eat this way? So again those are the big ideas in the book.

Robb Wolf: Oh it's fantastic and you know one of the – so the next chapter of the difference between exercise and movement I think that that one particularly for a certain subset of the folks that follow me because you know, I'm in the strength and conditioning. I do jujitsu and MMA and whatnot and so I'm always trying to figure out a balance between that because I'm getting older and so I need to really tailor the things that I'm doing towards say Brazilian jujitsu because that's kind of the thing that I really want to be good at and get some progress with. But oftentimes the things that I know that would benefit Brazilian jujitsu like just doing some low level cardio on like a Schwinn Airdyne or something. One, I don't want to sit more, two, it's so boring that I literally I'm just kind of like I just – I would almost rather shoot myself than do --

Katy Bowman: [Laughs]

Robb Wolf: you know, I roll my garage door up and I look and there are these huge mountains and foothills 400 yards away from my house and I'm kind of like well I could go walk up there but then I'm not maintaining this heart rate of 120 to 135 beats a minute. It's going to increase the you know, eccentric capacity of my left ventricle and that's going to help me recover with jujitsu. But so I mean this exercise versus movement deal I see this really for me as a strength coach this tough interface when I'm looking at performance enhancement versus like life enhancement. And the life enhancement piece seems so much more valuable until I start butting up against the demands of well I want to –you know, like I had a goal before Sagan was born that I was going to compete in the world's championships for age group Brazilian jujitsu and I really, really wanted to do well with that and the baby arrived and my sleep got derailed so I'm going to put that off for a little bit.

But you know, part of prepping for that would pretty much necessitate doing some reasonably unpalatable exercise and not really doing a nice broad plate of palatable movement. It's like talk to us a little bit about the –you know, the difference between exercise and movement.

Katy Bowman: Okay. Well so well there's two – so performance athletic performance is of course an entirely different category than biological sustainability. Meaning not just that you live longer like okay yes living longer but I'm tired of that being the only parameter for like for your goal. Your goal is that you feel really good every day and that again as we're approaching this as us being a species. Like what are the biological functions that you should be doing? Like how are you sleeping? Are you eating and digesting your food well? Are you able to get pregnant and sustain your pregnancies going to the bathroom and having sex? Like all of these things you would be surprised because I work on the disease, the mechanical disease and a lot of people are struggling with basic biological functions.

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So I set those two things apart. That all being said I do think that in many cases athletic performance would be not only improved but sustainable longer because of the context. That if you're only doing exercise , which I'll kind of parse out as something for a shorter duration, isolated like clearly if we were plotting you on a graph, there's peak and movement throughout the day right. It would be like --

Robb Wolf: Uh-hum.

Katy Bowman: --000072 and then it will go back to 00000 like that's the way most people approach exercise. So the difference between exercise and movement is those things are both they're both categories. So movement is anything that you do with your body where something has changed position. It's the broadest possible category. So when I'm talking about nutritious movement, I'm not talking about this thing we do called exercise, exercise being a tiny, tiny, infinitesimally small circle within the Venn diagram that is movement right? So you have a giant movement bubble and you have a tiny bubble exercise inside. So there's a lot of different reasons that they are different but the easiest or like the shortest way to differentiate between the two is that movement are those motions that you make while you are getting something else done in your life. Meaning that you are not moving just for the sake of moving. Where exercise is a really specific type of movement, where you're doing it just to extract some improvement for your health. You're trying to reap the benefit of health through doing this concentrated thing of exercise.

So like in the book I talk about breastfeeding as being a movement. No one would put breastfeeding into the exercise category. If you have breastfeeding classes at your gym that's rad.

Robb Wolf: [Laughs]

Katy Bowman: And put that in the show notes if you have someone who's offering that class. But breastfeeding is this specific mechanical environment of the jaw that when you've done it, as a baby well as a baby too and you are from four to six years, sorry moms out there who are breastfeeding. That it creates a size and shape of the jaw that can accommodate the teeth and accommodate other functions like respiration and breathing and speaking and the way that your tongue and your sinuses eventually work.

That it's a load, it's a load that should be there and that if it's not there, you have this adaptation where all of a sudden you don't have the space. Like no one really ever questions like why does every single person have to have their wisdom teeth removed? Like why do we sysmatically have to have these surgeries that make our bodies more suitable for basic function like chewing and eating your food? So this is kind of this recently emerged piece of information that's like these aren't the ways that the jaws have always been and they're mechanical. It turns out that your bones are kind of always being shaped and adjusting to the behaviors that you do and so void of this movement you don't have bones that fit your biological function. So that's really the difference is the movement like I get that question a lot is like how do I reconcile my need for movement with my need for exercise?

Like the first thing is you don't need exercise. You don't require it. You do have huge requirements, epic requirements for movement. A lot of those can be high intensity movements that get out your competitive ya-yas and keep you peaked if you will for performance. That I'm not saying that that's not essential. It's just that exercise is not necessarily the way to go about it. That when you're looking at research of exercise, you have to remember that you're looking at research of these isolated variables. Keeping that in mind we are talking about you know, diseases of captivity.

So one of the biggest cellular biology pieces of evidence that come out lately is all of the cells studies about the movements of cells were done in petri dishes. Two dimensional. They finally said let's make a three dimensional model of a cell and it turned out that it had a whole different way of functioning and moving. Now we've essentially been studying cells like all our biology- like biological tenets of understanding cells comes from looking at cells in captivity.

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Two dimensional chained pinned down cells and going look, look how they behave and then going you know, therefore put your three dots. Therefore this is how and then you work backwards to make all these

theorems about the body and they're all based on captive cells, , which totally makes sense because --

Robb Wolf: And nonmoving cells.

Katy Bowman: Right, right. Because captive cells --

Robb Wolf: Right.

Katy Bowman: --are not moving so it's like why would your brain think outside the captive box when you are in it? So it's really hard to reconcile some of the stuff that I'm talking about with you know, scientific data if you're not going back and going you have to consider the source of your data. And pinpoint exactly what it is that you're after. Because I'm sure a ton of you listening are after better performance. I am after better performance. Everyone is. But when you get sick being sick is your number one thing that you're interested in getting rid of if only because it hinders your performance. So this is in my opinion the way you go about it. It's slowly stripping exercise out of your life and replacing that exercise with movement period.

Robb Wolf: I like it. I like it. I struggle with it all the time trying to figure out how to make that stuff work. One of the things that I've done is I instead of a dedicated workout time I've been setting a timer throughout the day and I shift between the standing work station a physio ball and a regular like office chair that I sit kind of any in silence while I'm breaking up the patterns that I have so that – because you made a great point in the book also that we have this data saying that sitting is problematic but is it just sitting or is it just sedentism. Now if you're just standing one spot is that really going to be any better and what are the problems going to be with that. So I've been trying to get a little bit of a diversified palette with that.

And then I go up and just do either some kind of gymnastics tumbling movement in our kid play room where I have a couple of loaded bars and I do a little bit of stuff out on the gym with the things that I feel like are helping my jujitsu. And then instead of just sitting on the exercise bike and trying to maintain my you know, aerobic threshold level, I just get out and hike and sprint. If it ends up being perfect for meeting where you know what my cardiac output needs are I've been less hung up on that and more just focused on getting out and moving. Oddly enough, I actually do enjoy my life a lot more and I feel better.

Katy Bowman: Yeah, you know, we're all wrestling with these big problems right? Like how do I get work done, how do I attend to my family and my

relationships and also how I get food on the table. How do I build a community? Like these are all big things that a lot of people are trying to fit but it's because they see them as isolated things, right? I have to get my exercise for these 20 minutes , which takes me away from these people that I also want to spend more time with. So you're – everything is in separate blocks and the thing about nature is everything is in the same block. Everything in nature happens organically or at the same time. So as you figure out , which I'm here to help everyone figure out how to make your life be also the time when all of the essential things that you need are happening you'll start to slowly find that you can get all the things done all of the time. So as a competitive athlete like I'm definitely someone who is competitive and fit and my physical prowess has been a part of who I am my whole entire life.

But as you know there's this period of time that comes when all of a sudden you have little kids and it's like I really like to go somewhere else to exercise for two hours but it's not possible. When you're the mom, it's even more not possible to disconnect especially if you're trying to do all these other things like breastfeed six times an hour, don't even get me started on that. So my solution was okay we don't have strollers, zero. No baby devices. So we packed my husband and I our children so they're 17 months apart, we packed them everywhere physically with us in our arms, in our back. We teach them how to do it and I in my mind, I kept going I'm so bummed that my exercise – this is a while ago. I'm so bummed that my exercise time has been taken away from me by these children. You know, like that's how you see it. It's like these children have taken these away from my life.

Instead of going wow, these kids have given me an opportunity to carry 20, 30, and 40, they're 30 and 40 pounds now respectively and we pack them five to six miles sometimes. And --

Robb Wolf: That's a pretty damn good workout.

Katy Bowman: That is way harder than anything else that I've ever done and I've done some serious races but I have to tap out of holding these kids sometimes. I have to hand off. You know, are so tired. It's like instantly going, you want to talk about your capacity for doing work try throwing an extra 30 to 40 squirming, have an opinion pounds on your body and still try to move forward and up and down. You know, those hikes that you want to take or sometimes it's just to to the store.

**[0:25:30]**

Sometimes it's just a 20-minute walk to the store but a 20-minute walk to the store carrying a kid, unpacking your groceries all of a sudden I got my

grocery shopping done. I had 20 minutes of close time with my kids. We did a family walk and I got my exercise but all within the same 20 minutes. Like those would normally take me three separate blocks of 20 minutes but as I put it all together I am – both my husband and I, both former competitive athletes are in way better shape now plus way better health than we were when we were exclusively training just for the sake of athletic performance. And we're happier.

Robb Wolf: Shocker and then the kids –you get that enriched environment and I'll just --

Katy Bowman: Sure.

Robb Wolf: -- with you guys that's fantastic. You know it's funny I've been – when I do go out in the morning and I try to get a little bit of movement in. Zoe goes out there with me in the morning and she plays on the gymnastics ring. She does the evil wheel. We do walks around the neighborhood and usually Nikki gets up an hour or two later than what Zoe and I do. And then you know we're able to kind of hand off and I grab Sagan and then Nikki has some Zoe. Then they'll go for a walk and we've been slowly transitioning into that because and it's funny because we were really in this kind of a paralyzed state where we were so used to going out and doing that block of time exercising by ourselves that it just never happened. And then you look up and you're like okay I haven't really left the house for a couple of weeks because --

Katy Bowman: [Laughs]

Robb Wolf: --you know, in a way other than shopping because I've worked from home and all the rest of that stuff. And then we just started weaving more of this stuff in. We live far enough away from shopping that taking Zoe on a four to six-mile stomp to get food that might – there might be fatalities involved with that for quite primarily mine and then --

Katy Bowman: Right.

Robb Wolf: --you know, I might do the Hemlock Society and final exit with that. But it's really interesting stuff.

Katy Bowman: Yeah and you just – I mean not everyone – you just look for where you can do it. You are always going to be able to find where you can't but look for it where you can. You know, it's like you're trying to figure out like what am I teaching my kids and one of my big things was to not teach my kid to exercise. It's like we don't ever say like mom, needs exercise.

They understand that we need to move but it's more like I will always say oh, we need some food, we need some nettle, we need some berry. We live in a place where there a lot of berries and apples on the trees and pears on the trees so it's like we got to go. We got to go get some stuff for breakfast.

So I always try to make the motivation for movement something that has nothing to do with movement. So kids get as you probably already know or you'll find out, like they get bored. Like oh I don't want to just go into a walk like this is so boring. But it's like we have to go find our breakfast even though were not going to eat a handful of berries that we get or whatever. I'm like slice it up on what they're doing that the purpose of movement is something else beyond I need to get my exercise. That it's just an organic thing that hopefully in their brain chemistry is like this is just something that we need to do. We are going out to get water.

Sometimes I'll say oh we have to go count all the slugs. We need to go find seven spiders and put them in this bucket. Because that would be a normal typical childhood activity for a kid is to go you know, find your protein.

Robb Wolf: Right.

Katy Bowman: Essentially. And so that they – they're participating, they're participating with their vision and they're understanding and they're in their natural world. Even if you live in the urban jungle like this is still something you can really do. You have to fake it quite a bit but it's important. Even for myself, I don't – I love to take a walk. I love to go take a walk every day but I try to keep myself from being motivated that way and instead go what do I need to get done for work today. How can I get that work thing done in a way that uses more of my body. So the post office for example I walk to every day. sometimes I make up stuff, I have to mail. I need to mail you something, I'm like I need to mail Robb this.

Robb Wolf: Right.

Katy Bowman: This clipping from my newspaper and I'll slap it in and I'll walk down to do it. But in my mind, I have changed my motivation so to speak. I was able to accomplish a work task and then the movement was a byproduct a natural occurring byproduct of that.

**[0:30:05]**

Robb Wolf: Nice. Yeah gosh it's funny Zoe for a brief time like to "going on a walk" and then like you said she became bored with it. It's kind of like well what

do we do? And Then I said hey Zoe we need to go catch some lizards. She was like right on. So then it's either lizards catching or if we do head over to the Truckee river, which isn't far from the house then we catch crawdads and so I've got a bucket in the car and we just you know, we both wear shorts and I've got some – both of us have shoes on that we can go in and out of the water and we'll go catch some crawdads and lo and behold we get some exercise, some movement. However you want to characterize it. But we're both out and she's just enthralled with that stuff and so am I. It's a ton of fun.

Katy Bowman: Yeah, it is fun. It is a great way to put your parenting time with your movement time. You know?

Robb Wolf: Right, right. So you know, your chapter four where you talk about hemodynamics and why we may not need cardio, I think that some folks are going to read that and they're going to keel over and die just even looking at that. Like what's a – [Laughs] What's the story with that? And you do a wonderful job of really making that case with vascularization and nonlaminar flow and whatnot. But walk folks through that one. I think we'll find it really interesting.

Katy Bowman: Well I mean I guess the words are like need. Like throughout historical timeline cardio like needing cardio would be that to isolate this idea that getting your heart rate up for the sake of getting your heart rate up is something that's essential for human function.

Robb Wolf: Right.

Katy Bowman: So that's what that post is really about. Because I think that most people will say you know, it's like okay great I understand. I need to mobilize I need to move but what about my heart? Don't I need to make my heart stronger because we just have this – we have this way of understanding the – what's going on with our cardiovascular system. So like who owns a healthy cardiovascular system? I do, everyone's hand up. what does the cardiovascular system do again? And then everyone has their answer and their answer is something to the effect of my cardiovascular system is responsible for you know, bringing oxygen in to my mouth and nose and then getting that oxygen in through the lungs through the blood. And then distributing that oxygen and then repeat, repeat, repeat.

It's like great, how do we know when our cardiovascular system isn't functioning well? Everyone's answer is because I have a problem getting my heart rate up. I have a problem sustaining my heart rate. So what happens is you have a very closed rational system of why you need

cardiovascular exercise. Your heart rate the height, I don't want to say height, the amount that you can get it up to and the amount that you can sustain it and the time over , which you can bring it back down are our way is our way of understanding if we have a functioning cardiovascular system or not. But what I'm trying to explain the book is oxygen delivery does not happen within this arterial, this artery, this heart artery system that you picture when you think back to your textbooks.

That the end, the end user if you will of your cardiovascular system are the individual cells themselves. That the whole reason you have a cardiovascular system is to be able to bring red blood cells to the individual cells for fuel for breathing. Not just fuel for breathing. So you are one organism that's breathing but you are made of a trillion tiny organisms that are also breathing. So my question is how well are all trillion of you breathing? The answer is very poorly. You have cellular death happening all over your body and that cellular death is a better indication of your cardiovascular function than what you're measuring which is your VO2 output or your heart rate or how fast you can bring it down. That if you want a healthy cardiovascular system the result that you will be looking for is that you are free of cellular disease and pretty much every disease you have is some sort of failure in the cellular feeding or the cellular replication process. So that's what that book is about.

So a lot of people have very poor- so when you exercise, I think the belief is I'm exercising, my heart rate is up, all of my cells are being fed but that's not the case. The only parts of you that increased in circulation are the very small parts of you that are working. It would be if you're like okay so I'm you know, riding my bike or I'm doing whatever I'm trying to think of another exercise. I'm running or whatever only the parts of you that are articulating is this increased blood flow happening through. And then to make it even a little bit more – to add another layer on to it, is just because you see your arm and leg moving doesn't necessarily mean that that arm and leg is moving freely in, which case you would have this vasodilation right , which is the opening of the blood vessels, the arterials, the smaller ones to pull the blood out of your arteries.

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You have to get your blood out of your arteries. What do you need to be able to do that? You have to have supple arterial walls? What do you need to have that? You have to have supple muscle and what you require as a regular muscle use around those areas. So there's a lot of very stiff people who have chair baggage right, , which is cellular adaptations to being immobile not just throughout the day but throughout most of their life that --

Robb Wolf: Uh-hum.

Katy Bowman: --when they're going to do their exercise are not vasodilating. They're vasodilating in really tiny areas throughout their bodies. So they have essentially increased this speed and they've changed the velocity of the blood and that there's this whole other element of movement and interaction that's happening on your cellular level that might not be in the health making – in the health making way. That before you just go to cardio you should do a head to toe analysis of how much of my body would be vasodilating in response to cardio.

So I have a friend who is currently getting his degree in biomechanics and so he's done a lot of training with me and he's you know, at the university and he's talking to his biomechanics and they're still teaching in the kinesiology department that the vasodilation of the onset of exercise is chemically induced. Which was a disproven theory you know, back ten years ago but it's still kind of – everyone's understanding is that you start exercising and there's a cascade of chemicals that causes vasodilation , which would make sense that it's more systemic. But it's not. The only – the vasodilation response is triggered by the stimulation, the active contraction of the muscles that are participating.

So your bout of exercise isn't improving the cardiovascular system for the purpose of distributing oxygen head to toe throughout all of your cells that all of your cells regenerate and breathe that about the same rate , which is what you want. Disease is when you're having that discrepancy when you've got some cells breathing but some cells next door not breathing at the same rate. You end up getting stressed risers, mechanically speaking or mechanical engineer points of failure within the body. So that's what's that section is about. It's not that you don't need to be doing intense movements throughout your life. It's just the way that we do them and the context in, which we're doing them I think is ignoring a lot of biologically plausible and basic mechanical understandings of how arterial plaque is laid down in the body and that you're just constantly referring back to the closed system of that I know my heart rate is good because my heart rate is up. So therefore my heart rate is good. Like you're using the own variables within a system instead of going how can you actually tell that your cardiovascular system is performing well? What are you after for your cardiovascular system?

Then just make sure that your movement practice is matching up what you want your body to be doing for now and in the future.

Robb Wolf: You went through like even the morphological changes that occur from sitting and how that carries over into the standing position. And like you have some later in the book you go through some methodology for undoing that but I think you know, even for me like I see, I had never really sat that much. Like in school clearly I did, but we ran a gym for years and I was on my feet all day long. I was squatting constantly stretching. You know, I had a really quite diversified movement pool and then I started blogging and then I wrote a book and then I started traveling with you know, 16-hour days sitting on an airplane and whatnot.

**[0:40:00]**

The effects it had on my low back and my knees were catastrophic. And it's taking quite a bit of time to undo that and it's been interesting also that as that stuff kind of got buggered up, it was really, really hard to just maintain my base like I what I would consider like the youthful aerobic level. You know, like when you're really young, it just seems like you've got cardio almost no matter what you do. I think that may be that's because you're tumbling and lunging and running around and just doing stuff. So your base level of activity is really good but also you're just movement is good. You know, I think as possibly what I took from what you were saying is that when you are free of these adhesions and these movement restrictions and whatnot, then everything is just functioning at a much more efficient level.

Katy Bowman: Yeah. Like we always think like hey I'm moving over to the ground. I'm moving. It's like again you have to think of yourself as trillions of parts. While you might be carrying on with your day, with your exercise or with whatever you're doing less and less of you is participating over time. That's the way that I'm trying to help people see their body as a sum of many parts. I'm not talking about like your stomach and your liver and your elbow. Like I'm not talking about those and the parts. I'm talking about all the cellular structures that make you up are slowly kind of they're dying off or they' are inert. While you are moving they are still because of some of the like still meaning not being compressed or deformed or squashed or squished by the gravitational load that these – even these loads that are constant like gravity through your habits, through your adaptations to your habits, you've modified what the cells are actually receiving and that's kind of… you know, we talk about mobility for athletic performance and for better knees and for better backs but mobility when you are mobile meaning all of you, all of your hinges articulate, which then of course has a component of if your hinges are articulating then the muscles attached to that hinge are able to move through their ranges of motion. Then that's when you recognize that that movement of that part, of that hinge translates into movement of the

muscles that attach to that hinge , which translates into oxygen and red blood cells coming into that local area. You begin to understand that movement has a localized effect and so you have to be moving in a way that distributes nourishment evenly throughout the whole entire body. And variability and being exposed to lots of different motions is one way to get that.

You know you talk about cross training right? everyone cross trains right? Everyone recognizes that you got to do at least three or four things. Yeah?

Robb Wolf: Unless you're –yeah.

Katy Bowman: [Laughs]

Robb Wolf: Unless you're an Olympic lifter in which --

Katy Bowman: Yes, yes.

Robb Wolf: --case you do Olympic lifting.

Katy Bowman: Right.

Robb Wolf: And then you ride a golf cart to your Olympic lifting platform because it's too fatiguing to walk but yeah.

Katy Bowman: Right.

Robb Wolf: [Laughs]

Katy Bowman: So, so I would say most people go okay yeah I understand it like except in the most hardcore extreme.

Robb Wolf: Right, right.

Katy Bowman: Where it would negatively influence your performance right?

Robb Wolf: Right.

Katy Bowman: Talking about the performance. That you would have to cross train but what I'm saying is our notion of cross training is like you're thinking of 12 different things that you need to do when there are actually three billion. Like there are three billion different loads because every theme when I say thing you're doing I'm talking about you know, what's the cellular

squish. So if you go out and you're like but I run, you know, let's say that you run or you walk, you go different distances or you're doing your heart beat and you're going, you're going, you're playing with variability in all sense of of all sense of what you found in conditioning literature but you didn't recognize that every single step or run or whatever thing that you have ever done has been on flat and level ground.

So you're already missing flat and level ground being the almost never occurring environment for your foot and therefore the rest of your body. The geometry that you assume every single day would almost never occur in nature and yet it is your most frequently consumed --

Robb Wolf: Uh-hum.

Katy Bowman: --vitamin. So you're going wow, okay so if I can give you a million different surfaces on your foot and therefore a million different whole body positions because of this surface then your idea of cross training really wasn't coming close to what I'm talking about , which is you've got these huge ranges of cells that have never participated in your movement because of essentially been casted by your environment. Your shoes, the flat and level ground. So any exercise that you're doing but on a flat and level ground would have to be modified. The distance that you look at stuff with your eyes , which is three to 30 feet pretty much your whole entire life never looked really beyond that. Besides these little isolated you know, camping trips or whatever for the most part.

**[0:45:07]**

Robb Wolf: [Laughs]

Katy Bowman: So there's so many different ways in , which we're casted. You're casted by the belt that you put on your pants every day and the chair that you sit in and the couch, and the car that you drive. But that over time, these not only limit your physical experiences but then they started shaping your mental ones as well so then we take this construct of how it is and we put it on the next generation sooner and we build these things and that we do. That's kind of the whole meme goes, right. You take an idea and it becomes some physical expression because now you can't even get a car seat without a bucket seat. Like when did that happen? When did car manufacturers decide that no one should be able to sit in anything but a slouched flexed back position because it was more comfortable for them the people who had said that before. So now you put your kid in the car, your kids in the bucket and then they transfer out of that bucket and they go into the bucket seat of your car and now their preference will

always be for a bucket because their bodies have been molded to the cultural furniture design that came from someone's mind at some point.

Now you have bodies being shaped by beliefs, which then perpetuate the body and the belief. So we've just got almost everything you know is pretty much that. Sorry. Sorry, guys.

Robb Wolf: Wow.

Katy Bowman: Yeah, I know.

Robb Wolf: Is that a good argument for me to get a motorcycle with a side car for the kids?

Katy Bowman: Yeah. You should tell your wife that that's exactly my recommendation that you should --

Robb Wolf: Katy Bowman said

Katy Bowman: That's right. That's right.

Robb Wolf: Because Nikki has basically been like yeah you get a motorcycle and you wake up with your testicles in your mouth. So yeah.

Katy Bowman: Wow. She's going all Godfather on you right there.

Robb Wolf: She's Italian so yeah I mean that's --

Katy Bowman: Oh makes sense.

Robb Wolf: Yeah, yeah. Yeah. Gosh so you know, it – I mean we talked about this on the last show where it's just validating on the one hand, horrifying on the other hand because so much of where we've gone wrong with food you know, it's again like if the only – I had a – god I'm just bouncing around here but I had a boss who was really, really smart. This guy was very successful in business but he was born and raised in southern California and lived around the Long Beach area. We were driving around one day and we were just talking about like farming and sustainability and what not. He just looked at me and he's like so this is going to sound really stupid but like vegetables grow in the dirt right? I just looked down on him and I'm like yeah, mean like where else are they going to grow? Like out of your ear? He's like no, no, no it's just weird, you know, like I'm – I'm a city kid and I just don't get it. So actually drove out you know, there were some farm outside of like Huntington Beach and he was like poking

around. He'd pulled a carrot out of the ground and he's like it just seems so dirty you and I'm like yeah man it grows in the dirt in the you know, and so there's this huge disconnect with food clearly and where folks think that food is just a horrifying array of things.

But the layer of movement and then even thinking about you know, like horizon deprivation and stuff like that, like that it just seems so much larger and so much even more entrenched and not on folk's radar. It's been interesting the talks that I did for corporate folks in particular. I actually start the whole talk off with the movement piece and kind of the –you know, the hunter/gatherer exercise kind of notion. Because interestingly people seem a little bit more open to that but yet I think that there's even more blind spots there than even what I was aware of particularly before reading a book.

Like there are so many blind spots there but yet oftentimes it's a more palatable place to start the conversation relative to jumping in and talking about food and photo period and stuff like that.

Katy Bowman: Yeah. You know, it really has nothing to do with smart or stupid. It's not smart or stupid, it's not even educated or uneducated. It just has to do with your cultural experience to date.

Robb Wolf: Right.

Katy Bowman: It's just that. And I've met a ton. I mean I would say that most people doing clinical research are very well educated. So it's not about education but yet for some reason almost every bit of research done on the human comes from the United States was on this – was on us. And really it was on people who are at college right? That's your – for the most people --

Robb Wolf: Right.

Katy Bowman: For the most part that your data collection is being done by people willing in your own department to participate in your study. For the most part that's where a lot of it is done. But it's certainly done in the population that is around you meaning most studies in America are done in Americans. Yet in all of this research on – here's what babies need, here's all the baby reflexes and here's how they were just vestigular and here's how they went away until their brains really developed. Women's pelvis have grown wide because heads are too big and our brains are just like all this crazy stuff just has perpetuated because no one thought that what we were doing in America was any different than what human beings do all over the world.

**[0:50:28]**

So you have this whole body of peer reviewed literature. It's peer reviewed, it's published, it's the data is all there. The data is not false it's just that the data pertains to a very narrow population void of lots of input and suffering from huge amounts of certain inputs. They're just now starting to recognize that really understanding anatomy by studying Americans over the last 80 years probably wasn't the best way of --

Robb Wolf: Place to go.

Katy Bowman: Yes or writing. I mean it's okay to write a textbook of here is the – here's the body of the modern American , which is what the textbook should say but what it says is human anatomy and physiology. No. that's not human anatomy and physiology. This is the American body. So there's a really great article on how all of that understanding is now having to be redone because of the way they phrase it was some researchers were doing the equivalent of studying penguins and believe they were studying birds. That's how it was, that's how it was framed.

Robb Wolf: Uh-hum.

Katy Bowman: But here's the thing when you go do a PubMed or a Google Scholar review, no one flags the – no one flags the articles that have since been modified or it's like hey it turns out that that method wasn't a good one or some critical piece. So you could be reading literature that is peer reviewed and everything, here, there everywhere. But it's not actually – it wouldn't be valid by taking it into a slightly different context. So that's --

Robb Wolf: We see that with blood work all the time.

Katy Bowman: That's for sure, sure.

Robb Wolf: You know, in our clinic what we consider to be normal blood work you know, as in blood work taking some of our best guess at some anthropological parameters looking at the Hudson, looking at as many kind of preagricultural groups as we can track down some preindustrialized groups and using that more as our baseline. What we find is and also even talking to the testing labs what they report as normal has changed dramatically over time. Because they're just kind of moving the benchmarks further. Because what is normally showing up in the doctor's office is more and more pathogenic. So you put your goal post in at these arbitrary points but they're very, very different than what we look at as being normal blood glucose levels, insulin levels, systematic inflammatory levels.

But yet it's still in the literature of what's considered kind of normal and I guess therefore okay is very, very different than what we are looking at.

Katy Bowman: Well as those – I mean you just always had to check like consider the source. Those goal posts are put in there for insurance purposes. It's like when do I call this a diagnosis. It's like well --

Robb Wolf: Right.

Katy Bowman: -you can track someone over 15 years and you see change like in math right and the science you're always looking for deltas. You're always looking for any change, any change because everyone has like their own particular baseline and then there are broader baselines that go for different people at different times in their life etc. But health, biological health and medical health are again two different categories. So you're like looking at biology and then someone else is looking at medicine. So when you're reading the literature you just have to kind of go well what is this person looking for? This person is looking for a risk for death. This person is looking for interventions, cost of interventions, period over a life. They don't have to be paying for interventions and so all of your data is going to be skewed to the person trying to come up with the solution for it.

So I think that a lot of people don't understand that with "science" and beginning to not even like the term science. Because that people just use it as a noun and a verb and an adjective and the cuss word. You know you can use it for all kinds of things. But it's like you have to consider the source. They're just a method. It's just a method. So you have to do the work when you're reading to figure out, you have to read the context. You can't take it out of context. You have to read all 7000 articles to get the context and figure out what someone is after. So anyway, that's where we are right now, science.

Robb Wolf: Science.

Katy Bowman: Science.

Robb Wolf: Where is that going to get you? Just heartache and suffering I tell ya.

Katy Bowman: I love it. I love it. I love it. And dates lots of dates on Friday nights.

Robb Wolf: Right.

Katy Bowman: Science look to dates.

Robb Wolf: Oh totally, totally. Totally. I did yeah, yeah that's tough for a difference. But I wanted to pester you with about one other thing. We're getting tight on time but you have one chapter your feet sitting and standing. When you were on the first show you were able to unpack the news piece that was talking about like the Vibram shoes and you know, some barefoot running and I think you have a new product out also that talks about transitioning more to barefoot activities. Maybe you could talk about that. But the thing that I have with Zoe we started her barefoot as much as possible main shoe, you know, "shoe" that she wore was this kind of moccasin type thing that was literally just like a flap of leather around her foot and she seemed to do pretty well with that.

**[0:55:48]**

But now she's at an age where it's really hard to find something that is legitimately you know, minimalist in shoe. We just try to keep her out of shoes for the most part and we run around in the back yard barefoot and we get stickers and rocks and all kinds of stuff. But do you have a recommendation along that line? You know, as the kid – it seems like there's a gap from about like two and a half or three years old up until about 5 years old where you have some good kind of minimal shoe options. Like how do you navigate that?

Katy Bowman: Well so I live in the Pacific Northwest where we get a little bit more weather. So we do barefoot as much as possible unless weather doesn't allow it. And keeping in mind that we'll even do barefoot in bad weather just not for extended periods of time. So I use soft star. Are you familiar with soft star shoes?

Robb Wolf: No, no.

Katy Bowman: So Soft Star is kind of my go-to kit. They're just again –they're just leather. There's no right rides, there's no soul, there's nothing. And you can pick the style of the design that works best for the shape of the foot or the season or whatever you want. So we've fared really well with those. A lot of parents are.. so foot development is huge right so my first book was on feet. I do have another transitioning to minimal footwear, a more robust argument. And it's natural you should do it. You know like a really robust evaluation of both sides considering terrain right is it really – is it really a full sense to go barefoot but then overtake you know, input of vitamin flattened level. You don't have shoes then actually protecting us because we're over consuming flattened level. These are questions.

Robb Wolf: Uh-hum.

Katy Bowman: But so you have to think about, you have to think about – you can't just look at the biomechanics of the foot. You have to think about well what's the relationship of the foot moving through the environment? What are the essential nutrients we still might be missing just because we have minimal shoes on. But anyway, with kids, foot –you know, everyone's concern is like my kid's feet are turning out, their arches are flat. You know, what do we do? The foot, a lot of the foot structures maintained by the hip. So again full development really includes minimal chair sitting so that's why we axed all the furniture in our house seriously. We have no furniture in our house because I kind of consider. I mean we have furniture we just don't have stuff to sit on. We don't have couches. So my kids have never really sat on furniture for eating or for any other time you know, just like treats that they get in other people's house when they sit on their – when they go down to people's house. They're like look at these chairs they're awesome.

Robb Wolf: [Laughs]

Katy Bowman: So I don't mind that. It's just that it's like junk food for the body. So I don't keep it on the house so that they don't over consume it. So when kids don't – when the kids are not taught how to sit, you're essentially teaching them how to sit by modeling sitting and then providing tons of stuff for them to sit. It's the 90-degree knee in the hip that eventually collapses the foot. It's the lack of the hip and the foot hinging and working together getting up and down or the squatting position is sitting on the floor, cross-legged, straight legged, wide legged, like all the different ways that kids sit and that people would be sitting you know, where they're not all this furniture that really go into strong and healthy feet. That the feet don't live in a vacuum. They're really a whole body phenomenon. So if you're noticing that your kid's feet are doing something that you don't think they should do at first don't panic. You might not know what they're supposed to do. It's perfectly okay for them to go. Like you don't come out with baby arches and then lose them. They're developed but they're developed through this really robust way of moving through the hip and through the knee and walking over terrain etc.

Robb Wolf: Interesting. Holy smokes. So I need to take the couch and hack it off the back patio.

Katy Bowman: Yeah. You can.

Robb Wolf: I can save a lot of money. Like --

Katy Bowman: Yeah.

Robb Wolf: --decorating the house is going to be really inexpensive now.

Katy Bowman: Well I mean certainly and we have monkey bar. Like we've replaced stuff. Have a tour of my house so people can see. It's like not as freaky as it sounds. It's just we have floor cushions. It's also I mean it's the way that most of the world actually lives. Again it's the weird anomaly to have furniture.

**[1:00:02]**

Robb Wolf: Right gear.

Katy Bowman: Yeah.

Robb Wolf: Oh man Katy we're kind of short on time I don't want to totally capitalize your day like I said. I could have spent two hours just on chapter 1 just with questions that I had. But before we started recording, I kind of threw out the possibility that may be folks following the podcast, following the blog may be we could do kind of a book club and work our way a chapter a week through this and then may be at the end of the month we could pull Katy in either of the forum or may be a quick podcast just to answer some questions. Just throwing that out to folks and we'll see what type of interest there is. If we have some good interest and Katy if you're game for that then maybe we can circle back around and work through this stuff. If there's not enough interest then we'll – people will just suffer with their bad hips and pelvi and they'll be smitten from above for not seeing the wisdom of that idea. But I'm really excited about that as potentiality.

Katy remind folks where to track you down and what stuff you have going on.

Katy Bowman: You can always find me at RestorativeExercise.com and that will take you to any possible way besides my home address. You can get a hold of me through that website. You can –there's social media pages where I'm on everyday doing Q&A and you can find so many articles and in a way just to read more through RestorativeExercise.com. Best way.

Robb Wolf: Awesome. Okay. Thank you so much for coming on again. Thank you for writing really an amazing book like I'm – the folks that I have on the podcast I try to actually make it – if they have books it's actually a book that I want to read instead of just a mill of stuff to pump through for

content. And that said this has been the most enjoyable book I have read in ages and I've read it twice. I'm getting ready to read it again. I have the thing is just riddled with notes in the margins and underlining and whatnot , which I actually do very, very little of that. And so I think that that speaks at least from my perspective testament to what a wonderful book this is, how valuable it is. I look forward to getting you back on the show whenever you're ready to come on.

Katy Bowman: Well I really appreciate that. Thank you and any time.

Robb Wolf: Great. Thank you Katy, we'll talk to you soon. Take care.

Katy Bowman: Bye.

Robb Wolf: Bye-bye.

**[1:02:25] End of Audio**