

Speaker 1: Bulletproof Radio. A state of high performance.

Dave Asprey: You're going to love listening through to the end of today's episode. You're going to learn something about bone density you probably don't know about, how you can increase your bone density in a small amount of time. You'll also learn some things about how your body puts on muscle, and this works whether you're a body builder or whether you just want to have adequate muscle mass without a lot of work. And at the very end of the show, you're going to learn a new way to do pushups that can completely change the amount of muscle, and the amount of benefit you get from doing it. It's actually a way to cheat in a pushup that gives you more muscle growth. And if you listen to Bulletproof Radio, you know I'm all about saving you time, and saving you energy, and getting more results from less effort. You're listening to a top expert from multiple fields and editor of medical journals in order to learn this stuff. It's a fascinating episode. Listen through all the way. You'll love it.

You're listening to Bulletproof Radio with Dave Asprey. Today's cool fact of the day is a little bit troublesome. It turns out that kids and teenagers who take stimulant drugs to treat ADHD can have lower bone density as a result of that. And as you know from reading Head Strong, lower bone density is a result of changes in mitochondrial function, as well as changes in the environmental thing, like the amount of load that you have on your bones. There's a new research study that says that people who have used these drugs might need lifetime monitoring of bone density, so that you can see whether it's affecting them 10, 20, 30 years later. The researchers haven't yet said decisively that Ritalin and amphetamine are to blame, but they've drawn a very strong correlation there, and they're looking to see that it's something that is actually causation.

So what does this mean? If you don't really need those stimulant drugs, you might try something else. Things like changing the environment around you so you have more control of your biology. We call that bio hacking, and I've seen it work so well for thousands of people who have ADHD, or like me, who had Asperger's and ADD. When you get enough energy in the brain, it'll do what it's supposed to do. It's pretty amazing. Speaking of having your brain do what it's supposed to do, there's a brand new flavor of Bulletproof FATwater. It's called Bulletproof Dragon Fruit FATwater. If you haven't ever seen a dragon fruit, that's okay. You probably have and you don't know it. Anytime you see aliens eating fruit on a science fiction TV show, it's always a dragon fruit. They're these incredibly vibrant, tropical fruits with bright pink. It looks like alien seedpod kinda things, and the inside is either a pink or a white flesh that's vaguely like a kiwi fruit. Very, very cool thing.

I first had one, actually, in Thailand on the same trip when I first discovered yak butter tea, which led to the creation of Bulletproof Coffee. I was really excited to put this into FATwater, and you can get FATwater on the Bulletproof website. This FATwater has brain octane oil in micro droplets, so instead of using sugar to get a little bit of energy, you drink this stuff. It tastes amazing, and you're using

fat for fuel instead of sugar, and you feel really, really good. There's a few B vitamins in it that also can help with mitochondrial function.

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Today's guest is a friend, a guy I've known for several years, and the guy who was inspired to do what he does because his mom had osteoporosis. He figured out some biochemistry, and looked at what he could do, and ended up becoming a biomedical engineer, and has done profound things there. If you're watching this on YouTube, you can go to bulletproof.com/YouTube to get a quick link to the YouTube channel to see this. You'll see that he's kind of, I think, built like a brick, something or another, kind of a solid-looking dude. That might be because he's done some things like hacking male testosterone optimization.

The guy sits on the Board of Directors of the American Bone Health Institute, he's on the editorial board of the Journal of Steroids and Hormonal Science, and Diabetes Open, and he's working on a couple really cool projects, one of which I was the first person to ever see. So I want to share some interesting facts about bones, muscles, hormones, and some other things like that that are going to be really, really impactful and useful for you. And also, show you some new stuff that's happening out there that can make a difference for any of those domains of your own health and wellness. His name is John Jaquish. John, welcome to the show.

John Jaquish: Thanks, Dave.

Dave Asprey: All right, John. We've talked personally about this. How did you get into all of this at the very beginning? Tell me about your mom.

John Jaquish: Well, it was, yeah. I was young. I was an undergrad. My mother came to me and said, "I've been diagnosed with osteoporosis." So I quickly realized this is a disease of deconditioning. Anything that's deconditioned can become reconditioned. So I looked into what research there was for people who were building superhuman bone density, who had the most, and it was gymnasts. It really had to do with the way they would impact the ground. Another interesting thing about gymnastics, from a research perspective, is that we can see what a gymnast does. Their movement patterns as they strike the ground is very repeatable. They have to do it the same way every time, otherwise they injure. So very well-practiced as they do that.

So I wanted to create a device that emulated high impact forces. So it's the forces going through the muscular skeletal system that trigger the effect. So I realized telling my mother to be a gymnast wasn't the right thing to do, but ... Yeah, she appreciated that, too. But, what we would do is create a fixture where people could get into the positions they would naturally absorb by impact force, and then allow them to self-load and give them computerized biofeedback right in front of them, so they know where they are and where they were the last time they did it. Therefore, if an adaptation occurred in that particular kinetic chain, that they would be able to produce more force, showing a greater level of functional bone performance, because this is a functional test of bone, and also a stimulus. So they actually, they're able to see the function of their bone from a deceleration perspective, and from an actual performance and real-world perspective, as they used the product week, after week, after week.

My mother reversed her osteoporosis, but here's the thing that really nailed it home, and now I'm partnered with Tony Robbins in the project that's called OsteoStrong. There's going to be clinics. There's already 50 clinics in the United States, and there's already agreements for hundreds more, and we're expanding in other countries. So what we know about bone, and what bone really is in terms of musculoskeletal health, if you have weak bone and you fire a muscle that's connected to that weak bone in that connect chain, there's going to be neural inhibition because you can't engage a muscle to such a high degree where it will break the bone. Your central nervous system has a process called neural inhibition, you've talked about it before. Neural inhibitory processes will stop the body from damaging itself. So by raising bone density to a higher level, my level is +2, two standard deviations above normal. That enables me to have a stronger chassis, which is taking away a limit of muscle growth.

Dave Asprey: So weak bones equals smaller and weaker muscles?

John Jaquish: That's right.

Dave Asprey: And that's because if you had strong muscles and weak bones, you'd break your bones.

John Jaquish: Right.

Dave Asprey: Makes a lot of sense.

John Jaquish: Right. You can use that. I like using an automobile analogy. If you take a Formula One engine and put it in a Honda Civic, you would just rip the thing apart, just blow the wheels right off of it. Your central nervous system is smarter than the people who do that sort of thing, and put a big engine in an economy car because it's trying to keep you in homeostasis. But if you put the body in an environment where it is challenged, an extreme environment, then the body's going to see that extremeness and make the adjustments. Therefore, the entire musculoskeletal system will benefit.

People all over the world have had tremendous gains, tremendous things. The CEO of OsteoStrong had chronic back pain, chronic shoulder pain. Not a frozen shoulder, but close. You're going to meet him next week. His name's Kyle Zagrodzky, great guy. He had all kinds of biomechanics problems, and he was even in the fitness industry. He had a bunch of different fitness locations, and he was one of the guys who was early days and Curves, to get that out there. Always looked towards getting audiences that weren't already involved in exercise, to try and get them excited about what they can do, from the physical medicine perspective. So he just thought, "Oh, I'm getting old." He's in his late 40s and he had a lot of chronic pain. He starts doing this therapy after we met, and instantly, the pain went away. It's because he's building ... Not just triggering a little muscular growth, it's the bone that's getting stronger, and the associated tendons and ligaments in the whole connected chain.

Dave Asprey: So for someone listening now, they're like, "What the heck is going on that's causing strong bones?" I had an interview recently with the guys from Pulse Centers in Georgia. They were using pulse electromagnetic frequencies to drive bone density. You've probably seen me on Facebook live or on my Instagram page doing that on occasion, and that's one way to do it. But you found a way that takes, probably, less time than anything else I've ever heard of, stuff that's almost stupidly effective.

John Jaquish: Yeah.

Dave Asprey: How does it work? What is the OsteoStrong thing?

John Jaquish: It's a couple seconds. The actual action of what's going on. So when people ask me, oh, "The whole therapy protocol takes 10 minutes? Nothing could take 10 minutes." You only do it once a week, also, because the metabolic rate of bone is longer than the metabolic rate of muscle.

Dave Asprey: By the way, that's one of the reasons I wanted you on the show, is that exercising for an hour and a half a day, every day, six days a week, like I did when I weighed 300 pounds when I didn't get results, it's a huge frickin' waste of time. I want the minimum amount of exercise that's going to get me what I want. When you told me 10 minutes once a week in order to drive bone density, and it works for your grandmother, and it works for bodybuilders, that got my attention. I know that you know your science 'cause we know each other and we've talked at length about stuff. So this is why this is disruptive. This is why this is bio-hacking and just worthy of talking about. So people go in ... You said there's 50 locations and I've seen the gear once, so just describe what the process is and why you could drive bone density that way.

John Jaquish: There's four positions you go through, and you sit in these fixtures that are the robotic. So you log in and it's got all your measurements, and it closes in on you so that you're in exactly the right position, so it's highly calculated robotic musculoskeletal therapy. Then you basically ... Let's say you're in an impact position, you push away from yourself, and the movement you see is actually

the compression of bone. The machine's not moving at all. And then you have a computer screen in front of you that's telling you what your functional bone performance is in that kinetic movement.

Dave Asprey: So you're doing something that looks like a pushup, but it's a pushup where you're on a seat that's not gonna move, pushing against a surface that won't move.

John Jaquish: Right.

Dave Asprey: So all the energy goes into flexing and compressing the bones.

John Jaquish: Compressing a bone on its axis. So this is the axis of my clavicle, I want to compress it this way.

Dave Asprey: Do you have to compress it from end to end, towards the middle?

John Jaquish: End, to end, to end, right. So every once in a while, I'll come across somebody who says, "Well, I foam roll for bone density. That's how I get the pressure on bone." I'm looking at them like ...

Dave Asprey: Bone fibers are aligned a certain way. It doesn't work like that.

John Jaquish: Right, right. Like you do, do I really want to have this argument, or just go, okay?

Dave Asprey: Yeah, all right. Foam rolling has its place, for sure, but for bone density, that's not one of the technologies that I would necessarily recommend.

John Jaquish: Correct, yeah.

Dave Asprey: All right. So, you're doing what amounts to an isometric exercise, where you're wedged into a place where none of your body can move, so all of the force has to compress the bones because you're aligned properly.

John Jaquish: Right.

Dave Asprey: One is a pushup-like position. What are the other three positions that people go through?

John Jaquish: One is where the hips, like the 120 degree angle behind the knee where your ... Like you would strike the ground.

Dave Asprey: Like a leg press, sort of like a squat?

John Jaquish: Yeah, like a leg press, kind of squat kind of thing. Then there's another one for the core to distort the ribs. The bone actually gets distorted slightly, so we have some stop motion photography that, I think it's on the OsteoStrong website,

where you can actually see an individual, postmenopausal female, go from relaxation to compression. You can see movement, but nothing moves in the machine. The movement is from the axial compression of bone.

Dave Asprey: Wow, so it's actually mashing her bone.

John Jaquish: Yeah. I was just having a conversation with Head of Orthopedics in Sweden, huge medical group. This guy was asking me, like, "Do you think we could ever get some sort of, like, PQCT, which is a CT scan of limbs, where we can see a little bit of the compression?" This guy's so excited about learning. Orthopedic surgeons always understand this because they understand the physical mechanics of bone, and they also put screws and pins into bad bone and good bone, so they're very familiar with this. The guy says, "Maybe a tiny CT scan of a bone, and maybe we can actually see some of the compression." I sent him that picture. You can see it with your eye. You don't need a CT scan.

Dave Asprey: So you can compress your legs that way? So you do a squat, you do a push up, and the other two positions?

John Jaquish: There's one for the core, the ribcage and then there's one for the spine.

Dave Asprey: Okay, that's basically like a deadlift kind of position, but these are all without any actual motion other than compression of your bones.

John Jaquish: Right.

Dave Asprey: You do it, it takes about 10 minutes once a week. The idea behind OsteoStrong is that the gear to do this is pretty big and heavy, so you're going to go into a location once a week for 10 minutes, like on your lunch hour or something. Do this and then get a digital tracking of what's happening to your bone density and your strength 'cause they go up together.

John Jaquish: Right.

Dave Asprey: Your ligaments get better. Your bones get better. This is one of those ways of taking what would be tens of thousands of dollars of gear and making it very accessible to people.

John Jaquish: Hundred thousand dollars of gear.

Dave Asprey: It's a hundred thousand dollar machine, there you go. I don't have one.

John Jaquish: Yeah, they're extraordinarily expensive.

Dave Asprey: Yeah, I don't have one at home.

John Jaquish: No, no, you do not. I would not recommend that. Get a location near your place in Canada.

Dave Asprey: And also, 10 minutes once a week is not worth it. That's enough to go do it, but if you were to spend a hundred grand to have something like that at home, you should probably buy a Tesla.

John Jaquish: Right. You don't have a barber chair at your house, either.

Dave Asprey: Exactly. But it's a small enough amount of time with a big enough benefit. That's why I'm intrigued at this. All right. Let's say that someone doesn't have an OsteoStrong location near them and they wanted to do some bone density stuff at home. What could they do to improve bone density now?

John Jaquish: It would be very difficult for me to ethically say that they ought to go out and do high impact exercise. However, some athletic people, they may not be doing high impact activity, or they may be and they don't know. Another thing I created is an iPhone application called Fracture Proof. What Fracture Proof does is you download the application. The application actually benefits American Bone Health, so trying to help the education systems, trying to get people more up to speed on what they need to do to grow bones. So, a little bit of it goes back to a study that was done in Bristol, United Kingdom a couple years ago that determined ... This is one of the most important things in this discussion: The minimum dose response. Any time somebody tests a drug, it's like, how little of this drug ... When you were experimenting with brain octane, how little of this do we need to trigger the intended affect? Increased cognitive abilities if you're allowed to say that. I'm part of the company, so I am.

Dave Asprey: More mitochondrial energy does interesting things to the brain. I can say that.

John Jaquish: Right, okay. The minimum ... They're this group in the United Kingdom. They did a study where they attached accelerometers to people, and then they had them go through high impact activities through whatever they did, whether it was sports or some of the older people just went through their activities of daily living, or exercise class, cardio type stuff, and try to determine, or they did determine with crossing the accelerometer data with regular blood draws, because you can test somebody's blood for blood turnover markers. If you go through high impact and we test your blood, if the impact is high enough, there are markers that show that there has been an affect of growth. It's called the remodeling effect, so osteoclastic activity happens first, and then osteoblastic activity happens later. What was so profound about this study is they discovered what the minimum dose response for triggering bone growth is. This is awesome.

Dave Asprey: What is it?

John Jaquish: Okay, but let me back up. For a hundred years, Dr. Julius Wolff, he had people jumping off of tables. After they would die, this was a hundred years ago, after they would die, he'd get the cadaver and he'd saw-

Dave Asprey: From jumping off the table?

John Jaquish: No. When they would die of natural causes, he would saw into their bone and look at it and say, "Okay, the people who went through high impact had higher bone density." It's called the law of mechanotransduction. Everybody who has been to medical school studied this. While he made that observation, he had no way to determine what that minimum dose response was. This is why every educational body recommends resistance to grow bone. Now, resistance in high impact is a lot different than resistance like at a gym because a gymnast, for example, get 10 times their body weight when they slam against the ground from a dismount of the uneven bars. Nobody goes to the gym and lifts 10 times. Hardly anybody lifts 2 times. In fact, according to the American College of Sports Medicine, the average of people who exercise on a regular basis, they load their low extremities with 1.3 times their body weight. If the minimum dose response, which was discovered in this study, was 4.2 multiples of body weight, that's what it was. That's the minimum.

Dave Asprey: So you're saying lifting weights won't really affect bone density?

John Jaquish: It can happen if you are at a very high degree, maybe if you are doing strong range partials, maybe if you're also doing high impact.

Dave Asprey: I mean, there's other variables besides the environmental signal that tells the bones they're strong.

John Jaquish: Of course.

Dave Asprey: 'Cause if you're lifting, you're going to get more testosterone, bone density. You're gonna get more IGF1. You're going to get more growth hormone. You're going to get better circulation. You might change how you eat. You might get more vitamin K2. You'll get more collagen stimulus, but those are tiny things that affect bone density compared to the right loading, which is a huge signal.

John Jaquish: Sure, those are building blocks, but you still need the signal. A guy with high testosterone that doesn't do any exercise is not gonna build big muscle.

Dave Asprey: Right.

John Jaquish: You can have the IGF, you can have a high testosterone, you can have the calcium, the vitamin D. If you're not putting load on bone, not a whole lot is gonna happen.

Dave Asprey: Right.

John Jaquish: That's been shown. Yes, there are some little degrees, usually calcium and vitamin D can slow down the loss 'cause ...

Dave Asprey: K2 seems to be particularly-

John Jaquish: K2, yeah, yeah, they use them.

Dave Asprey: Okay.

John Jaquish: What this study discovered, this 4.2 multiples of body weight, they determined that the people who failed to achieve 4.2 didn't grow any bone. They had never had the turnover markers present with a high level of statistical significance. But the people who exceeded 4.2 multiples of body weight did have bone turnover, so they were able to grow bone.

Dave Asprey: What about things like the Bulletproof Vibe? One of the things that they use whole body vibration for, and the reason we chose the frequencies that are in the Bulletproof Vibe is it's what NASA uses to help astronauts get reconditioned after getting no stimulus on their bone in space.

John Jaquish: Right.

Dave Asprey: So this is a vertical vibration 30 times a second. I know you've studied the whole body vibrations space very extensively. Is there any usefulness for bone density for people who are already healthy with bone density there? It's okay to say no. I mean, there are studies that go both ways that I know of.

John Jaquish: Yeah, the right answer is no. Well, but, there's a but.

Dave Asprey: There are studies that go both ways.

John Jaquish: No, the vibration does not do anything for bone. What the vibration can do is increase somebody's biomechanics. If somebody is highly deconditioned, very poor biomechanics, kyphotic, they can start to fire some of the stabilizing muscles so then they can go on and do more impact-like activity, or they can do this osteogenic loading therapy.

Dave Asprey: So on a typical vibration plate, how many times your body weight is going to happen at the bottom of vibration?

John Jaquish: Just the body weight.

Dave Asprey: Body weight? Well, no, there's acceleration, 9.2 meters per-

John Jaquish: To have it be relevant in trabecular bone, you have to account for the accommodation of skin being pushed together. You have to accommodate for the natural process of all the tenderness, ligamentous material there, which is

designed to decelerate someone. And, muscle is completely designed to decelerate you.

Dave Asprey: Right.

John Jaquish: It's difficult to determine because a lot of the vibration manufacturers ...

Dave Asprey: There's a lot of crap out there.

John Jaquish: They played a silly game with mathematics to say that gravity is six times normal when you're standing on a vibration plate. That's ridiculous. That's like, they might as well put a blinking light on it and say you're exercising at the speed of light. I was involved with a vibration company. The stuff that is out there was appalling, nothing I was involved with, but ...

Dave Asprey: Yeah, but there's a lot of stuff that will ruin your low back. When I started experimenting like 15 years ago, I had hurt my hips and my back with the side to side stuff, and I broke a couple machines, but I saw benefits. That's why I ended up doing it the way I did it. So you're saying that there are benefits to it, but they're mostly neurological and circulation based?

John Jaquish: Yeah.

Dave Asprey: Right, okay. I would support that. There are studies that say if you have osteoporosis, if your bones are very weak, you can see benefits from it. But if you have strong bones, they're not gonna give you superhuman bones.

John Jaquish: But see, the highly controlled studies found no effect. Some of the poorer controlled studies did see some effect. I can say there was something nefarious going on, but what I think what was going on is they didn't control the activity of the participants in the study. If we take somebody who is kyphotic and doesn't have-

Dave Asprey: Define kyphotic for the audience.

John Jaquish: Hunched over, like some of the older people, or their head is just translated a little bit.

Dave Asprey: Anyone with an iPhone.

John Jaquish: Yeah. Anyone who looks down at their iPhones. When you have poor biomechanics, you're not gonna be able to absorb impact level force. When you improve somebody's biomechanics and don't control their other activity through the whole period of the study, if you're gonna study somebody's bone density, it's gonna be over a long period of time. You can't tell them, oh, all of a sudden, if you feel fantastic, you're not allowed to go out and run around in a field and play soccer with your kids or something like that. If all of a sudden they

start improving their activity, that may have a tiny bone density effect. Even the best studies that showed a bone density effect, which like I said, they were the poorly controlled ones. It was very minuscule.

Dave Asprey: It's more about lymphatic circulation, and I do see a lot of tightness when I do it, versus going for a walk. There's a mitochondrial stimulation and things. I remain a fan of whole body vibration done right.

John Jaquish: Oh, oh.

Dave Asprey: But for bone density, it's not as strong signal, compared to jumping off tables or in the case of what you're doing with OsteoStrong, loading the bones properly. I definitely ... You feel it when you do it. It's a very different kind of exercise than lifting weights when you're doing OsteoStrong.

John Jaquish: Yeah.

Dave Asprey: All right. So OsteoStrong will become available for people. I'm assuming it's Osteostrong.com?

John Jaquish: Osteostrong.me.

Dave Asprey: .Me, okay, cool. That's something that you're partnered with Tony Robbins on. Okay, well, let's talk about Tony for a minute because I'm fortunate that Tony has invited me to speak at his Unleash the Power Within conference. I'm on the regular agenda now, so I speak to like 15,000 people on a regular basis.

John Jaquish: It's awesome, yeah.

Dave Asprey: It just blows me away. And Tony, when you go backstage, he's got a trampoline, like a mini trampoline. I don't know any human being, and I know a lot of crazy mad men out there, who has the raw energy production ability of Tony Robbins. He throws off heat, he's got air conditioners blowing on him on stage, and he's just emoting. He's sending a signal that backstage, he's got every piece of bio hacking gear, everything he can to just give him more energy. And right there is a trampoline. What are the affects of rebounding on bone density?

John Jaquish: Because it's cushioned at the bottom, very little.

Dave Asprey: Now, you might get ligament improvements, though, from vibration and bouncing, or does that also require the same thing?

John Jaquish: That's not as researched, so it would be difficult to say. I could guess it would be more of one.

Dave Asprey: You're a research professional. You've been studying this stuff your whole life. You worked with pro athletes, and lots and lots of people, so whether or not

there are studies, in your experience, what would you guess, given that you know more than almost anyone else and you've seen more than almost anyone else and you had to flip a coin, what side is it gonna land on?

John Jaquish: It would land on the tendon and ligament improvement.

Dave Asprey: Okay. I tend to think that's right, too, but I don't have anywhere near your level of experience in that part of it. It seems likely.

John Jaquish: One of the problems here is that it's like no one does cancer studies on diets with a lot of high fat in vegetables, right?

Dave Asprey: Yep.

John Jaquish: Because there's not a lot of business to be done. Nobody is gonna sell a product that's gonna potentially make a trillion dollars or billions of dollars or something like that to tell people to go eat vegetables and a high fat diet. Right?

Dave Asprey: Yeah.

John Jaquish: So we're just not gonna get that level of study.

Dave Asprey: Right, no one's gonna pay for it.

John Jaquish: You're not going to be a pharma-level study there. That's the problem with all physical medicine interventions like that.

Dave Asprey: I hear you. And frankly, if you have a study that says a food has a medical effect on you, you're not allowed to speak about it because then you're accused of selling food as a drug. So a lot of the research that exists around things like collagen or brain octane, I'm legally forbidden to tell you what it actually does.

John Jaquish: Right. And, to make things even worse, if you did a clinical trial on it, they would say, oh, this needs to be controlled.

Dave Asprey: But I still can't say it.

John Jaquish: Yeah, you still can't say it.

Dave Asprey: It drives me nuts.

John Jaquish: So even if you do everything right and play by the FDA's rules, then you're just fenced off in another area.

Dave Asprey: I can tell you. It makes you feel good. Now, you're working on another project, which is the one I mentioned at the beginning of the show. I was the first person outside of your company.

John Jaquish: The first guy showed. I couldn't wait to get it to you.

Dave Asprey: Yeah, you flew up to my house, actually Bulletproof Labs Alpha there, and I played with this and was like wow. We ended up testing it with four different people on the Bulletproof team. These were the only four prototypes in existence. We did it for about six weeks. All of them were like, "Can I keep this?" You're like, "No," and took it back.

John Jaquish: A few of them ... The prototypes cost \$2,000 a piece to build. A couple of them, two of them said, "I'll give you \$2,000 if I can just keep this." Of course I needed it, so ...

Dave Asprey: Yeah, this was very early stage startup stuff. This device is called the X3.

John Jaquish: The X3.

Dave Asprey: I keep wanting to call it triple X because I gotta just tell you guys this. John is an incredible research scientist. He's got biceps, at least as big as my head, and knows what he's doing. But he wanted to call this product triple X. I'm like, "John, that might have a connotation." He's like, "But, it makes you grow muscle three times as fast as lifting weights."

John Jaquish: Yeah, there's research that says that.

Dave Asprey: I think X3 was the right name for it.

John Jaquish: Well, I thought triple X would be like a controversial name, and it would be, right? Everyone's gonna laugh when they hear that name. Oh, yeah, I gotta check that out and they'll remember it. The problem was from a search engine perspective, that's like the worst thing you can do because it's like anybody will find it.

Dave Asprey: It would be the shake weight. It would be terrible.

John Jaquish: Yeah. Call the next three because of the gains come three times as fast.

Dave Asprey: In all of your research on bone density and on muscle building, and just being a bodybuilder and working with a lot of the top bodybuilders, some of whom have now endorsed this thing. I'll just tell you. My deal is, I would love to work out less and get all of the benefits because I have stuff to do. I'd rather record another episode of this. I'd rather go, like this morning, I took my kids to the zoo. If I could get another hour of time to go to the zoo versus hit the gym, I'll take that.

John Jaquish: Right.

Dave Asprey: So how do I put muscle on and just maintain, mostly? I don't want to look like a bodybuilder. If I decide to, then I'm going to commit more time and more effort. But in the meantime, I want to maintain the almost muscular physique, which is one that I think is gonna help me live the longest.

John Jaquish: Sure.

Dave Asprey: So...the way to do this that you discovered involves loading the muscles in a different way than gravity and weights does. Can you walk me through that?

John Jaquish: Right. When you ... Let me walk back a little bit and talk about some of the bone density research.

Dave Asprey: Sure.

John Jaquish: One of the later studies that I did on bone density, I just wrote the protocol and I had a hospital in London do the research. It was published in the Journal of Osteoporosis and Physical Activity, great journal, by the way 'cause they cover physical medicine. What we discovered was that we've always known, and it's been talked about, is in range of motion. If I'm gonna push something away from myself, let's say a bench press bar. When it's laying on my chest, I can handle, let's say X. But when I push it further away from me, like let's say halfway up, it's more. We all know we have greater capability. So when we select a weight in the gym to do weightlifting with, we will select the weight that we can handle in our weakest range of motion.

While it's been known what the difference is and the capability, what was discovered in that study, a guy named Basel Hunt, who's a clinical psychologist in the United Kingdom healthcare system, he was absolutely blown away at the differences. Remember I said 1.3 multiples of body weight is what people, on average, load their hips with. What we see in that study and in the data in general is the people actually load the hips in a maximal perspective and impact deceleration perspective at nine times their body weight.

Dave Asprey: So translate that into English for people listening who don't know what maximal-

John Jaquish: I'm going to, right. All that stuff I said, forget all that. What you need to remember, the takeaway here is, you are seven times more powerful in your strong range of motion than you are in your weak range of motion.

Dave Asprey: There you go.

John Jaquish: Right. If I'm gonna do a bench press, basically, I'm losing a magnitude, huge multiple of the growth potential because whatever weight I pick, I can handle in the weak range of motion, which means in the strong range of motion, it's not really doing anything. This was the problem. Because in conventional lifting, we

pick a static weight, we're only stimulating in the weaker range of motion, which is also where joint damage happens. The guys who try and train heavy over and over again, they have tendonitis, they have all kinds of damaged joints, biomechanics problems. When you go to a power lifting event, a lot of the older power lifters, they're walking with canes. You kind of look around and you say, "This sport was about health, right?"

Dave Asprey: No, it was about power!

John Jaquish: Excuse me, guys. This was about health, I thought? I don't know. I mean, well, I love power lifting, fascinated by it. I always have been. It's why don't we, and the question when I looked at this research data, I thought, why don't we develop something that is accommodating? Why can't we have a variable resistance product where in the weak range, we have a very low amount of weight to protect joints. In the strong range, we have a weight that we can never un-rack at the gym, much higher. Then I took it a step further and built a protocol around this so, and this is another takeaway, diminishing range with variable resistance. So when you do it, you never lock out. 'Cause you lock out, you turn the muscle off. It's a very confusing system for your central nervous system and then it ends up doing nothing. Let's say I go to full extension. Let's say with one band that I have, you know, this one.

Dave Asprey: Just, we haven't talked about that. So what you're using is custom made bands with a really interesting ball bearing device that allows you to not twist your joints as you're doing ...

John Jaquish: Right.

Dave Asprey: You buy resistance bands for, like, I don't know, \$30 or something, but they don't do what this does at all.

John Jaquish: Right. The bands are special in that they're layered latex, as opposed to molded rubber. The power behind them is very different. It's kind of difficult to explain that over the internet. People see a tiny video and they see a rubber band, and it's like, isn't that the same as all the other ones? No, it's not.

Dave Asprey: You had to custom make the bands.

John Jaquish: Yeah, yeah, yeah. What we do is we vary the resistance. So let's say I have 80 pounds when it's on my chest.

Dave Asprey: On a bench press? Okay.

John Jaquish: It's 200 pounds. Yeah, on a bench press. 200 pounds when I'm halfway away from me to full extension, and then it's 350 pounds when I'm at full extension. Let's just say that that's what the power curve is. That's what it is when I use 'cause I tested it with a load cell when I used that particular band. So let's say I

go through 10 repetitions and all of a sudden, I can't hit that 350 anymore. Now, I've built up to this. Hitting 350 at a peak is not what people do on day one.

Dave Asprey: You're a pretty solid guy.

John Jaquish: Yeah, yeah. It's ... I'm gonna pat myself on the back. I am ridiculously strong. So I'm able to go to this 350 until, like, let's say 10 repetitions and then I can't get there. Then, I diminish the range.

Dave Asprey: So you don't push as far?

John Jaquish: Right, right. And so, I can only go, like, let's say halfway and I do maybe another five or six repetitions that are halfway to where I get to the 200 pounds. Then, I'm too exhausted to do that.

Dave Asprey: And there's no pause at the bottom. You never unload the muscle.

John Jaquish: Right, exactly.

Dave Asprey: That's important.

John Jaquish: Constant tension. It's constant tension. First, it's variable resistance with the heavy bands and the very particularly made bar that'll handle hundreds and hundreds of pounds that has an Olympic bar function, so it swivels. If you turn your wrist, you don't lose grip on it. That's huge. That's part of why this was such a profound thing. Then there's also a ground plate to hook it to the ground.

Dave Asprey: So you can do the curls and things like that.

John Jaquish: Right, right.

Dave Asprey: Go through a range of motion. We're doing this on video live at the Be Unlimited Bulletproof conference, we're doing holotropic breathing with Stan Grof and things like that. If you want to watch this on video, bulletproof.com/YouTube will give you the link, but we'll talk everything through so if you're driving or you're at work, you don't have to watch the video. It's this heavy bar about two feet across with extremely heavy hard around the ends. You could just fit it in your luggage, it looks like.

John Jaquish: Yeah, it's 21 inches and you drop it right in.

Dave Asprey: It weights what? Six pounds? Eight pounds?

John Jaquish: Eight.

Dave Asprey: Eight pounds. It's a solid thing, and it's got these swiveling hooks on the ends that hook to some bands. I can tell you, having done this for that time about 18

months ago, you do this for like five minutes, you feel like you're gonna die. You get dizzy from it, and then when you're done ...

John Jaquish: You gotta sit down. You can do like one set, and you have to ... The level of exhaustion-

Dave Asprey: It's insane.

John Jaquish: That with the variable resistance, of course, it's a deeper muscular stimulus. Keeping the constant tension, that's huge, and then the third thing is the diminishing range. You end up the end of one set, you have one inch repetitions where you're just exercising the weaker range of motions so you fatigued all ranges of motion simultaneously in one set. It is [crosstalk] triggering an adaptation to the human body, typically, the greater the stimulus, the greater the response. You don't get much of a tan on Christmas day, but you will in July. You don't have to be outside for very long. The exposure to the stimulus, the more intense you can make that, and so we're basically tricking the body into being able to put tremendous forces through the muscular skeletal system with very little risk of injury, and then trigger, and then going through that full range of motion triggering massive muscular growth.

Dave Asprey: It's an interesting thing. What I would do is I would have my Bulletproof coffee in the morning, and then I would do this basically around 12:00 or 1:00 when I'm in a fasted state so I've got nothing but ketones from the Bulletproof coffee. Then I do this. Afterwards, it's like I gotta eat now, and I go eat.

John Jaquish: So this is very, very controversial with all the things I've seen online, yeah. People haven't experienced it. Their exposures, they see a video that's one inch by one inch and a half on their phone screen, so it's very difficult to see the complexity and quality of the product. And so, when I say I put on 30 pounds in a year, in muscle, and I dropped body fat at the same time, like some of these ... I think they call them bro lifters or bro science or whatever.

Dave Asprey: Oh, the science trolls, yeah.

John Jaquish: Yeah, yeah, where they read an article by Arnold, which was written by not Arnold, but had his name on it in the 1970s. They assume they know absolutely everything there is to know about every nuance of human physiology. God bless them. They're nice people. They mean well. They think they're protecting their friends from some goofy product, but it's not goofy. There's a ton of science behind it, and yes, I did put on 30 pounds of muscle in a year.

Dave Asprey: You are looking substantially thicker since the last time I saw you.

John Jaquish: Since the last time you saw me, yeah. I've even been filming the 12 week program. We have a free 12 week program with the product. I've been filming the 12 week program. Even in the videos from week to week, there are users of

the product who bought the preorder who have been saying like, "I actually see you getting bigger every week."

Dave Asprey: I gotta tell you, very clearly, John, X3 is a scam because I put on 30 pounds of muscle in six weeks.

John Jaquish: Oh, in six weeks?

Dave Asprey: And I didn't exercise anymore.

John Jaquish: Right.

Dave Asprey: Actually, I did, but I was using SARMs.

John Jaquish: Yeah.

Dave Asprey: And you're not. That's the reason I bring this up. You're not doing that. You're not using SARMs.

John Jaquish: I have not experimented with SARMs.

Dave Asprey: What about testosterone?

John Jaquish: I had low testosterone when I was younger.

Dave Asprey: Sure, I had it since I was 26.

John Jaquish: 28 for me.

Dave Asprey: Okay, cool, so you take physiological doses of it?

John Jaquish: Yeah.

Dave Asprey: Okay, cool. What physiological doses of bioidentical testosterone do is they make you live longer and like your life better. Any time someone else says, "Oh, you're taking testosterone, it doesn't matter." Actually, you don't know what the hell you're talking about.

John Jaquish: You get such a little dose. I mean, you feel better. You grow.

Dave Asprey: You don't get big from that.

John Jaquish: What you do is you don't lose muscle if you get the prescription. Most people get the prescription when they're like 40 or 50. In fact, part of the reason that I really got excited about this product was working with head of the clinical director of physical medicine for Titan Biomedical. That's a lab that prescribes

testosterone, and it was funny because people will get a prescription for testosterone. They wouldn't see any results at all.

Dave Asprey: Yep.

John Jaquish: I had a friend at Cenegenics that said the same, that's the similar type of service said the same kind of thing. We have patients that just don't gain any muscle at all.

Dave Asprey: They're happier and they're probably better in bed, but they don't gain muscle.

John Jaquish: Right, right. And also, I think frequently, they think they're gonna look 18 again. There's some unrealistic expectations that are often even on the fault of the person who is ...

Dave Asprey: Yeah, it still helps, and it really can improve your outlook on life if you have the low testosterone [crosstalk].

John Jaquish: You're not gonna put on a ton of muscle from testosterone therapy. So, I was always an athletic muscular guy. Then when developing this thing, I had just ridiculously awesome results.

Dave Asprey: We have no formal affiliate or anything like that. I'm an advisor to a couple companies making interesting muscle developing stuff. I'm not officially an advisor here. We're just friends. We're talking about this stuff. This is, I'm guessing it's X3.com. I actually don't know.

John Jaquish: X3bar.com.

Dave Asprey: X3bar.com. I can tell you guys, this is legitimate stuff. I'm really impressed with it, which is why I wanted to have John on. Plus, I mean, you know a thing or two here. You've studied this extensively. You've looked at the effects of whole body vibration, and you've looked at the effects of what happens when you don't allow the muscles to relax, when you just kill them the way the X3 bar does. I felt it. I tried it. I think this is one of those time saving things that maybe pro bodybuilders, I guess you have some pros who are now using this, can use. But also, just normal people, whether you're a stay at home mom who's like, look, I don't have time to work out. I want to deal with my kids. This happens a lot, actually. I hear this. It happened to my wife. I used to have a yoga practice. I used to do all this stuff. And now, the demands of life are just too much, but I still want to maintain my muscle mass because it's important to feel good.

John Jaquish: Remember, one of the reasons we're friends, I remember the first time you called me. I think it was like a two and a half hour conversation.

Dave Asprey: Yeah.

John Jaquish: I'm not even sure where you got my number, but it was just like, "Hey, this is Dave Asprey." I was like, "Really?"

Dave Asprey: I called 1-900-Big-Muscles and you answered it.

John Jaquish: There you go. So we talked, and it's not even just the things that we're working on. While they're different, they're going towards a very common goal of what you just said, but also, they're optimizing. I didn't want to develop this so people could save time. I wanted to create the absolute ultimate serious strength training thing.

Dave Asprey: Yeah, you're a perfectionist.

John Jaquish: Yeah, and a part of it is a lot of people have said that this is a little over built 'cause it handles over 500 pounds. In fact, I got a video on YouTube where I'm doing 550 pound, I had a load cell in the middle of the chain. I mean, between the band and the bar, 550 pounds for reps. Not everyone is gonna do that, but I wanted to show that something like this, that this, with variance in resistance, could make somebody as strong as possible because now we're leveraging what we've learned about the human body and the differences of the capability in range in motion. So, I mean, anybody who says, "Oh, it's too expensive, or whatever. I say, "What if it's the last fitness dollar you ever spend? So is it too expensive?"

Dave Asprey: You're charging about \$400 for this?

John Jaquish: At \$429, yeah.

Dave Asprey: All right, good deal. I can tell you, I don't have one of these. I tried the original prototype, which looked a little different, but it was pretty similar. This was back quite a while ago, so I'm about to get one of these things. I guess we do have a financial issue. You're giving me one for free, right?

John Jaquish: Yes, I am.

Dave Asprey: I've been bought, guys, but I am truly impressed. I have gear that costs up to \$45 grand. Actually, one piece of gear is \$130,000 that improves stem cell production in my labs at home. I'm willing to ...

John Jaquish: I think I've seen it.

Dave Asprey: Yeah. I'm willing to ... That's the CVAC, by the way. I'm willing to not ... I drive a pickup truck, not some sports car or something.

John Jaquish: I've been in your pickup truck.

Dave Asprey: It's a nice truck, but I put my R and D dollars into things like this. I can tell you, for the money, this blows my muscles out in a way that a \$15,000 Electrical Stem doesn't, even though I'm a big fan of Electrical Stem, still. I have multiple technologies to do this. I also like the computer-driven resistance things. But, this, for travel and for people who don't have a lot of space, or want something that's much more economical, I think this absolutely deserves real attention as a biohacking device. That's why you're here. What else can we talk about? Let's say that someone doesn't have access to the X3 and they want to put on some muscle relatively quickly using more traditional stuff. They have a choice of Nautilus machines or 24-hour kind of machines, or they have a choice of bars or jump ropes or something. What's the best option?

John Jaquish: Yeah. Well, part of it is if there was an easy way to accomplish that objective of variable resistance really, like, the highest degree like what we're doing, if there was a way to do it, I wouldn't have bothered to build a product. I would've just advocated whatever that was.

Dave Asprey: What if you've got, like, the Doug McGuff body weight exercise, you know, the real slow things like that. That seems to be effective in a smaller amount of time, at least for average muscles. No one's using that, I think, to just get completely bodybuilder grade, but if we're looking at that equation, which is how do I get enough in a minimal amount of time?

John Jaquish: Right.

Dave Asprey: Any recommendations for that?

John Jaquish: There's ... Without recommending so much garbage out there ... There is so much bad advice.

Dave Asprey: Let's say you've got maybe body weight exercises. I mean, should I be doing slow pushups, fast pushups? Give me...what I can do on the road.

John Jaquish: Slow is always better in any type of movement because you get stability firing. What I tell people who like to bounce the bar off their chest when they do a bench press, or they're kind of the CrossFit style pull ups where they let their body weight drop and then bounce off their bicep tendon as they try and jerk themselves back up, you can probably tell by my tone, I'm not a big fan of that, though CrossFit is doing a very good job of cleaning that kind of stuff up.

Dave Asprey: Yeah. I mean, it's-

John Jaquish: A very good job.

Dave Asprey: I would say that the CrossFit trainers that I've met and worked with, they're very focused on form.

John Jaquish: The last two years ...

Dave Asprey: Yeah. Let's face it. If you're running CrossFit gym and you aren't well enough trained to focus on form, you're not gonna run a successful gym because people get injured.

John Jaquish: Yeah, totally.

Dave Asprey: But when you train them right, they'll become very strong, right?

John Jaquish: Right, yeah. I'm a CrossFit fan. Body weight exercises, I'm probably mostly a fan of balance and stability type stuff. I say this to bodybuilders and I mentioned a friend of mine, Phil Hernon, who was a 1996 Mr. USA. Awesome bodybuilder, he runs a really successful supplement business now, and he's just one of these really mindful individuals who offers his help to aspiring athletes and bodybuilders basically for free, though he does train some ... He's training a few of the top bodybuilders right now, but he is ... Jeez. I lost my train of thought. Why'd I bring that up?

Dave Asprey: Because we're looking at what you could do without gear.

John Jaquish: Oh, right. Phil, I shared a bunch of research that I had come across and then a study that got published last year in The Journal of Steroids and Hormonal Health with Henry Alkire. He was my ... He's instrumental in putting these projects together. He works with me. And so, I showed Phil this research. This goes back a little bit full circle to the vibration. So, stability firing, stability firing is one of the primary mechanisms that triggers growth hormone. That's what you're really doing on Vibe. That's what you're doing when you do a one legged squat and try and balance yourself when you have to stabilize.

This is like when you draw a line on a piece of paper and you draw it really fast, it's easy to draw it straight because you're using momentum. When you draw a straight line very slowly across a page, that's harder because you're actually firing stabilizing muscles to keep that line straight. That's the way you need to look at your lifting because you don't want just the primary actors ... When I'm pushing something away from myself, it's not just my pectorals. It's all the stabilizing firing because not only from a safety perspective, when all those stabilizers are enacted, they're protecting me from injury.

But secondarily, when a muscle fires without your intentional actions, it's called a spinal reflex. It means a tendon is moving and you're not moving it, so the body fires that muscle to protect all the joints around it. When that happens, when that spinal reflex firing happens, especially in a rapid succession, growth hormone goes up. And so, Henry Alkire and I did a study where we looked at all 23 different data sets, so it's a meta-analysis. Does everybody know what a meta-analysis is?

Dave Asprey: I'm guessing most listeners do, but in case you don't, meta-analysis is something where researchers look at all of the other studies, decide which ones are worth paying attention to and look and say, well there are 25 studies, 5 of them were crap. The 20 that were any good, this is what they found.

John Jaquish: Right, yeah, exactly, just ramming a bunch of research together and using statistics to determine a better answer. Also, it takes a lot of biases out if you had one biased researcher or somebody who was maybe looking at the wrong variables or something.

Dave Asprey: Funded by Monsanto...

John Jaquish: Right, right.

Dave Asprey: Where you just lie blatantly.

John Jaquish: So, 23 data sets all came to the same conclusion, which was stability firing rapidly increases growth hormone.

Dave Asprey: So this would imply that if you're using the Bulletproof Vibe, you would want to ... Actually, well, this is what I did when I was using the prototype. I would stand on the Vibe and I would do the exercises with the prototype. Is there a value to doing that, or was I just trying to double dunk 'cause I'm lazy?

John Jaquish: It was absolute value.

Dave Asprey: Oh, okay.

John Jaquish: In fact, if you go through the X3 12 week program, it gets more and more aggressive not only with the heaviness of the band that you're using 'cause that has a lot to do with stability firing, too. You don't need a stability fire when you just stand on one foot, but when you stand on one foot and then you bend your other knee so that your femur is parallel to the ground, you got a lot of stability firing there because that's tough. So we definitely go through that 12 week program. We're shifting people towards this stability based exercise. We start with the two legged squat, and then people migrate to a split squat where they just basically have a toe on the ground behind them, and they're putting the band and they got the bar across their shoulders like a front squat loaded position. So they're putting massive forces through one leg, but the core is totally lit up. If we were to do electron myography on those muscles, you would see firing, just like crazy through the whole core, which, that's tremendous. That's gonna up regulate growth hormone.

Dave Asprey: All right. So, you would suggest for people who are exercising without X3, without any special gear, without the Bulletproof Vibe, if they can do things that engage stabilizing muscles, these would be body weight exercises...

John Jaquish: One legged squats, it's ... I say this to trainers and they look at me like I have two heads. I say, "Do you do two legged squats with your clients?" They'll say, "Of course. It's the most functional exercise." I say, "Oh, you must train kangaroos because people walk on one leg at a time."

Dave Asprey: Right.

John Jaquish: So we lose our balance. We generally don't have two feet firmly planted on the ground. We lose our balance when we have one foot on the ground. So it would make the most sense to train on one foot at a time. That is not what we do, but it's just, there's a lot of things that we don't do that are just kind of the common practice, which is [crosstalk].

Dave Asprey: A lot of your career has been what's the very best way to do this?

John Jaquish: Right.

Dave Asprey: Versus the way we do it.

John Jaquish: That was the impetus behind X3 and OsteoStrong, same thing.

Dave Asprey: That's why I like to hang out with you 'cause you're a perfectionist.

John Jaquish: Awesome.

Dave Asprey: All right. Let's do two more things. One, I've gotta ask you the question that I ask everyone on Bulletproof Radio. Then for people who are watching on video, let's actually have me do a couple curls or something just to demonstrate.

John Jaquish: Yeah.

Dave Asprey: I've lost some of my gains from the SARMS, which happens when you stop using SARMS, but it was still a fun experiment, but I'm still reasonably strong. But I just want to play around with the thing. Do me a favor, don't blow me out because I'm interviewing two of the world's top spiritual and meditation masters after this at the Be Unlimited event, so I don't want to go to sleep when we're done, so we'll just do a light workout.

John Jaquish: Okay.

Dave Asprey: But before then, and that's ... I'm not sure we'll put that on the radio show, but that'll be on bulletproof.com/iTunes. Sorry. Bulletproof.com/YouTube is where you go for that just to get a link to all the channel. And then, let me ask you the question. If someone came to you tomorrow and said, John, based on everything you know in your life, exercise, physiology, bioengineering, and not, what are the three most important pieces of advice you'd have for me if I told

you I want to perform better at everything as a human being? Three most important things. What are they?

John Jaquish: Well, one would be ... The first one, actually, would be the order that we just went through them. Be mindful of bone density, and I mentioned Fracture Proof is a good way to figure out if you are capable of hitting the ground and functionally switching on bone density.

Dave Asprey: That's an iPhone app?

John Jaquish: That's an iPhone app, right.

Dave Asprey: Okay, so tell people watch your bone density. That actually could sound like you're like, okay, bone doesn't matter so much, but the reason for that would be that bone density drives almost everything else in the body.

John Jaquish: Right. It's the chassis that your engine sits on.

Dave Asprey: Got it.

John Jaquish: Addressing bone density is an absolute key to performance.

Dave Asprey: Cool.

John Jaquish: And that's into something that Tony Robbins, like when he looked at my talk track, how I would go not just speak at medical conferences, 'cause I do that, it's very different. I gotta really present the data, not be so excited as I am today. They won't really [crosstalk].

Dave Asprey: Doctors get pissed when you're happy. It's weird.

John Jaquish: Yeah, yeah, yeah. Well, they don't want anyone who's promoting, so I understand. They want the data, and they want to make their own decision.

Dave Asprey: Yeah.

John Jaquish: If they're excited, that's fine. It's having an eye towards bone density and then building it.

Dave Asprey: All right.

John Jaquish: So there's two different ways to do that.

Dave Asprey: That would be the first thing you would recommend, though, just in terms of the three things?

John Jaquish: Yeah.

Dave Asprey: All right, so have a strong chassis 'cause that matters a lot. What's the next most important thing for people, just they want to perform better, not just in the gym, but just in life?

John Jaquish: Variable resistance. For example, if like a real easy way to get some variable resistance gains, if you're a guy who really doesn't do any type of exercise, get in a pushup position. Start doing pushups. When you can't do them, drop to your knees, put your knees against the ground, push away from yourself. So now you're doing the up part of the pushup with your knees. Then when you get to the top, lift your knees up and give yourself the negative of your whole body weight.

Dave Asprey: Okay, so just the lowering part?

John Jaquish: Right, so you're basically cheating through ... They call it cheating. I hate that because ...

Dave Asprey: I love cheating. It's great.

John Jaquish: Well, it's like a bio hack for how to get to a greater level of exhaustion. Like I said, the greater the exhaustion, the greater the effect.

Dave Asprey: Okay.

John Jaquish: So you're exhausting yourself, you're forcing reps.

Dave Asprey: That's a neat hack, okay.

John Jaquish: Yeah. You drop to the knees, push yourself up, lift your knees up, and then in the negative, in the concentric motion, you get your whole body weight, and then do it again. Do it however many times you can do it until absolute fatigue, and you'll see just a tiny little bit of what X3 can do, but that's variable resistance. You're changing the resistance.

Dave Asprey: So strong chassis would be number one. Number two would be to switch it up so you get the variable resistance. All right, third most important thing you could do to be a high performance human?

John Jaquish: Stability.

Dave Asprey: All right.

John Jaquish: This is one legged squats. This is buying a balance board while you're watching your favorite TV show.

Dave Asprey: Just stand on the balance board?

John Jaquish: You're watching Orange Is the New Black, and you put the balance board in front of you, and you just stand on it and let your stabilizers keep you there. You don't even have to think about it. These are muscles ... This is exactly what's going on on vibration. The hormonal effects of stability firing, like, the data sets weren't all on whole body vibration platforms. They were in all different types of different things. One of them was just, like, a precursor test for someone who would put a precursor on an Achilles tendon. I think it was the Achilles, one of the tendons, and forcing the muscle fire because you're altering the length of the tendon. So firing in spinal reflex to protect the joint, but it had the hormonal effect.

Dave Asprey: Got it. So for people who want to be high performance, have a strong chassis, get variable resistance, and then be more stable. These have a combination of neurological and hormonal effects that just generally make you stronger, more energetic, things like that, okay. Beautiful answer.

John Jaquish: Yeah.

Dave Asprey: All right. You've been listening to John Jaquish, who is a founder and creator of X3 and OsteoStrong. I guess, with OsteoStrong, I don't know if you're a founder, but you're a medical director.

John Jaquish: No, no, no, I'm not. They had started before me and I ...

Dave Asprey: You're, Medical Director, I think is your title?

John Jaquish: I am the Director ...

Dave Asprey: Jeez. Look at your arms. That's insane. All right.

John Jaquish: The ... What is my title there? It's Medical and Scientific Advisory Board.

Dave Asprey: There you go. I would encourage you to, if you're interested in this stuff, you just learned how to do a pushup that gives you some of these benefits. If you're a biohacker and things like that, you might want to check out the X3. No matter who you are, OsteoStrong is, I think, going to be a really big game changer because it's such a small amount of time for a really big thing. All right. Let's officially end the show for people who are driving, unless when you get to work, you want to go to bulletproof.com/YouTube and then you can see me getting my ass kicked by the X3. We'll just do some curls real quick so you can see what the gear looks like.

John Jaquish: Nice, all right.

Dave Asprey: At the end of the show, John and I were chatting and he just decided he's going to offer a 10% discount code to people who want to give this a try who are Bulletproof fans, probably because he's a Bulletproof fan and just because, well,

we did this on the fly. So if you want to use code Bulletproof on the X3bar.com website and save 10% to give this thing a try, hey, that's cool. It saves you about \$42.90 or something, hey, there you go, which is super cool. So give this thing a try if you want to save some time on exercise, or not. It's a cool thing. When you try it, you'll see what I'm talking about.