

Paleo Solution - 224

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Robb Wolf: Howdy folks. Robb Wolf here. It's early in the morning and you only need to ask our guest today Katy Bowman, master level of biomechanist that is early. Katy, how are you doing?

Katy Bowman: Oh it's early, it's early. I concur.

Robb Wolf: And you're the mommy of two and they're both young and rough sleep night last night so props to you for getting up and actually spending time with me today.

Katy Bowman: Of course. Thanks for having me.

Robb Wolf: So if folks are not familiar with Katie, she has a fantastic blog, KatieSays.com. She is the author of where did that page go, we've got alignment matters and then also Katie what's the book on the deals with Gals Feet?

Katy Bowman: It is every woman's guide to foot pain relief, the new science of healthy feet.

Robb Wolf: That's it. That's it.

Katy Bowman: Yeah. It's very long.

Robb Wolf: I just finally pulled it up. [Laughs] Now does that one apply to dude's feet to --

Katy Bowman: It does.

Robb Wolf: Okay.

Katy Bowman: Yeah. It does and it says so in the beginning, I kind of got beat into submission by my publisher who really wanted me to make it for women for this niche and I was like but mean have feet too and but I said in the beginning, we put it towards women because I mean really women and the buy more I would say health folks and they also buy the shoes for the family.

Robb Wolf: Absolutely. Yeah.

Katy Bowman: I don't know if your wife buys your shoes but.

Robb Wolf: You know, I usually wear shoes until they virtually rot off my feet.

Katy Bowman: Right.

Robb Wolf: So I don't even remember the last time I purchased.

Katy Bowman: Right.

Robb Wolf: Usually it is, yeah I guess she kind of does but it's usually like Amazon.com and it --

Katy Bowman: Sure.

Robb Wolf: -- drop ships to my house to my house.

Katy Bowman: Right.

Robb Wolf: And all the stuff. So Katy, give folks a little bit of your background so that they understand where you're coming from with the --you know, your approach to movement analysis and whatnot?

Katy Bowman: Well I'm a biomechanist which is someone who studies Newtonian physics like pressures and gravities and stuff like that as applied to biological systems. So anything that's living or was once living the way that it --mechanics, the way that works, the way that it moves in some cases on the easiest level like a human body, I focus on the body. I don't do any other tissues although I do have interest in trees, tree biomechanics but that's just because I'm a nerd. But anyway I think most people think about mechanics as or biomechanics as in athletics, you know, a picture on a baseball team will go to a biomechanist to figure out why they can't accelerate their ball in the right way or they can't get you know, the spin that they want on the baseball. The biomechanist will assess the way that they're throwing and saying well you're not maximizing your lever legs and you're not going through the ranges of motion where you could wind up and take the energy stored in other parts of your body and eventually impart it on to the ball going out of your hand. So they film and they assess and they give pointers on you know, hold your elbow up here a little bit longer this phase of drawing your arm back should take a little bit longer. You're dropping your elbow here and then sometimes the biomechanist will also be the person giving the corrective exercise as well saying you know, the muscular balance on

this side is such that the pull is what's dragging your arm down. So we get these stretches and these corrective exercises. I do that as well but I would say that where my career really went after graduate school was I became less interested in the category of athletics and movement or athletics and fitness because it's a real narrow category of human movement.

So I study kinesiology is the study of how humans move not necessarily how athletes move and so when I went to graduate school I studied the movement as it trickled all the way down to the cellular level. So how does – we don't really talk about movement so much right because you don't really think about your eyes responding to the screen. You're looking at as a human movement but it is and it causes a cellular adaptation or a tissue adaptation and now we know that it's actually affecting genetic expressions. So movements as a category of any time there is a motion whether it's a giant exercise type motion or something as simple as how deep your lungs are inflating because of the alignment of your torso when you take a breath, all of those things are themselves an epigenetic factor. So that's my perspective. So then I became really interested in well what are the biological imperatives of a human and what types of movements do we require in the same way that what types of nutrients do we require.

Robb Wolf: Uh-hum. Uh-hum.

Katy Bowman: Because I would say the exercise, exercise is currently the way that people look at it is probably how people used to look at food 60 years ago.

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Robb Wolf: Just parsed out, sliced and diced, separated pieces?

Katy Bowman: Well not even like parsing the three main categories right? You've got like strength, you've got cardio and you've got stretching as our main kind of groups. We look at how is that balanced. That's really kind of how we looked at food which was make sure you have your carbs, your fat and your protein and then all of a sudden how many different fats were there and then it became like well what's the relationship of proteins to carbohydrates that you're taking, like all these things that you know way more about than I do. So we became super nuanced with that because we realized that there's all these diseases that happened when the food that you were eating was not matched well with the machinery that you have, the biological machinery.

So what I'm hoping to do for movement is to really explain how oversimplified our relationship is with movement by detailing out. Like I work with loads so when you start calling things loads instead of calling them movements or exercises then you'll be able to see I guess the similarities between food and then just help people get back on track and get out of this disease profile that they have got by understanding that they're not – they're movement starved. They're movement starved. Even chronic exercisers are movement starved because they don't have a broad enough sweep of all of the nutrients created through motion or the loads, load profiles that they need.

Robb Wolf:

Oh I love it. I love it. So talk to folks a little bit about that because you know, there's – I think you know, and it's a fantastic analogy too but you know, it makes think back to the early days of nutrition when it was a bomb calorimeter you burn some stuff inside of a vacuated or an insulated chamber that was surrounded by water and that increased the temperature a certain amount. That's how many calories were in there. There was no thought about hormonal consequences or gut you know, biome or anything like that. And then I think also you know, we're at a point where just simply getting out and doing anything it seems to be good for the vast majority of people because they're so sedentary that they have virtually anything that they do is increasing their movement, their ability by remarkable amounts. But compared to what's optimal and what we would really ideally see, it's quite a difference.

But you know, we have people that usually latch on to one specific area of movement usually because it's related to some sort of a sportive endeavor whether it's you know, cross-country running or now crossfit which would be really interesting to talk to you about crossfit because it claims to have a really broad movement load. But I would argue it probably doesn't but you know, based on kind of the gearing because that tends to stay in like the glycolytic pathway. But you know, why is it important for people to do something other than just run, lift some weights and you know, follow a mobility DVD and just call it good with that. Like what are they missing and what could they potentially get?

Katy Bowman:

Oh well that's a huge question. What pops into my mind as you are talking about the example of that earlier data collection on the energy contained in food right, you know, --

Robb Wolf:

Uh-hum.

Katy Bowman:

So it's kind of like I feel that same way about pedometers. So everyone will slap on a pedometer and then they're going to quantify how much

they had moved by this external apparatus that measures really not how much they move but how many times the pedometer was accelerated towards the ground. Like how many times did you bang that accelerator as what it's measuring? It's not measuring anything about movement. So you can have two – you can have the same person where that exact same pedometer and get the exact same number of steps but what's physiologically happening could be different in each of those scenarios. So just by – you could go for a walk and we're like okay that's great because you need to walk and you need to get outside and here's the things that you get from walking. But what I am trying to present is not everyone is getting from their walking what they think they are. You could be falling for example. You know, we say that human movement is a series of falls and that is what it has become but that's not what it's supposed to be.

What I'm trying to explore in this I have another book coming out in a few months called Move Your DNA and that is a lot of people move elastically. Meaning they you're using the recoil, the passive recoil properties of muscle which are non-caloric expending. So you're supposed to be moving by the series of muscular contractions that is accelerating you forward and deaccelerating you in a controlled manner where there's not a lot of wasted energy. Meaning that as you're taking a walk, you're not – you see people like a spring in their step, right? They're kind of like bobbing along or you see people walking they kind of lumber from side to side.

[0:10:18]

Anytime your center of mass or your body is not doing all of the work to move you as most in the direction that you intend to go as possible. Meaning like if you're going off side to side, you're not --

Robb Wolf: You're burning extra energy.

Katy Bowman: You are. You are. Well but you're – what I try to – what I'm trying to explain is that just because your whole body is moving relative to the ground does not mean that you fired any muscles to do so.

Robb Wolf: Hmm. Hmm.

Katy Bowman: So if you're taking a walk and let's say that you sit at your computer all day long to like eight or nine hours, and then you get up and then you go and take a walk, the belief is when you stand up, your body goes back to how it was before you sat down for ten hours you know, for the last 25 years or 35 or 75 years of your life.

Robb Wolf: Right.

Katy Bowman: But we're kind of casting the same effects that we get. If anyone has ever broken anything or had a surgery and had like immobilized in a cast and you take the cast off, you're like what the heck. You know you're atrophied on one side and if you ever had an arm cast, you know if you broke your arm and were casted at 90 degrees between the upper arm and the forearm right so it's this you know, you bend your arm. You get a cast like you see in all the movies.

When you take that cast off, you've actually lost muscle mass but you've not lost muscle mass only in the way that you think you have. You'll have a skinnier muscle but your muscle mass is made up of a chain of sarcomeres right? So you've got – if you have a muscle, its length is made up of a series of smaller pieces and the more time you spend with that muscle in a shortened position, then your body actually will go through a process --

Robb Wolf: Conform to that.

Katy Bowman: Well yeah it actually goes through a process called sarcomere lysis where there's no point in maintaining muscle mass that's used to achieve a range of motion that you never go through.

Robb Wolf: Uh-hum.

Katy Bowman: So you lose it. So now your metabolism is lower, your joint range of motion is slower. You have adapted and I think the fallacy is that we keep using the term adaptation to imply improvement. But you've – but adaptation is really adjusting the tissues in your body so that what you do most frequently is easier on you in the short term. It doesn't really imply that you've become better in the long term.

So that's what people need is to understand that the breadth of movement that they should be getting is much broader. It's like it's really pretty vast. You've got 300 joints in your body and all of them should be loaded and the ranges of motion and when they don't, move over a period of time they become sticky in which case... You know, your foot is a good example right? So if you've been wearing shoes the bulk of your life, you've got all of these joints, 33 joints in your foot. But if you had a shoe on, then none of those joints had had to deform and then the ankle deforms excessively. So we're casted by shoes and then you take your shoes off and then you go to walk around. It's not like those joints in your foot start all of a sudden moving and the muscles in your foot to life.

They've adapted, they've atrophied. The nerve supply has decreased. The muscle mass is low, their bone density is lower and then your ankle is kind of hypermobile because it's had to compensate for everything that's happened in your feet. So then you go for you know, a walk and you're... You know you say you don't do barefoot a lot and you go out and play a game of football with your friends at a picnic and you hit a pothole and then all of a sudden you sprain your ankle. Because that is not a scenario to which you have the equipment to do.

You've actually lost the equipment, the equipment being the full amount of muscle mass necessary to generate force and to --

Robb Wolf: Proprioception.

Katy Bowman: And I could go and on, all of it.

Robb Wolf: No, no it's fascinating.

Katy Bowman: Yeah. All of it.

Robb Wolf: And you know that maybe a decent segue like just a few days ago there was a news piece talking about a settlement that Vibroom, Vibrum, Five Fingers has offered to people, you know, basically casting Vibram as this evil entity that promise people better, healthier feet and legs and then these folks ended up getting injured and there was actually a -- and it's to me seemed like a pretty well done study looking at transitioning people who would not historically barefoot run. They did some barefoot running and they showed some bone marrow edema in these folks. I believe they used an MRI to kind of dig this stuff up. But what do you think about that Vibrum story? I know you did a fantastic piece on your blog but what are your thoughts on that looking at this from a biomechanical perspective and you know, where is the liability there if there is any?

[0:15:13]

Katy Bowman: Well first I like to clarify that the lawsuit against Vibrum no one had an injury which doesn't mean that people don't have injuries in them but the lawsuit didn't have anyone who was injured. It was simply the class action lawsuit that was brought about was because the woman who was wearing them had claimed that she had not received the benefits that she believed that Vibrum had offered or advertised which is all you need to do is put these shoes on your feet and then you can just start running in them. Vibrum has a guideline of transition which I will say from a biomechanical perspective is pretty oversimplified as is anything. I don't think I would get my physiological guidelines from any brand but she did. The lawsuit, I mean the lawsuit is even saying that there's no way that

Vibram can advertise that their foot, that their shoe create – they were using like barefoot literature so in barefoot research when we measured you know, runners or walkers and barefoot, we can say here's what your center of mass is doing with barefoot compared to regular running shoes that's usually the comparison.

And so what Vibram did is Vibram took the barefoot research and said well our shoes are barefoot shoes so any benefit that you get by doing something barefoot is equal to what you get while wearing our shoes. The assumption being Vibrams allow for full range of motion. But of course it's not the same thing because you've got I mean you've got a little bit of cushioning there. You got something between your toes, etc. So the lawsuit was you can't use barefoot and equate the benefits of your product to research that is not about your product. You need some sort of research that quantifies --

Robb Wolf: Actually wearing shoes.

Katy Bowman: Yes, yes.

Robb Wolf: Right.

Katy Bowman: You would need a population saying here's barefoot and here's Vibram and here's how they link and then you could go forward. So it was about – it was really just about that and that therefore people had been swindled, that was my favorite part, had been paid excessive amounts of money for this benefit that they would actually have to do work to do. Like the lawsuit. I mean it's just you can see it. I link to a link and you can go read it and it's really it's really hilarious. It's really, really funny because the lawyers I'm imagining her writing it it's like these shoes don't even work unless you go through all of the painful changes of you know, learning a new gate pattern some of which people may never learn and you know, you can get basically really sore while exercising. That is bad. It's like it was just really, really funny. I did see the study that you were talking about the swollen bone marrow but what they did find –so let me go back, can I go back?

Robb Wolf: I mean you can run wild kid.

Katy Bowman: Okay. I'm going to go back.

Robb Wolf: Just do whatever you want.

Katy Bowman: I'm going to go sideways, I'm going to check – this is like the agility part.

Robb Wolf: You're the biomechanist, you do whatever you want to do.

Katy Bowman: You go wherever you want to go. So in that study there was like a really kind of like I would say a slanderous or it was a sarcastic I would say write-up of the Vibram to me. It was very entertaining but I wouldn't say it was very helpful. But they included this study and so this study that you're talking about which is an ACS study about looking at populations who were regular runners and then they did a baseline MRI of their lower leg and foot and then sent them out to run for I don't remember how long it was, six weeks maybe, maybe longer. And then had them come back and took a second MRI to see if there was any swelling. Because swelling of the bone marrow is kind of a precursor to fracture. So there's quantifications. I mean swelling is always associated with remodeling right. So the hard part to parse out is if you're doing something different you're going to always have to expect some sort of swelling right? Everyone who exercises know that. Like that's why you're exercising right is to --

Robb Wolf: To elicit an inflammatory response.

Katy Bowman: You're trying to create an adaptation. An adaptation is basically you know, damage and a beefing up, a repair and then giving you more material to deal with the next time you do that so that you don't have that response. So they did parse that out where they said like if you had a zero where they quantified as a zero to 1 inflammation, then that would be regular. But then there are levels of inflammation that are associated with fractures coming soon. So if you had a nagging pain in your shin or your foot and you went to your doctor and they gave you an MRI and they saw that level of inflammation what they would tell you to do is you need to do a different activity. So you don't need to stay off your lower leg or your foot for example. But whatever you're doing whether it's running or jumping or whatever your regular, most frequented thing is, that's clearly what's creating this scenario. They can't pinpoint exactly what it is. It could be something in your gait or whatever so you need to do something different so that inflammation can go down.

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Because if it sits there, then eventually you'll have a fracture.

Robb Wolf: Uh-hum.

Katy Bowman: But what I found most interesting about that study is they didn't control it. Meaning that they allowed the two groups to progress.

Robb Wolf: Zoe just walked into my office.

Katy Bowman: I saw that. I love that purchase, I'm surprised like my milk didn't start going.

Robb Wolf: [Laughs]

Katy Bowman: How old is she?

Robb Wolf: She's two, she's two so. Sorry.

Katy Bowman: That's okay. I can hear this little like hey daddy, how's it going.

Robb Wolf: She came in saying hey, hey.

Katy Bowman: [Laughs] It's great. That's you know, more kids are work that's the real life.

Robb Wolf: Right, right.

Katy Bowman: What I found interesting was they did not give anyone guideline. So the people who were given Vibrams and they had never run in Vibrams before were just said to progress you know, slowly. The end. So everyone ran different miles and mileage and there was no control over like these were experienced runners with like good gait or whatever.

Robb Wolf: Uh-hum. Uh-hum.

Katy Bowman: They said in the study the reason that they did that is because they said we know it decreases kind of the scientific value of what we're finding however this is how Vibram's guidelines are on their website. So we allowed our runners to follow the Vibram guidelines. So in effect what they did was they researched where the existing guidelines adequate and not... They really didn't research the effect of running in minimal shoes as much as they affected, researched that. So my point I guess with all of that is I don't think the guidelines were good enough.

Robb Wolf: Just as far as allowing people to get into... You know, like for so many people they should have simply walked for a long time before even thinking about running in the Vibrams for example

Katy Bowman: Yeah. I don't even think that people really understand just how atrophied their feet are.

Robb Wolf: Right.

Katy Bowman: But it would be like the equivalent of taking your lower leg out of a cast and then taking it out for the run. Like you would never do that but our feet to us they're as healthy as they always have been because they've never really been healthy.

Robb Wolf: Right.

Katy Bowman: And so our baseline with our foot is like hey my foot is at 100%. It's like actually your foot is at 15% but it's been at 15% since you were one and someone put shoes on you and that's where I think the problem lies. So that we end up with this kind of communication problem between the allopathic group as like really they're kind of giving a broad sweeping statement. It's like minimal shoes aren't healthy because they're seeing the injured people who really – who shouldn't have been running in the first place who should have taken not I think on the Vibram's website it's something like it might take weeks and I was like I think it's going to be – you're the rarity if it takes less than a year but there's no way for you to see injuries that are going to be made in five to ten or twenty years. All you know is I'm fine doing it right now and then when your X, Y or Z pops up later, you probably won't even associate it with the transition and the frequencies of the way or the style of which you're running like your gait pattern because it's too disassociated with you. People don't think of things in their knees or their hips as stemming from their feet. Because you know, those are like three and a half feet away so how could they possibly relate --

Robb Wolf: They just dangle down there and they get smelly occasionally.

Katy Bowman: Right, right.

Robb Wolf: Yeah, yeah.

Katy Bowman: They're like the earrings but for your ankle.

Robb Wolf: Exactly. Earrings for your ankles I love it. So you know, when you have kind of looked out as part of your work, who does have reasonably healthy feet? As maybe an athletic population or a –you know, like dancers, ballet, gymnasts, anybody that you do run across that you're like okay those feet are pretty healthy?

Katy Bowman: Well culturally we've all worn shoes. I mean the rarity, the healthiest feet are in the unshod populations who've been unshod since birth. I mean

dancers have the worst feet no offense dancers, I love you but I mean they're like especially ballerinas you know, when they're going on point what they're doing is they're kind of creating a block out of their foot and all that pressure and they've got toe deformities and bone spurs. Dancers really do sacrifice their feet for the art of dancing.

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Rock climbers too right? You know, anytime you're cramming your foot into something really tiny, the people I would say who are most mindful about the foot would probably be yogis or people who do a lot of yoga. Because there's a whole, I mean that's – yoga itself is kind of coming from a barefoot culture. So there's a lot of that. Also, you know what hula dancers. I'll have to take hula dancers. I'll take them out of the dancer category.

Robb Wolf: Okay.

Katy Bowman: Because it's a barefoot activity, right?

Robb Wolf: Right.

Katy Bowman: You're logging hours and hours kind of connecting your pelvis and your foot back together and you're using that whole area of the foot.

Robb Wolf: Interesting.

Katy Bowman: Yeah.

Robb Wolf: You know, Capoeira originally was a barefoot deal. Have you played around with any Capoeiristas? It would be interesting also to see what your thoughts were just in general on their overall physiques and movement patterns and whatnot.

Katy Bowman: Yeah. I don't think so and I was -- you know, I've been in Ventura California for a long time and there's a big capoeira population in Sta. Barbara. But no I never have. I would say though a lot of people exercise and think about their feet more but before this kind of barefoot or minimal shoe movement happened the last few years, what you do for an hour or two hours a day really isn't trumped by what you do with your feet.

Robb Wolf: Right.

Katy Bowman: The other 12 or 15 hours. So even if you're super conscientious and you know you're doing your martial art or you're doing your dance or

whatever else you're doing, the way physiology works is it adapts to what you do most frequently not what you do at the best of intentions.

Robb Wolf: [Laughs] That is a patentable line there. That is phenomenal.

Katy Bowman: Yes it is patented right now. Right now just as where you're talking I just had – every time you use it now you have to pay me a quarter.

Robb Wolf: I will pay you a dollar. It's worth a dollar, maybe a dollar and five.

Katy Bowman: It's on record folks.

Robb Wolf: You know I guess it's just kind of blowing my mind because you're just paralleling. It's nice to hear somebody in a different discipline talk about a lot of the same stuff that I talk about more with food. You know, I kind of play with photoperiod and you know, sleep light cycles and all that stuff. But it's getting any change for folks seems monumental at times. You know, like just getting a –there's a huge swathe of the population like if you can get them off the couch and like walk to get their mail it's like oh man you know no pink ribbons for you. They're all gold today so you know, brother, but at the same time that level though is just woefully, pathetically inadequate if we're going to have anything approximating you know, really legitimately healthy genetic and epigenetic signaling going on right?

Katy Bowman: Right.

Robb Wolf: So it almost feels like peeing into the wind not wearing goggles and what the heck do you do? I mean so you know, what are you trying to do as far as you know, messaging for people? Like how are you trying to help people slice up their daily routine so that they move towards some sort of epigenetic optimum or just generally that are health? Clearly spending more time barefoot, I would assume standing you know, like I write and I completely saw my body just degenerate up from under me when I would sit and so I finally moved to a standing workstation which is better but there's still issues with it because I'm standing one spot. I'm not going over uneven terrain all throughout the day and whatnot. Like what are your recommendations maybe starting from the feet and working our way north as far as getting some better movement and better physiology going on?

Katy Bowman: Well I think that people, I think people are paralyzed because they think it's so overwhelming. You know, it's really hard to be told that everything you're eating and everything you're doing and everything you're thinking

and everything in your house and how you're raising your kids and how you were raised was wrong. Like it's too big. It is just being slapped in the face from every single direction. So what I tried to do is I think that time is everyone's biggest limitation even when it's not, even when people have plenty of time that they're kind of dribbling away. I think that when they hear this big message that they automatically assume that that big message comes with a huge hours and hours a day of responsibility of what they need to now be doing and they don't have any extra time so therefore they just can do nothing.

So I like to start with what I call the time free things that you can do and I've created like different portals for people to come in because there's like alignment. Alignment is just like thinking about where your structure is throughout the day. So even if you're standing there, you can stand in a way that loads you better. There's ways that we stand that are culturally derived and ingrained in our tissue because we've been doing them because our parents did them and sometimes because we were forced to do them by you know, the heel of the shoe that's on our foot.

[0:30:27]

So putting on a minimal shoe is something that takes no extra time. Right? You're going to put on a shoe in the morning regardless. So even if you're not a barefoot person yet I mean obviously spending more time barefoot that's great but putting a shoe on in the morning is something you're going to do no matter what. So all it takes is you changing what's in your closet so that you're not putting something on that shoves your pelvis forward all day long that you can't undo because of the geometry that's creating that situation. So changing footwear I don't care if you go like Vibram or whatever, just get out of the heel, that's the first thing. Eliminate the heels from your shoes, zero drop, zero rise, get a pair.

Robb Wolf: Not just – not one shoe. [Laughs]

Katy Bowman: Yes, yes right. Well it just depends on how much time you're really --

Robb Wolf: You need to be really specific with this stuff, otherwise you --

Katy Bowman: You're right.

Robb Wolf: -- and I will both be sued here in like two years and people are like they told us to get a shoe and --

Katy Bowman: That's right.

Robb Wolf: Yeah, yeah.

Katy Bowman: And split a pair of your friends so you can both be healthy.

Robb Wolf: Totally, it's cheaper, yeah, yeah.

Katy Bowman: And then the other one is how you sit, not even like the alignment of how you sit but you have to get off your couch. If you're going to sit there and watch TV or have a conversation, sit on the floor. Sitting on the floor is what people pay to do in yoga class, right? You're like for some reason yoga classes the world over have like just inadvertently you made it seem like the only time that you can sit on your floor in a cross legged fashion or a straddle stretch like put your legs way out and lean forward has to happen when you pay \$15 enduring this hour time with special music.

Robb Wolf: Maybe you know what Katie, what we need to do is you and I need to patent some sort of like stinky, hippy carpet spray. No, right now I just patented it right now.

Katy Bowman: Okay.

Robb Wolf: So now we need to start selling this and then if people spray stinky hippie carpet spray, then they'll get down and just wallow around on there like they do in a yoga class. It will be perfect.

Katy Bowman: So --

Robb Wolf: You know, you're going to be incredibly wealthy by the end of this podcast --

Katy Bowman: We already are. I just looked and Amazon just sold 72 of our sprays right now while we're on --

Robb Wolf: Cool

Katy Bowman: Yeah. I think it's a counter culture. I mean there's definitely -- I think with food you're a little bit -- I want to say that you're a lot more fortunate in the food arena because diet has been just one of those things that we've been coached over the last 20 or 30 years to be aware about. I'll bet anyone who's really super concerned about what they ate before because you only ate what was available but because more things became available that weren't those things that you know fell from trees or grew up from the grounds than we had to have like a period of time in which everyone kind of got ill and then it was like hey let's look at nutrients and food and relationships of food. But --

Robb Wolf: People are at least trying to think about like okay my food might have some impact on my wellbeing --

Katy Bowman: Yeah, yeah.

Robb Wolf: - whereas like movement, movement patterns and you talk about the way that you move or don't move, the way that you're inspiring that that could change the signaling of your genes?

Katy Bowman: Yeah.

Robb Wolf: And people are like you're nuts.

Katy Bowman: Right and it's like no really I'm not nuts. Like you have a type 2 stretch receptor and the counter receptor in your lung tissue that depending on how deep your -- how -- you're like when your lungs inflate they inflate downward. Right? Like they're sacks that drop down towards the ground as they inflate and they go back up. So they're pulling air in and they're pushing air out. But --

Robb Wolf: Wait. I thought my clavicles just went up and down when --

Katy Bowman: They do. You could do that too especially if you're like a butterfly. [Laughs]

Robb Wolf: Nice.

Katy Bowman: Yeah. No matter how you deform your skeleton around it, what's happening is there's a relationship between how your skeleton deforms while you're breathing and how deep your lungs deploy. But the amount of stretch that those lungs get which is equal to how much they deploy which is based on the kind of pressure gradients that you create by you inflating your stomach or is your diaphragm moving, are your ribs moving, like there's all these different ways to get oxygen thank god. Hold on I'm going to take some oxygen right now.

And then the amount that that stretch receptor is stretched which is a process called mechano transduction is taking... Mechano transduction is the process of deforming a cell that goes all the way down to the deformation of the cytoskeleton that signals the nucleus on how to express the genes that are within it.

[0:35:03]

So that stretch receptor in your lungs then goes and sends a communication to your heart about how much to beat. So which makes sense right because of the whole point of your cardiovascular system is to deliver oxygen if you're pulling in low amounts of oxygen because you're not deflating fully, then you're going to have to increase the beat of your heart or the heart rate because you're going to need to bring more volume of oxygen in because the volume per area is so small per volume. Like if you do a fixed volume like say a cup so a cup of your blood has low oxygen in it because you're not taking full deep breaths then you're going to have to circulate your blood faster to bring the oxygen to the capillaries, to the tissues so that your cells don't die. So it's this like beautiful relationship but if the way that you sit or stand all day are what you put on your feet, it's affecting the quality of lung deployment and therefore the amount of oxygen then your heart has to compensate for your physical environment choices. We don't want that.

Robb Wolf: Right.

Katy Bowman: Cranky.

Robb Wolf: This is heavy stuff sister. Wow.

Katy Bowman: Yeah. To me it's totally light. To me it totally makes sense but I'm also a bio mechanist which means that you don't go into a field unless you have a proclivity I think for thinking that way.

Robb Wolf: You're definitely ear lobe deep in it. I will say that. You're lobe deep in it. It's fascinating stuff. So you know, having people think about where they're sitting, off through the floor instead of the couch which oddly enough you know, part of my sitting while writing led to the first back problem that I had ever had in my life and just a payback because when I was a physical therapy aid, I saw people come in with back pain and they would you know, cringe and beat up with sweat and pain and I thought that they were malingerers. And then I actually had some back pain and I was like I'm a bastard. [Laughs]

Katy Bowman: [Laughs]

Robb Wolf: I'm getting exactly what I deserve for being a bastard towards those people. But you know, some of the gimme's sitting on the floor wearing some minimalist shoes, getting around barefoot as much as possible, like I know a lot of people that wear shoes inside their house.

Katy Bowman: Right.

Robb Wolf: And they don't even take their shoes off inside the house. So for the love of god at least you know, take the shoes off, stick them on a stand to the degree that you can try to get some minimalist shoes, no heel at all. What else? What about for – I see so many people becoming kyphotic and losing shoulder mobility and capoeira and gymnastics I'd seen that folks tend to have pretty healthy shoulders, tend not to lose this normal kyphotic kind of architecture in their spine. They remain pretty mobile in their shoulders. What about shifting from feet ankle, hip and heading more neck, shoulder, thoracic region? Like what do folks need to do to keep those things happy and mobile?

Katy Bowman: Well you know, walking is one of those things where we don't think about it as an upper body activity. But really you've got this thing called reciprocal arm swing right. So when you're taking strides at your legs, your arms are doing the opposite. Like your left leg goes back when you walk and your right arm goes back to kind of counter balance. So there's this whole reflex driven relationship between your upper and your lower body that so many people especially I'm going to assume that most people who are listening to you are probably going hey I don't know you know, I'm a mover and so I want some tips on how for example I'm walking. So what I would like people to do is go out and go for your walk outside and I want you in your minimal shoes, in at least one. You're going to go out and you're going to look at what people are doing with your arms because you're going to see that most people have removed their arm --

Robb Wolf: Their arm swing.

Katy Bowman: --yes they remove their arm swing or worse they changed it --

Robb Wolf: The side to side.

Katy Bowman: Yeah you can see the side to side or one arm pumping or no arms or you're on the phone. Right? Or the other thing that people do with good intention is that they pump their arms out in front of them to work harder metabolically but disrupting the whole integration of the way the arms and the legs save the spine.

Robb Wolf: Oh like the whole heavy hands deal.

Katy Bowman: Or the heavy hands or holding weight or just imagine like kind of applying race walking principles like I'm going to --

Robb Wolf: Right.

Katy Bowman: --flex my arms and my elbows and I'm going to pump my arms out in front of me only when reciprocal arm swing although it looks -- like if you put your arm down by your side and you reach it all the way back behind you and all the way up the front, the motion of this kind of slicing front to back it can look one way but it can be driven by a completely different set of muscles.

[0:40:03]

So in reflex driven walking as you're moving forward the leg that's driving you forward is pushing back. It's extending the hip and the work is backwards. The work is basically hip extension only the foot is connected to the ground. That's what catapults you forward. So your arm needs to extend and work behind you not flexed and work in front of you. So everyone is like busy pumping their arms out in front of them. Ironically in the same direction and muscle tension patterns as it takes to work on your computer all day. During your exercise time what you're doing is you're strengthening and reinforcing all of the malalignments and motor programs that are set by the office or school or that seated look at your computer kind of curl forward. So instead of working your arms in front, they should be working back. So you know, everyone is like I'm back in my arm you know, with women tend to be like the back of my arm is so flabby and what do I do. It's like you stop pumping your arms out in front of you when you walk and start letting your reflex reciprocal pattern take over and you kind of kill all your birds with -- I hate to kill birds with a one stone but you know what I mean. If your arm works behind you not only are you working that posterior musculature that helps offset that like hyper kyphosis of the spine or the office head and neck but it also keeps you from over rotating your spine when you're walking. It's what keeps you from developing so much tension in the muscles up your back. So everything is kind of connected like that.

What we do for fitness because again what we're focused on with our fitness or health is purely metabolic variables like how many calories does this burn, what's my heart rate. We have failed to acknowledge because people aren't taught about the structural adaptations to movement. So you can have emotion that's good for you know, pumping your heart and burning more calories but just burning calories or just tensing any muscle isn't really good for the body. Right? Like if you pull your shoulders up to your ears, you know, in your aforementioned reading pattern, you know if you pull them all the way up to your ears, that's burning a muscle. But just because you're doing that doesn't mean that --

Robb Wolf: Doesn't mean that it's good for you.

Katy Bowman: -- its' good for you. Right, right. You're going to end up damaging the disk in your spine. So we've got to kind of stop evaluating things only on metabolic baseline. There is so much more going on structurally and with most of the affluent ailments are really mechanically induced. I mean there's ones that aren't but there's mechanical precursors I mean including things like how well you digest your food and how you can extract your food. You know, your gut is not in the vacuum. It's inside these three pressure chambers. It's running through three pressure chambers all of which you can change the pressures just by which muscle, skeletal muscles you decide to fire based on your cultural experience.

Robb Wolf: And we should be squatting the poop as part of that.

Katy Bowman: Squatting the poop is another one. That's another one of my doesn't take any time get yourself a squatty potty. You don't even have to be in shape or have the necessary joint range of motion to support yourself like in a squat. A squat is a pretty big physical feat but if you get a squatty potty, you can just -- or just take you know, two trashcans, so your little waste paper baskets and put them over or maybe take five or six copies of you know, --

Robb Wolf: My book.

Katy Bowman: --maybe your book.

Robb Wolf: [Laughs]

Katy Bowman: Take your book and put it up on each side, ten copies, a squatty potty made.

Robb Wolf: Nice.

Katy Bowman: Yes.

Robb Wolf: And probably the best utility that that book has ever provided. Since its day of inception, I'm going to throw this one at you. Imagine this scenario, 63-year-old guy walks into your gym. You ask him what he does and he tells you I'm a glass blower, I have been for about 35 years, what do you do for outside of work activity. I'm a long distance cyclist. Can you picture that?

Katy Bowman: I can.

Robb Wolf: This guy, you know, we had nowhere near your background but this guy was so kyphotic like even in his 60s he's been with us almost eight years and in the course of eight years he's regained almost 2 inches of height just from the mobility, stretching, strengthening, trying to you know, like almost breaking his T-spine over a foam roll or at times trying to you know, get any type of an input at the other direction. We at least got the guy to get into cross-country skiing and he bought like some fly land cross country skis so at least when he's out doing some stuff he's in a somewhat of an upright posture instead of being hunched over at a bike. But what do you recommend as far as that mobility, stretching, foam rolling like trying to alter tissue you know, in a favorable direction? Clearly you made this point earlier which again is you know, the Katy Bowman patented technique number one, you know, the more time you spend at something the greater the input or you've said it much more eloquently than I just did.

[0:45:25]

But you know, the big signal that's going it's going to win. So try to do as much signaling that's beneficial as you can and you laid out some of that as far as barefoot or minimal shoes, sitting on the floor trying to regain a normal walking gait. But then beyond that like what are some of the other things that you like? Do you like foam rolling? Do you like contrast hydrotherapy plus stretching to try to elicit some tissue changes? Like what do you do in that direction on kind of I guess a restorative therapeutic exercise or mobility program?

Katy Bowman: Well I would say that with everyone that I see and everything that I teach, we kind of have like a multi-pronged approach. So the first is we always did education part which is kind of if I have to sum it up it's just what you just said which is helping someone understand that the situation that they are in whether it's an actual health issue or it's just a structural like I don't like the way my spine looks flopped over here, maybe they don't have any sort of cardiovascular issue or digestive issue or hernia or whatever. But they just – they know that it's coming so they're like what do I do.

The first thing that we would do is similar to what you would do which is have them look, have them understand that the cycling that they're doing is what's contributing to that shape and that you can't offset one with the other. This whole kind of idea and like in the same way you can't offset a candy bar with an apple right. The apple does not negate that you ate the candy bar.

Robb Wolf: Right.

Katy Bowman: They're both input. You will cascade all of your chemicals and you will deal with them equally. Which isn't to say that the effect would be the same or let me see it. Which isn't to say that they both don't have their own effects in isolation but when you combine the two there is going to be an adaptation that's going to happen regardless. So if someone is a cyclist but at the end of cycling every day they do foam rolling and that's great. What that does is it's changing the input that comes in all day long. However you're going to get in a plateau of loop of sorts if you can't reduce the loads that you're putting in. So kind of as you did which would suggest another activity to take up whatever and I don't like pulling people off stuff that they love. When someone loves something you know food included there's something that that's giving them. If you take something away without understanding what that was it's giving them what sort of benefit they are reaping from that you know, I'll put quotes around like poor behavior or unhealthy behavior it's kind of setting them up to fail. Unless they've got a tremendous amount of willpower. So cycling maybe was giving him you know, this athletic endeavor or he just has this daily need to use his body by giving him something that doesn't promote kyphosis and you know, psoas that in its resting state now becomes short where that pull on his spine is all the time that's helpful. So we do educations that people understand that kind of in the same way that you are as you eat that you are as you move. Right. You are as you move. So you've got to learn how to move differently. A lot of people have this approach or idea they can go to physical therapy or a trainer to get some extra exercises that fix the problem so that they can continue on with the very behavior that got them where they were.

Robb Wolf: Right.

Katy Bowman: It doesn't work like that. Physiology doesn't work like that. Everyone needs to take a physiology class or --

Robb Wolf: And the physics class.

Katy Bowman: And the physics class. Thank you very much.

Robb Wolf: I think that competency in basic physics should preclude citizenship in my opinion.

Katy Bowman: Yeah --

Robb Wolf: You've got some physics class don't go.

Katy Bowman: Get Zoe on that right away. It's like I'm sorry you can't, we're not getting breakfast until you can explain *Poisson's* effect.

Robb Wolf: Exactly.

Katy Bowman: Yeah. So there's this kind of basic understanding of how it works. I mean that's not deep, that's just you know, you want to be different, you got to do different.

Robb Wolf: Right.

Katy Bowman: So then corrective exercises are great and then I always kind of break the corrective exercises into active and passive. So things like foam rolling and having someone else stretch you and some even techniques that you do yourself like yes you're foam rolling yourself but it's a passive technique. Meaning there's not an activity in the musculature as you're doing it. So depending on when you want sarcomeres to change in terms of number either getting more mass back or... I hadn't really talked about the flipside of when you have a habitual like if we go back to being casted in the arm.

[0:50:17]

Robb Wolf: Right, right.

Katy Bowman: One side of you –what?

Robb Wolf: I said right. I'm sorry.

Katy Bowman: Yeah, yeah. you probably already thought through what I was going to say. On one side, something is getting shorter but on the other side something is getting structurally longer which also inhibits the joint's full use of motion. So like research shows that the best way to get that sarcomere either absorption or regeneration to happen is through like e-centric loading. So most of the corrective exercises I do have an e-centric portion to them but I also – I don't give, I really don't give corrective exercises. I have before and sometimes I do just to spot, fix something like oh you're having problems with your head so do this with your neck and bring your shoulders back here. The exercises that I try to do I'm trying to help people reestablish their reflex driven movement patterns which is the way you walk right now isn't really the way you would have walked should you had developed in nature the entire time. The spine shape that you have right now is not your genetically. It's the expression based on the environments that you keep and the chemical environment

of which movement and posture are all a component of. So I mean I think that all corrective exercises are great. immobilization in general however you want to do it, actively or through like yoga tune-up balls or foam rollers or whatever you're using to get into the crux and crannies. You have to undo your sticky spots because when you don't use an area of a muscle what happens is the muscles are all kind of gliding over each other. But when you have an area that doesn't move then the level of connective tissue develops between the two which then prevents them from moving.

Hopefully you don't allow that tissue growth, that connective tissue growth to grow too long between two muscles because then you have an adhesion. And then now those muscles requires a lot of physical breakup to get them to move. So adhesions aren't made overnight but you've got a lot of adhesions in your body because there are so many parts and motor programs that you've never used that are off our cultural radar or culturally blind to all the amounts of immobility that we have. So unless you're going digging deep, you know, what is –I think Kelly Starr, it says go hunting right? You know, --

Robb Wolf: Right.

Katy Bowman: You got to go hunting for your spots all the time and make that your full time job. It's just a daily mobilize. But what I'm trying to do is to help people realize that you can't just mobilize. You can't floss. I mean it's equivalent to flossing right? You can't just floss, you have to look at what you're eating or what you're consuming that puts the crap in there in the first place and change how you think about movement and move more in general and move more of you when you are moving. So that all the muscles have an opportunity to contract because then there's this whole other thing where the blood that's in your arteries can't even get out. Like the blood in your artery doesn't do you any good. The blood needs to get to the capillaries but the only capillaries that pull blood are the capillaries embedded within muscles that are moving. So when you have big adhesions or areas of your body that aren't moving, you also have cells in those areas that aren't getting the rate of oxygen that other cells are getting. So then very quickly you become a garden of flourishing parts and rotten or dying parts. The interface between those two is where injuries are made.

Robb Wolf: Uh-hum.

Katy Bowman: So you're not all the same age. That always trips people out. The bone that you have you are turning over bone faster, you could have one bone

in your body that is ten years apart in age. Like your bones all of your tissues are regenerating based on use so your underused areas are essentially older than areas that you use more. But you can't – when you don't bring your whole body along for the ride, you have a machine that doesn't wear out all at the same time and that's what disease and injury is.

Robb Wolf: Interesting. Gosh that's a great way to look at that.

Katy Bowman: Thank you. I just patented it right now while we are talking.

Robb Wolf: You are brilliant. No I really love it and it you know, I mean you see a lot of this stuff out of like the epidemiological studies, you know, that we get these big-pictured kind of jabs at this stuff. Exercise in general makes people live longer but the broader the types of exercise the better the effects you know. And when you start thinking about tissue remodeling, gene expression and what not you know if you have one area that isn't getting stimulated you know, whether it's just nutrients delivered or tissue remodeling or whatnot, then that chunk of tissue is just going to get kind of old and worn out and that maybe you know the piece that actually fails when it is loaded at some point. It's just it really ties a lot of stuff together. It's really fascinating.

[0:55:24]

Katy Bowman: It does and I think what's helpful is you know when you compare movers to nonmovers, exercisers to nonexercisers, I mean exercise definitely trumps what you're talking about longevity, right. Death is really what people are looking at and then you know, profiles that are linked to physiological profiles like well lipid panels and bone density tests that are associated with early death. But I guess the take that I have on it is if we keep evaluating practices by do you die earlier or not that doesn't say much about the quality of life while you continue to be here because with medical intervention it's easy to get yourself to live longer but it doesn't say anything about the medications that you take while you're here, your ability to do what I call like the human things or like the biological requirements like you know, how easy do you get pregnant, can you carry your baby, can you deliver your baby vaginally? Because then of course that sets a whole platform of the baby coming out.

Robb Wolf: Epigenetic yeah, yeah, yeah.

Katy Bowman: Yes. It just keeps tricking on. Some people can't even have sex without pain. So like we're talking about looking at our humanness as something that is a journey and not just a destination of how many years were you

on the planet. Because that doesn't really tell us very much about what you did while you were here. If we think about being human as something more than just living but you know, enjoying and thriving and having you know, whatever sort of spiritual experience you want to be having all of those are thwarted by pain and disease and so that's why I'm calling for a more nuanced look at movement. I guess because those two things are related. You can be here and you can take you know, pills that make being here a little bit easier on you but that's not what I wish for my fellow human.

Robb Wolf: It's beautiful stuff, Katie. It really is. I mean that sincerely really beautiful stuff.

Katy Bowman: Thanks.

Robb Wolf: You know, we're right at the hour mark. I feel like we could go on for like six hours. Are you cool coming back on maybe in like four or five, six weeks? I know we're going to have a ton of questions and I have really enjoyed this like are you game for coming back here in a month or so and doing another shindig?

Katy Bowman: Sure of course.

Robb Wolf: Awesome. Okay so let's remind folks. You have a – every woman's guide to foot pain relief, also the book Alignment matters and then you have a new book coming out when?

Katy Bowman: My big book. My big book on everything that I just talked about today about the diseases of captivity which is what I call the things that we have created from mechano transduction is move your DNA but it doesn't come out until it will probably presell like in July so not too far. Actually you know what it's a lot – I was up until 1 finishing like all that final edit stuff that you know how that goes and then this is what happened. I finished all these edits of reading through and writing it and my computer deleted them all. My whole email system crashed and I was just like oh.

Robb Wolf: Right.

Katy Bowman: Yeah it was a lot of stomping around the house here for a few minutes and then I just said well I got to do it anyway so I just sat down and did it again.

Robb Wolf: Oh man, was it easier the second time?

Katy Bowman: You know what it was – there's way less nuance. It's like I was like whatever. I don't even care.

Robb Wolf: [Laughs]

Katy Bowman: Let them have an extra apostrophe.

Robb Wolf: Exactly yeah. Funny how that happens.

Katy Bowman: Yeah. Luckily the editors will cancel that.

Robb Wolf: Yeah, yeah. Katie, this was an amazing show like very, very excited for what you're doing. Where else can folks track you down? You have some DVDs. Do you have a practice also where you work with folks?

Katy Bowman: I don't do much anymore. I've been kind of took a few years off to do the mommy thing but the blog KatySays is probably the best place. Like if you're just going what then alignment matters is actually the first – I've been blogging for over seven years so and it's not. It's like a blog with actually just articles on what to do and how to do it. It's not super bloggy in terms of like casuals. It's kind of more like my notebooks. I always think about as like these are my notebooks and the problems that I'm just putting out for the public to read. So alignment matters is that place where you can start instead of reading a hodgepodge on the blog site. They're all organized and indexed and it's a really great place to get a kind of foundation and then the foot book is for everyone --

Robb Wolf: Who have feet.

Katy Bowman: Who have feet.

Robb Wolf: [Laughs]

Katy Bowman: One or two, the book is for you.

Robb Wolf: Or if you know someone who has feet.

[1:00:00]

Katy Bowman: Right. Right. That should be good. That should be great. And then that's really the best place. The restorative exercise institute is the clinic it's the online center where we train professionals. So you might have a restorative exercise specialist. That's someone who's trained by me to offer the protocol in your area so you can look at like the graduates if you're like I just want to do a live session that's there too.

Robb Wolf: *That's where you can find* the body cool. Cool.

Katy Bowman: Uh-hum.

Robb Wolf: Katy this was phenomenal. Really amazing show. Anything else that you want to close with or I mean you've patented at least --

Katy Bowman: I patent everything.

Robb Wolf: --three products. Yeah everything is now patented so.

Katy Bowman: That's right.

Robb Wolf: Who is the guy like Glen Danzig? He said he's suing the human race so maybe you've patented everything else. He's suing the human race and you have patented all the rest of nature so we're good.

Katy Bowman: I do want to pattern nature. Patenting nature is great.

Robb Wolf: Yeah, yeah. I mean you definitely cover your bases then so.

Katy Bowman: although you'll probably get sued.

Robb Wolf: By Glen Danzig apparently.

Katy Bowman: Yeah.

Robb Wolf: So yeah.

Katy Bowman: There you go.

Robb Wolf: [Laughs] Awesome. Well hopefully you sleep better tonight. Hopefully your edits go better and thank you so much for being on the show.

Katy Bowman: Yeah thanks for having me. It was great.

Robb Wolf: Awesome Katy. Talk to you soon.

Katy Bowman: Bye-bye.

Robb Wolf: Okay, bye-bye.

[1:01:15] End of Audio