

Form, Function & How to Fix Your Feet – Peter Francis, Ph.D. – #907

Dave:

You're listening to The Human Upgrade with Dave Asprey. Today's show we have a live audience from The Upgrade Collective, my membership and mentorship group. And you may hear some questions from them during the show because they're typing little chat windows with me, which makes it a lot of fun.

Dave:

And you're going to get a lot of value from the show today. I've committed for 2022 to making sure that you know why you should listen to a show at the beginning of the show so you can save time. If this show is about something you don't care about, then hey, you should do something else like meditate or go eat a steak or something.

Dave:

And if this show is really good for you, then listen. What we're going to talk about today is the biomechanics of moving your feet, barefoot movement and minimalist footwear. And you could say, but I wear high heels. I don't care. I want you to listen to the show anyway, because your foot connects you to the ground.

Dave:

There's neurological reasons for it and there's mechanical reasons for it. We're going to go into that, and I promise you that whether you are 20 and the way I was when I was 20, where I didn't have good insoles and my feet hurt all the time or whether you are 70 and you don't want your feet are hurt, you are going to learn stuff that's really important.

Dave:

Because if your feet are off, you're not going to exercise, you're not going to move, and it's going to suck. And just a quick word about that. I've got size 16 feet. I have forever had problems finding shoes that fit me, especially barefoot shoes.

Dave:

So Vivobarefoot makes shoes that I can get in my size that are big enough and have enough space that they don't look like the normal, we'll call them male birth control shoes with toes that I have been known to wear for a long time because at least my feet didn't hurt. Now I have feet that feel great. And I have shoes that look like a grownup.

Dave:

On that note, our guest today is Peter Francis. Peter, welcome to the show.

Peter:

Thanks, Dave. It's good to be here.

Dave:

You are over in Ireland as we're recording this, and you've got a PhD in exercise science and physical therapy, and you look at the difference between feet in shoes and feet outside of shoes.

Peter:

Yeah, that's right.

Dave:

I got to ask how do you get into that?

Peter:

Well, it's kind of a funny story. After my first degree, I was in the Middle East teaching English in a primary school, and I was a really keen runner. And previously, I'd had an injury called plantar fasciitis, which if anybody doesn't know it, it's a painful heel condition that's really bad when you step out of bed in the morning.

Peter:

And I'd had that injury. I'd had loads of treatment. Spent lots of money on it and it went away. But when I was in the Middle East, I didn't have access to the same treatment. So I read a magazine article that talked about barefoot, and I thought, oh, well, what the heck? I have nothing to lose. So I found the only grass park in the country.

Peter:

To keep it that way, they put a million liters of water a day on it. But I said here it goes. I ran for 10 minutes, and I came back two days later, and I did it again. And my plantar fasciitis was gone. And so what I'd previously taken a lot of treatment, a lot of resources was now gone into barefoot runs.

Peter:

So when I came back to Ireland to do my PhD, I said to professor, hey, this amazing thing happened to me in the Middle East. We need to do some work on this. And he sorts of roll his eyes a little bit as professors do, but he humored me because he allowed me to have one of his undergrad research students to do a project on it.

Peter:

And that was the first ever barefoot study we did where we took the arm off a treadmill, we videoed runners with them without their shoes and we found they ran a bit differently. So a lot of my best research questions, et cetera, have just come from tripping over experiences and being curious.

Dave:

You wrote a book called "Running from Injury. Why runners get injured and how to stop it." And I have been very vocal. 80% of people who start running in the first year get injured and stop running. And to be super blunt, I'm not a huge fan of running and maybe it's my bone structure, but I also just when I look at the science of it all, how many 65-year-old runners do you see? Not a lot.

Dave:

But you're saying that if you fix your feet, it may be much better. So how much of running injuries, how much does foot versus ankle versus knee versus hip versus spine?

Peter:

The reason I wrote the book is because that way of looking at it is sort of the problem. So if you say, well, is it barefoot is the answer? Or is it strength and conditioning is the answer? Or is it the surface? Or is it your training amount? And the answer is it's all of those things.

Peter:

And the whole idea of the book was to bring all of those concepts together in a kind of a usable form and sort of understanding the broad concepts. So, I mean, the barefoot aspect to it is that we were barefoot for millions of years.

Peter:

It's an evolutionary story that's kind of well out there now in the media. And when we get that level of feedback into our feet, if we think of our brain like a computer, if it gets really good information in, it can then allow you to move really well based on the information it gets.

Peter:

So you move in more subtle and careful ways than you do if you have something that completely blocks that information to your foot. So that's the kind of direct input. So now we've got a better, a more refined stride if you like from this better information, but of course, muscles work according to use them or lose them.

Peter:

So when we're running in this way, we're using the muscles in our feet. So therefore, they're larger and they're stronger. And of course, we need our nervous system, our muscles, our reflexes, all of those things working. So when that starts to happen, muscles, of course, further up the chain are being used differently as well.

Peter:

And you see that in studies where runners tend to move from this kind of extended leg out in front of the body, upright torso thundering into the ground to a more flexed spring like action. So the barefoot part of it is important for a few reasons and that one, we move better, but two, we use muscles that were evolutionary designed to help us to run.

Dave:

There's kind of sterile running on a treadmill, running on a street or a track on a straight line. It seems though, if we go back in history, hunters maybe weren't running over a flat surface. And even if you're saying playing soccer the way I did for 13 years before I blew up my knees, that's not a straight line.

Dave:

You're jumping over the other people that you knocked over, you're cutting sideways, all sorts of things. How much of the research you're talking about is about sort of prepackaged running versus running in a real environment.

Peter:

I love the example you've just used about soccer because one of the breakthroughs I had one day was I was supervising a student in the area of professional soccer and he showed me the data and I was like, over 50% of their injuries are to muscles.

Peter:

And then you look at the runner and the top five running injuries are not to muscle at all. They're to joints and little ligaments and tendons. And so I said to myself, what is it about the way a soccer player moves that's different to the way a runner moves and that's leading to this injury pattern?

Peter:

And sometimes injury patterns in different sports are brilliant because they start to show you where the loading patterns are happening. And so the idea was, well, if you're a soccer player run around for 90 minutes, that's still an endurance run. So I started to look at it and said, well, they move at various speeds.

Peter:

They've got a jog, they've got a sprint they've got to run in between. They've got to change direction. They've got to kick the ball and maybe head the ball in some cases, throw the ball, jump. And so one of the big messages in the book, of course, is running is extremely low on movement variability.

Peter:

And as you said, if you do it on a track or a pavement or whatever, it's even lower on movement variability. So I talk about this concept of within running variability and outside of running variability. So within running variability, we want to do things like go barefoot on the grass or the sand. We want to run up a hill.

Peter:

We want to do sprints. We want to do as much running variability as we can, but then equally outside of it, particularly with our modern kind of sedentary lifestyle, we want to get involved in some strength and conditioning and cross training that introduces variability from other sources in order to make this more conditioned and more robust and more able to run.

Peter:

So you're right, the kind of standard jogger is probably the worst kind of runner because it's so low on movement variability. And if you've got those crash mechanics we've already talked about, then it's not going to end well.

Dave:

How much of the importance of barefoot comes from making the muscles do stuff to hold up the arch of the foot versus comes from more neurological input from all the nerves at the base of the foot? It is that we feel the world better, so we move better? Or is it that we're actually doing work, so we move better?

Peter:

One thing I love about this area, and I know we're going to talk about the whole lifestyle area in general later on is that you cannot separate it. And so one of my favorite types of review papers to write is a

kind of a narrative review where you mentioned earlier even about, well, we need a biochemist, and we need somebody who knows about electrons and then we'd need a sport scientist.

Peter:

I love to zoom out, look at all those people's work and then try and put it together. And when I did that, I wrote a paper called From Barefoot Hunter Gathering to Shod Pavement Pounding, Where Do We Go from Here? And I realized you just can't separate it because as the foot comes in contact with the ground, I mean, let's use our hand as an example here.

Peter:

As soon as something comes in contact with the ground, you can see the skin around the outside of my finger has started to deform. So not just where I've put my finger, but the skin around that has changed. Now, that's called passive tissue. So that's before we even talk about a nerve or a muscle or anything, right?

Peter:

So we've got some deformation. Now, underneath that deformation we've then got a sensory nerve. So now the way that this pebble has come underneath our foot, let's just say, we've got deformation for a start, but now we've also got a sensory stimulation. So what's going to happen next is we're going to get a reflex.

Peter:

So that will maybe just ever so slightly changes from that sort of pebble that we've moved onto. But our eyes, of course, are telling us what the next step looks like and also our brain is receiving information constantly about what the previous steps have been. So we're in this sort of feed forward feedback the whole time.

Peter:

We're looking ahead, but our brain is going well, the last 100 steps were like this. We're seeing what's in front of us. We're getting this skin change. We're getting these ligamentous changes, these reflexes all going on at once. And then the muscles that you talk about under the arch, well, they're a product of how we've used our body over time.

Peter:

So that's what muscles look like, they totally behave according to function. So you can see when you go through that analogy of hitting the pebble, changing the skin, then changing the nerves, then changing the reflex, then changing the output, it's just impossible to separate those things.

Dave:

So the whole system of movement really comes together at the feet probably more than anywhere else. I've had the best ROI on working on my feet of almost anything. And ROI means return on investment where, how much energy or effort you put into something in terms of change.

Dave:

And I remember I used to walk and everything hurt even just barefoot, super tender feet. So a little bit of gravel or something. My feet just weren't tough enough. And I think a lot of people have that going on because we're wearing shoes all the time. What's going on with the tender foot thing versus an actual injury?

Peter:

I think in that case, it's just a case of adaptation. And so you develop calluses on the foot really well over time. It's sore to begin with, and then it gets stronger and stronger. Now it helps if you've sort of grown up barefoot a little bit, it can be an easier transition.

Peter:

So what's really interesting though, is the skin on the sole of the foot, it requires a lot more abrading to become damaged we'll say, compared to the skin on your thigh, which I found really interesting because, again, it's probably a design thing where it made sense for the skin to be able to adapt under foot in a way that it can't at your thigh.

Peter:

I mean, it's a question I get a lot about if I go to the park and my skin and it's sore. And again, I think we give our bodies a lot less credit than we should do firstly, because even the way this deformation happens is so clever because it most of the time stops the pebble from breaking your skin in the first place and then it starts to adapt.

Peter:

Now, just like muscles and training, let your skin adapt over time. Don't do a half an hour straight away when you've never walk barefoot before would be the sensible thing and build that tolerance to skin soreness up over time, the same way you'd build a muscle up over time in an exercise session.

Dave:

Back when I worked with Bulletproof, I had made and launched a sleep induction mat, which had special spiky things on it like ACU pressure spikes, and my feet would just get tender. I tried the barefoot thing a lot, but it just hurt. So what I started doing was resting feeling then standing on that.

Dave:

And it looks like it wasn't as much about toughening the skin as it was about remapping the nerves and the sensitivity of the brain, because the nerves have a local pain signal and then the brain has an interpretation of the pain signal. So you basically can have actual damage and pain, actual worry in the foot and then the brain going ah.

Dave:

And I think I had to remap all of those just by doing that. And then all of a sudden I could walk on the rocks that weren't very good, but I don't go hiking barefoot. I think you have to have hooves to do that or something.

Dave:

I put on thin-soled shoes so I can feel the rocks. And I really like that. And it was neurological as big of a shift as it was biomechanically. Do you ever look at EEGs or anything about what's going on in the brain when people change how they run?

Peter:

No, I haven't, but you're exactly right in terms of our response to everything and our environment is massively determined by sort of expectation and previous experiences or something. It's a bit like if you ever start the cold-water swimming and you do it at first and the pain and the hyperventilating and all of that.

Peter:

And then after a while you just jump in and nothing has really changed other than you're prepared for what's about to come and your brain is prepared for that. So it's something we look at a lot actually in a clinical setting in terms of people, when they have injuries, fear, avoiding and avoiding certain behaviors because they're afraid of what will happen.

Peter:

And they have certain ideas and expectations about what will happen. And we find if we just change some of those ideas, then people start to behave in new ways.

Peter:

And I think barefoot is a great example of that, where as you say, it's a bit sore and we're expecting it to be sore again and we're not used to it. And sort of, can we reap that? And again, a very hard thing to separate, mind, brain, past experience, anticipation. There's so much going on there.

Dave:

So fear of running is worse than running itself.

Peter:

Certainly when it comes to injury. Certainly when it comes to injury.

Dave:

You're still not going to make a runner out of me. But I definitely spend probably 95% of my time either barefoot or wearing Vivo shoes or some kind of minimalist footwear. But usually especially ever since I finally found the Vivo with a very big toe box, I've noticed a massive difference when I travel.

Dave:

I used to wear shoes that were either less comfortable and less biomechanically up so I could look descent. What is the deal with the big toe box? Why does that matter so much? Some people have narrow feet, some people have wide feet. Why do we care?

Peter:

Essentially you need a shoe that is wide, thin, and flexible so that your foot can move as it did for millions of years before.

Peter:

I mean, that has a lot of uses because the broader the surface area, so if your foot is allowed display, for example, the sort of lower the contact pressures will be. That's why you feel a pin when you put it on your foot, but you don't feel a flip-flop because the contact area is so broad and therefore the intensity of the stimulus is a lot less.

Peter:

So I think that allows the foot to move normally. If the foot moves normally, then the muscles start to work and so on and so on. So it's really just about allowing your foot to move of as nature intended.

Dave:

Why do we have pointy toed shoes?

Peter:

It's really interesting when you go back in time and look at how all of this stuff began. I mean, I think it was 1905 was the first paper that started to say, hang on a second, fashion is really messing up our feet.

Peter:

But you can go back even a little bit further where you see stories of people in African countries starting to wear shoes, not necessarily for utility or protection, but to demonstrate superiority to their peers because the White man valued wearing shoes.

Peter:

And so there's a whole complex area there that's, again, not my specialty, but where we have fashion culture and utility all in the mix. What I found interesting was outside of fashion, it stayed fairly minimalist up to as recently as about 1970 when it comes to running in particular.

Peter:

And that's when the real big, cushioned shoe came into it. But I would say fashion was probably one of the big drivers for that.

Dave:

I've read interesting historical paper about some section of the Tim's in the UK where people would throw their shoes in. God knows why people do what they do. But they had layers of shoes that were preserved in mud over time.

Dave:

And they figured out that sometime going way back several hundred years, the richer you were the longer and more curly the toe of your shoe would be to show that you had people to run for you because you were pretty much hobbled in these shoes, but you walk around like a clown pretty much, but a clown with a pointy thing.

Dave:

And so the bigger the pointy part and the curly part on the front of your foot, the richer you were. So this was sort of there's some tribes who have penis sheaths and they're ridiculously large and they're looping them over the ha-ha. This was pretty much the European equivalent of that one step removed.

Dave:

So and that sort of made its way into fashion. It's still there today, which I think is part of it. And what about heels? So that's the pointy front. Why do we keep putting one- or two-inch heels on there? I had custom made cowboy boots made because I thought they might fit me better, but they have to have a heel and heels seem to screw up your back and your hips. Why heels?

Peter:

That's a good question. I know from a running perspective, it was to take the strain off the Achilles tendon.

Dave:

That was designed for that?

Peter:

Yeah. Particularly from what I believe, you had office workers who were then trying to run on the weekend. So the little heel that would be in an office shoe was basically keeping the foot in a shortened position during the week.

Peter:

And then you were trying to run in what were still flat sold athletic shoes and it was causing some problems. So I think the original idea of the cushioned heel was to kind of elevate that.

Peter:

And I think that's one of the interesting things, people often design well-intentioned solutions to a specific problem, but then it's not till later that we realize it's set off a chain of events of a whole other problems. And I think that would be a good summary of what happened in the athletic shoe industry.

Dave:

It's kind of funny. I used to have a Volvo racing station wagon believe it or not. What would they call those in Ireland? They a different name for them. The big boxy things that don't have a rear boot. Anyway, I kind of liked it because it looked like a soccer mom's car, but it was a full-on M Series BMW level performance.

Dave:

And the thing was awesome because you wouldn't get tickets in it. But the seats were designed to make sure you wouldn't get whiplash. So they were curves. He'd sit like this all the time. And it was giving me spinal problems, especially as a tall guy because they were trying to prevent an injury that caused a chronic injury and I ended up having to sell the car and I bought I think an Audi TT Quattro.

Dave:

So I had just stuck out the top of it above the windshield and everything was fine. It was like driving a roller skate, but at least I was sitting up straight. So what I think is happening with shoes is sort of the same thing, they're trying to prevent an Achilles injury from running.

Dave:

So they're putting the heels in running shoes as opposed to cowboy boots where I guess it's for the stir and just reminding me that that's so your foot doesn't slide through and then you die because you're dragged by a horse. But you were trying to prevent one injury. But what injury do we cause by having chronically elevated heels in our shoes?

Peter:

Well, the thing about any human tissue is that if you make it easier first, it doesn't adapt. And so we're completely designed to adapt to stresses in our environment. And so if we remove those stresses, we no longer have a reason to adapt and waste energy.

Peter:

So let's say you've got a pain in your Achilles. If we rest it and we take the stress off it, you'll feel a little bit better in the short term, but your Achilles is also going to get weaker and less designed for the activity that you wanted to do. So it's sort of short-term pain relief for long-term dysfunction.

Dave:

Got it. Short-term versus long-term. Seems like humans suck at long-term thinking in general.

Peter:

For sure.

Dave:

What percentage of the time do you wear shoes at all?

Peter:

Well at the moment it's winter time in Ireland. So I'm usually minimalist most of the time when I'm out and about, and then maybe barefoot around on the house and I still go barefoot for a run on the grass as long as it's above six degrees Celsius, I'll still do that.

Peter:

Whereas in summer, there's times where I'll be halfway down the road and realize that if I need to go somewhere that requires me to have shoes, I don't have any.

Peter:

And I really got into that actually in New Zealand because in New Zealand when I was there for six months, it's culturally acceptable. So you can go over there would be a Walmart or whatever you can go to those places with nothing on, which I love.

Dave:

You don't have to have pants at Walmart apparently.

Peter:

Yeah. That was the only store I could just pull out my head for over your direction.

Dave:

I run into this a lot. I live pretty far north. I'm up in Canada. Where I live, it's rainy and wet all the time at least for six months of the year. So I look at what's the best thing to go hiking in? I can get out my Vivobarefoot and they're not, at least ones I have aren't waterproof. And so what do you do when it's mucky and you want to do the barefoot thing?

Dave:

Because I'm afraid to put my foot in muck that's two inches deep because you don't know what's underneath it, whether it's a hypodermic needle or a sharp rock or whatever. How do you do that? Or is that just a time where your feet are going to get wet and that's what it is?

Peter:

I mean, personally when I go hiking, I just wear a minimalist boot. That's how I-

Dave:

Even if it's wet, you just let your feet get wet and you don't worry about blisters?

Peter:

Yeah. I don't find they get wet. Now, it's probably because if it was raining, I'd also wear a set of waterproof bottoms that probably cover a lot of the shoes. So I haven't really had that issue. I wouldn't go pure barefoot because if I want to cover any sort of ground in any sort of time during the day with a lot of roughing surfaces, it's just easier to wear a minimalist boot.

Dave:

Got it. Now let's talk ankles. So I promised our listeners that we'd learn a lot about shoes. We learned about heels, we learned about pointy toes. You want a wide front of the toes so the foot can display, the toes can move properly. It took me about three years of yoga to learn how to consciously spread my toes out because they were always all crammed together.

Dave:

So you can change the shape of the foot. But what about ankles? High top shoes for basketball to keep your ankles safe and a lot of hiking boots are like that. What's the point of ankle support? Is it a good thing? Is it a bad thing? Is there minimalist with ankle support? Give me the download.

Peter:

So like with everything, the answer when it comes to an individual is always, it depends. I would say one thing I used to really like when I was a therapist at a rugby team was I would often strap their ankles using tape, particularly if they had a mild ankle sprain injury.

Peter:

Because what it would do is for a couple of days, it would encourage them to walk around more normally. And if they walked around more normally, then the muscles would start to work again. So what tape is brilliant for is, it's basically just extra proprioceptive feedback to the brain.

Peter:

So this idea we spoke about earlier about why go barefoot, well, if you get better information to the brain, you can move better. And it's very similar with injury because we damage a lot of receptors with injury. And so when we put tape in, people think when you tape the ankle that the tape is somehow holding the ankle there.

Peter:

It's not really. It's just that when the ankle moves, the tape creates a stimulation and then the brain is getting better information from that damaged ankle. And so then it's starting to use the muscles around it much better. So I like it in that sort of context.

Peter:

And again would I use something that has a high ankle in someone where I felt it would relieve a tissue problem in the short term? Of course, I would. And then I want to transition away from that as much as possible. So it always depends on who you're dealing with and why they're with you and so on.

Dave:

What do you recommend for women who want to wear heels for professional reasons or just because they think they look good in them and then want to be barefoot the rest of the time?

Peter:

It depends on what their goals are in general. So if I have a runner, it's not going to be a great idea to try and transition yourself from positions where you've kept your tendon in a shortened position to then wanting it to barefoot run or something like that.

Peter:

And if we can try and get people to think away from, is this good and is this bad? More to, will this be a really big change in loading? That empowers everybody to sort of answer their own questions almost because it's not that one shoe is bad per se, it's that in this case, it would require a change in loading that we're not prepared for.

Peter:

So if I'm dealing with an athlete, keeping them in yoyo positions between shortened and then really lengthened probably isn't the best idea. But if you don't care about it, then wear your heels.

Dave:

Well, sometimes you don't care, but most women that I know will put on heels for the right occasion, whether it's some kind of formal event or they wear it for work or to look good or just to feel sexy. But then the rest of the time, I don't want my feet in my back and my hips to hurt.

Dave:

So I don't know in anyone who doesn't transition unless they're a Waldorf teacher or something where there's just no reason for that. And however, that's a very small percentage of women who don't. So it's not ideal to do it, but we all do it.

Dave:

Is there a stretch or an exercise? Or if you wear two-inch heels all day, should you go down to one inch and then a minimalist, or is there a transition period or a stretch? What do you really do because this is a fact of life for half the audience?

Peter:

I think in the context that you've said there, I don't think it'll be a problem. Certain occasions where you wear heels, I don't think that ever causes a problem. I think we're always a product of what we're doing on average.

Peter:

So I don't think having a bag of sweets now and again will give you diabetes, but if you're doing it all the time, then it probably will. So I think that they'll be absolutely fine. And again, you could even make a small argument that it's a form of variability, and remember our bodies love variability.

Peter:

So the more we change things up in different ways, the more stimulants we get. That's not always a really bad thing. Now, the other thing you mentioned is transition.

Peter:

I think transition is important because for some reason everybody understands the idea of when I do my first ever circuit training class, I won't do an hour of it because I won't be able to walk for a week if I do that.

Peter:

I think everybody intuitively kind of has a sense of that, but they forget about that when it comes to experimenting with barefoot or minimalist activities and they go straight for it and then wonder why they've got an injury. So I do think you've got to take your time.

Peter:

If I'm working with a runner, for example, who wants to transition, then I'm looking at every second day, maybe for 10 to 15 minutes on a soft surface maybe as part of their warmup or their cool down or something like that and then gradually building that up.

Peter:

If I'm dealing with an everyday person and they want to get more into it, I'm like, maybe, well, continue to work in your normal shoes, but maybe when you're hanging around the office, wear your minimalist shoes, and let's try to get your minutes up-

Dave:

There you go.

Peter:

... over time, if that make sense. Or if it's a short walk to work, walk to work in your minimal shoes and then go back to the other one. So it's all just building minutes. Whether you want to train, run, go to the gym, it's all just building minutes slowly no matter what you're doing.

Dave:

How do you measure foot strength? I actually don't know. Where does the strain gauge go? Is it your big toe, your little toe? I don't even understand what foot strength is much less, great, it must be good for you. But why do I want it and how do I know I have it?

Peter:

And it's a great question because sometimes when we're doing research, we've got to kind of get creative when we don't have the specific piece of technology or kit that we want to measure things. I mean big pieces of kit that maybe measure thigh strength have been around for years and they're quite accessible, but it's a little bit more complicated when it comes to our feet.

Peter:

We tend to measure big toe strength using some form of a dynamometer or a strain gauge that's usually mounted on some sort of stable, either a wall or a frame that's been specifically designed for it.

Peter:

And I suppose we're most interested in the big toe because some of the important muscles in relation to the big toe are there and the big toe sort of was one of the key evolutionary transitions to allow us to walk and run.

Peter:

And then another thing we do as scientists is if we can measure one part, we can kind of use it sometimes as a surrogate measure for other parts. So in other words, if a person is really high in big toe strength, there's a good chance that they're high in all foot strength. So there's kind of ways and means that we can kind of work on it.

Dave:

So you put a strain gauge on the big toe and you're like, flex your toe and then people do that.

Peter:

Yeah, they do. But what you've got to do, you've got to be careful to remove what we call confounding variables. So you've got a lot of room for error, if they're, for example using their ankle or using their knee to push down. So you've got to try and set the participant and the apparatus up in such a way that it's literally coming from the big toe. But that's the joys of the reality of doing science in that area.

Dave:

I feel of all the parts of the body where I've done functional movement and I've had people come in and assess me, I'm very fortunate. I get to work with people all over the planet and I can do whatever I want there and I'm willing to do that. Around the scapula and shoulder is really rough.

Dave:

There's all sorts of weird little knots and compensating patterns and things. But the part I was unaware of until just the last, maybe three, four years was the foot. You can have people who are just foot functional movement people who just study all of the different bones and nerves in them.

Dave:

And it feels like when I get something working in my foot that I didn't know was even turned off, that it ripples throughout the system a lot more than fixing a shoulder or a back or whatever would do. Is that your experience as well?

Peter:

Certainly it was my experience from a lower limb perspective. But what you're saying makes sense in that even if we think of the big, long ligament that runs down the back of your neck that sort of is designed to keep our heads steady.

Peter:

If we are out running and trying to hunt, that we can actually run and keep a steady gaze. So the whole chain is going to be affected. As soon as you put on a pair of shoes or change a pair of shoes or go barefoot, you change something at the bottom, you change it the whole way up to the top. So I wouldn't be surprised if there were experiences like that in the upper body.

Peter:

I mean, for example, when you do breath work, start using your diaphragm a lot more, it's quite interesting how movement around the thoracic spine and the shoulder can change as well because now those ribs are no longer kind of clamped down from sustained postures. So we're so interconnected, that I would imagine that is the case.

Dave:

Let's talk about kids. There are actually studies of this. What do shoes do to kids, to their gait, to their knees, their feet? Just kind of walk me through the perspective on that.

Peter:

Well, I think the solution to this, as with most things, realistically will lie with children in terms of if you watch a toddler scream when its parent is trying to put its shoes on, they understand their evolutionary legacy quite well. They know that this is weird, and they don't want it.

Peter:

So it's kind of funny how many things adults give kids that they don't need. So as a kid is developing, the bones are largely ossified by the age of 10 and the foot is largely kind of finished by the age of 15, if I was to use crude and broad kind of numbers to capture the population.

Peter:

So in those developmental stages, of course we want as much stress and feedback into the feet as we possibly can get so that bones and Achilles tendons and things like that develop well. There's one nice

study from Japan that looks at two schools, one where the kids were predominantly barefoot and the other where they were not.

Peter:

And there's big differences in their sprint biomechanics, their jump height, and there's another functional movement I can't remember. But my first direct experience with it was when I was in New Zealand, I looked out the window one day of the office and there were boys at athletic event on, and I realized in the 100 meters that half of the guys had no shoes on.

Peter:

And what surprised me was I was already barefoot running for quite a few years at this point, but what surprised me was that they were doing it on a hard, tartan surface. So I went back to work for a while. And then by the time it got to the 3000 meters, there was still a third of the boys going around with no shoes on.

Peter:

So I went down and spoke to the teacher, and they were like, oh, this is the Kiwi way and so on. So we did a study to actually find out how many of these boys are doing this and what other ways are they living like this? And about 50% of them would be what we call habitually barefoot. In other words, they're more barefoot than they're not.

Peter:

And what we saw was that half of the kids in the 100 and the 200 meters had no shoes, and it went all the way down. I think by the time it reached 3000 meters, it was closer 20%. So I thought that was really interesting in terms of a direct experience of kids who just didn't want to have the shoes on, even when they were competing on a hard surface.

Dave:

I want to bring Karandy on. Karandy can I bring you on to talk about what you've seen in the off? All right. Chris is going to plug you in. This is one of our guest who has a really cool observation. Go for it.

Karandy:

Hi. So my name is Karandy. I'm a speech therapist and also a myofunctional therapist. And I have a lot of people who come in for different issues that they're experiencing usually related to TMJ discomfort or basically their bite is off. And the dentist just said, hey, it's your tongue.

Karandy:

You need to go see a myofunctional therapist. They come and see me. And they walk in the door and a big part of our assessment is actually posture, seeing how they are resting, how they're sitting, how they're breathing, and I'll see feet doing all kinds of crazy things.

Karandy:

And usually, I can tell that they have tethering in the back of the mouth based on their ankles, where their feet are. And that's outside of my scope. So I'm very happy to then say, hey, I actually need you to

go see a PT and then they'll go and I follow up a few weeks later because I'm like, what happened to my patient? They never came back, and they didn't need to.

Karandy:

After they went and worked with the PT, they were able to functionally change what was going on. Usually there's also pelvic floor dysfunction and it's impacting the whole system of their airway and their tongue is now able to rest appropriately and they can now live their life pain free, and their team J issues way. And I didn't touch them. It's pretty cool.

Peter:

It's fascinating. And I think it's probably, as you said, the number of interactions there are probably representative of a lifestyle issue in general, the way we're living in modern environments and the associated behaviors, stress, sustained posture, footwear, food, all of those things kind of either have us in a sympathetic fight or flight kind of state and conversely some of the other more beneficial activities we engage in can get us closer to that parasympathetic state.

Peter:

And that's basically going to mean either inflammatory ways of being or anti-inflammatory ways of being. And I think all of those interactions are a product of probably a number of factors in how we're living now. And most chronic diseases are all of an inflammatory kind of pathway. So it's amazing to be able to tie threads and links through various bits and pieces and different diseases.

Karandy:

Say something else that I'll see is often... So we have different orthotics or appliances that you can put in the mouth. And sometimes people cannot tolerate them. They have different and oral aversions or sensitivity issues. I'll see oral ticks, things like that. And first, what I'll have them do is take their shoes off, walk barefoot.

Karandy:

And usually what I'll see is if they're walking on something, I have them walk on different surfaces and they don't know why I'm doing this, but I'll see what are they responding to? Some people don't notice at all what they're walking on. Other people are hypersensitive.

Karandy:

They, oh, this feels spongy or the carpet, I don't like it. Usually they have an opinion of some sort, and those are going to be the ones that have a little bit more of a tick and I'll send them off.

Karandy:

Again, I'm like, I need you to actually be working with a PT or sometimes it's an OT because we have to get their core strong enough that they can then be walking a little bit more on their feet. And then again, usually a few weeks later, we can put those appliances in their mouth and they're fine. So it's, again, but it's the feet that are driving it.

Dave:

Wow.

Peter:

It's mind blowing. Isn't it?

Dave:

If you had to guess, is that neurological? There's less inflammation in the nerves maybe, in the feet. And so when you get neurological inflammation, it tends to propagate along the nerves. So you could get more TMJ or is this more some alignment thing? So the jaw alignment changes because proprioception, the sense of where the body is in space, it changes. I know this is a guess. You don't have a study because no one has probably ever studied this.

Peter:

I would guess, again, as I said earlier, that it's very difficult to separate all that. So when you run barefoot or walk, you increase that information to the brain and then you start to move more as your body is designed to.

Peter:

Does that then help to lower inflammation because you're not using it in ways that you weren't doing before? So is it direct in terms of you change the movement pattern and now you change what's that the jaw or does changing the movement pattern set off a chain of events more in line with your natural physiology? Who knows?

Dave:

We certainly don't know on this, but it's really interesting. So if you have problems with TMJ and problems with your feet, by the way, both of these are problems I had. I used to be super duck footed have flat feet and I had a lot of TMJ problems, and I've covered with Dr. [inaudible].

Dave:

Jennings some of the stuff that James Nestor has more recently popularized around expanding your upper arch. I did that many years ago. It really changed ever everything, and my feet do hurt less as a result. But I think also fixing my gate and my feet probably affected my nervous system, my spinal alignment. So it is a system.

Dave:

And when you get someone like Peter here, who's a foot guy, you're also an exercise guy, but a foot guy, you're going to focus on the feet, but you might not have sensors attached to the forehead because would you ever even know to look for a correlation there?

Dave:

But as biohackers, the body is a system. And I'm saying, what could we do for the least amount of work to push the system towards being a more effective, more coherent system? And it looks to me the feet are one of those areas that have very high leverage for having a well-functioning system.

Dave:

And it could even have strange things like the amount of substance P, which is the primordial pain receiver or pain molecule. There's substance P receptors on cells and almost everything alive has them, is everything animal. I don't think plants have substance P.

Dave:

But anyway, if you get more of that in your feet, what's the effect systemically? We just haven't measured all of it. But the people who look at feet like TCM or the stuff that you're doing, wow, overall wellness and resilience increases because I was barefoot. Would you bet on that final statement, overall wellness and resilience goes up when people have functioning feet?

Peter:

You see, the trouble is as a scientist I'm in a mess of the million and one factors that all interact to produce an outcome. And so my job is to try and partition it as much as possible. And, again, when I wrote the book, there's 10 chapters on the problems.

Peter:

And my idea is that if you understand the 10 problems really well, then you wouldn't even need to read the second half of the book because they're just the reverse of the problems. But to give a story on that, I ran for 40 weeks. So I was injured on and off for nearly 12 years before I became consistent.

Peter:

And I ran for 40 weeks within that injury 10 years. And it was when I discovered barefoot. So barefoot was a game changer. I did the most miles and the most consistency I did when I changed the barefoot. Now, but what brought the thing together to make me perform well in running was well, I understood that I can't change my training load too quickly.

Peter:

I understood that I shouldn't chase my former self if I'm not in the same condition. I understood that the labels condition gave me weren't actually true and I didn't need to obsess about them. I learned that I needed more variability. I learned that I shouldn't take rest periods that were too long.

Peter:

I learned that pain and function are not necessarily that closely linked. I learned that I need head space. That if I want to run, that I can't be a busy lunatic running around trying to do a million jobs. I learned that I shouldn't deny bagels when they come. So you see how barefoot is a big factor, but without all the other factors, you're not going to get the outcome.

Dave:

So if you eat kale and you run a lot, the kale cancels out the running. That's what I heard. I got to ask you this totally unrelated. You're in Ireland. Are people choking down kale in Ireland or have you avoided that mostly North American fad?

Peter:

I think in Ireland, we're seeing a thing that we're seen in a lot of westernized countries, which is a trend towards wellness. And we spoke about fashion earlier and how essentially underneath the bonnet where chimps who want to get along and get ahead and so on. So were susceptible to that.

Peter:

So I do think that there is a growing awareness of modern environments and a growing trend towards trying to perhaps live and behave within these modern environments in ways that align more with our hunter gatherer history. So you say kale, but it could be spinach and it could be avocado. That kind of way of thinking and doing things is popular.

Dave:

Got it. So I would just say, if you're in Ireland and eat your traditional foods, cabbage is 10 times better for you than kale. Kale is a total con. You do not need kale to be healthy. And by the way, I'm just saying that because, well, kale is evil.

Dave:

Also we're talking about kids and kids don't like kale because kids don't like shoes either. Kids know what's good for them. And I found a study on kids and shoes, and a lot of people have been asking me this, what do I do for my kids and all? And this was a study from 2011 meta-analysis.

Dave:

And they found that kids wearing big, padded shoes walk faster, they take longer steps, reduce foot motion. And the things that went down when you put these shoes, the non-Vivobarefoot style functional movement, but just the random padded, athletic shoe kind of thing. So the cadence went down single support time, ankle max dorsiflexion, ankle at foot lift and arch length and foot torsion.

Dave:

A bunch of stuff went down as well. And that was for walking. And then there was things about tibial acceleration, shockwave transmission. It's an overwhelming amount of data, but there's a huge number of shifts from either running or walking in padded shoes versus not padded shoes.

Dave:

And when you look at research like that, I can see how it would be really hard to do research in this space, if you had someone about a two-year-old right now, or a five-year-old and they said, what do I do? What would your advice be?

Peter:

My godson is seven months old. And my advice to my brother is to keep him barefoot and minimalist as much as possible.

Dave:

I kept mine barefoot as much as I could when they were really young. It's very hard to find toe shoes that fit kids because they whine a lot, oh, I don't want to get my foot in there. Oh, my toe. Well, then go barefoot. It's snowing or something.

Dave:

You can only be so much of a hard ass as a parent. And so mine have both had toe shoes, but they tended to not wear them because either flip-flops or crocks are just the three drugs of shoes. Which is worse, flip-flops or crocks?

Peter:

Probably the flip-flops are worse than a well fitted crock.

Dave:

Is there such a thing as a well fitted crock?

Peter:

Well, I don't know. I don't use them.

Dave:

I'm not trying to pick on the brand crocks. They're actually convenient shoes if you're going to wander around somewhere and you don't want to put on shoes and all that. But I don't like seeing my kids go out and play in those, but I don't always have control over it. So you do your best.

Dave:

What percentage of the time can I let my kids wear convenience shoes, the equivalent of fast food, versus just look, now you're going to go barefoot or put on some minimalist shoes? Is it half the time when they're wearing shoes?

Dave:

Are they going to get benefits? What do you think? And there may not be a study, but the good thing about scientists is there isn't a study, but you're going to bet better than I would bet. So where would your bet be, that the cutoff is for the amount of time in minimalist versus convenient shoes?

Peter:

Well, the study we did in New Zealand, they had to score a certain number of points to be considered habitually barefoot. So one of the questions we had was, are you barefoot this activity all the time, half of the time or more or less?

Peter:

So with those boys being able to run on the track like that, I would say that's a good marker for well-functioning athletic ability without shoes. And from what I can remember, they were barefoot half of the time or more.

Dave:

Okay. About half the time. Got it. So you want your kids to be wearing those. So here's a question for you then. Let's say you go into a shoe place somewhere and they scan your foot, would you want to make your shoe bed with your feet bent back, with your arch?

Dave:

I didn't even know how you would do that. Do you want insoles that push up on your arch and kind of support it? That feels like that wouldn't be a barefoot shoe if you did that. So talk to me about arch support. I guess, that's where I'm going.

Peter:

I think that the aim of the 3D stuff would be to just go back in time using modern technology. So if you think about maybe 10,000 years ago where you would use whatever animal hides to make a pair of shoes, you would fit it to that individual's feet. I think 3D stuff is just going to be a slightly more specialized version of the same thing. So whatever allows your foot to move naturally would be a good shoe.

Dave:

I like that. I think we are going to see more 3D printing. I just worry if we're going to print 3D snowballs to put on each photo, we're going to print shoes that are functionally more useful that way. Either way, I think the guys at Vivo are likely to figure that one out, if anyone does.

Dave:

And guys, as you know, when I talk about a company on the show, I ask for specials for you. So check this out. How about 100-day trial of Vivobarefoot? You can send the shoes back if you don't like them, even if you've worn them outside, which is particularly cool and 20% off your first order. So that's really cool.

Dave:

I'm just telling you if you do what I'm talking about, get some shoes that look good and feel good on your feet even if it's a little weird. The first time you put them on, you'll say, it feels like I'm barefoot. That's fine. Just wear it for a couple months. And if I'm wrong, send it back. It didn't cost you anything, but I'm not wrong.

Dave:

This is something that has made a massive difference for my performance. When I started going barefoot, I started connecting my brain to the nerves on my feet. So want you to go to vivobarefoot.com, V-I-V-O barefoot.com/Dave Asprey. The code is Asprey 20.

Dave:

And you can get them for your kids. You can get men's, women's, whatever you like. This is a meaningful thing to do. I believe very strongly in making small changes that affect you every day. So if you were going to make coffee in the morning, you could upgrade your coffee beans. It didn't take any time or energy to do it.

Dave:

You are going to put on shoes in the morning, at least most of us are. And if you do, put on shoes that make your nervous system and your musculoskeletal some work better because it was the same amount of tying of your shoes no matter what you did.

Dave:

So that's the philosophy behind what I do. That's [vivobarefoot.com/Dave Asprey](https://vivobarefoot.com/Dave%20Asprey). Use code Asprey 20, get 100 days to try it out 20% off. It's a pretty good deal. And Peter, thanks for coming out and walking me through all the weird foot stuff.

Peter:

No worries, Dave. You're welcome.