Introduction to Hypertension and Heart Risk

Hello and welcome back for another amazing conversation we're going to have this time. We have Dr. Joel Kahn, who is an incredible cardiologist and a very dear friend.

How are you doing today? Superb. Great topic today. Yes. We're going to dove deep into really what uncontrolled hypertension does to the heart. And I can think of no one else who I'd rather have this conversation with than Dr. Kahn, because you have been such a lifeline to me, even as a family medicine doctor, to reach out to someone who, you know, if someone has a heart issue and you were always super responsive and gave me the best advice, so listen up, everyone.

I think we're in. I learned quite a bit today, so I think we'll just get the ball rolling with. The first question is basically how does uncontrolled hypertension directly affect the heart structure and function over time?

Yeah, great question. And there actually are some estimates that 80% of people that know they have high blood pressure by their doctors diagnosis or maybe their own home monitoring, 80% are not well controlled.

So we're talking the majority of hypertension patients are not hitting 120 over 70 or some reasonable marker. And to answer your question, you know, over time, there are acute situations.

You know, you acutely can raise your blood pressure at 200 over 130. Terrible diet indiscretions, terrible alcohol indiscretions, anger, emotion, stress, fear and all.

And they could put you into it. You know, and I know it's called congestive heart failure or pulmonary edema. It could cause a stroke or an intra cerebral bleed, a bleed in the brain.

They could acutely damage your kidneys. These are infrequent and probably emergency room based acute situations you can cause. I want to certainly mentioned this.

Everybody has a heart beating away and above the heart is a tube called the aorta. You can tear your aorta that's called an aortic dissection and suddenly feel this massive sudden pain in your chest might occur during gym exercise, during sex, during shoveling snow, and might be spontaneous.

And that can be a quickly deadly situation or a slowly deteriorating situation that usually you'll be in an emergency room and hopefully make a diagnosis.

So those are kind of the acute situations. They're not incredibly uncommon, but they're all potentially very lethal. So we want to avoid it. And there's kind of a statement I never practiced in Brooklyn or Williamsburg in New York, but around the Jewish holidays, when people are eating chicken soup in salt, the emergency rooms fill up with people having acute, high blood pressure.

And I'm sure it occurs in many other settings, in many other cultures. But my friends in New York tell me you actually see that around the high holidays.

And also that's another reason I'm big and I don't do chicken soup. So it's not the chicken, it's the salt. But don't do chicken anyways. Chicken has a lot of sodium in it, as many people may know.

But then there's more the chronic. And just to be really to the point you know over years of blood pressure 150 over 94. You'll probably never feel it. You'll never know your high.

You're not going to be flushed, you're not going to necessarily be winded. But verses 120 over 70 slowly impact scar your kidneys, shrink your kidneys, cause you to be on your way towards chronic kidney disease.

How Uncontrolled Blood Pressure Damages the Heart

And maybe if you combine that with a little type two diabetes, like about 40% of Americans might be on your way to even dialysis. Tragic. Tragic. You know, you will injure your heart both the arteries, because we've known for at least 50 years that high blood pressure chronically is one trigger of clogging of arteries called atherosclerosis.

And on your way to a heart attack, stent bypass or sudden death, terrible, terrible things. Or if you don't, clogged arteries, the muscle of the heart has to work harder.

If the blood pressure is 150 over 94, the heart's pumping against more resistance. Kind of like putting your hands around the aorta. It's harder to get the blood out and the heart muscle thickens.

And it's a condition called cardiac hypertrophy. People don't live as long of the heart muscle thinking. People get short of breath. If they're heart muscle thickened, people develop congestive heart failure and your quality of life goes down and probably your quality of life goes down.

Very often your doctor will say, Go get an echocardiogram, an ultrasound of the heart because you have high blood pressure and they're looking for a thicker heart muscle. So that occurs.

It damages the brain. That has to be mentioned. One of the triggers of dementia is chronic hypertension. Those would be probably the biggest one. Yeah. High blood pressure age is the body.

It's impossible to talk about wanting to lead a long, healthy life, what we sometimes call a health span. If you're not really focused on your blood pressure, which all equates to get a home blood pressure cuff, it's like my number one recommendation of patients go spend $90.

I like I'll give a shout out. I like omron platinum. That's a brand and a model of a home blood pressure cuff that's pretty reliable on your arm. Just hit a button and do it about three times in a row, about a minute apart to get a reasonably accurate home.

Blood pressure. If you don't all have a home blood pressure cuff, you are an amateur health advocate. All right. That's great. So, yeah, I agree. The arm run is, I would say, the most reliable brand.

If you're going to. And they have some other one like a generation three. That's also pretty good for those who are looking at to be a little bit more cost conscious.

It's like $35 off Amazon, but just kind of getting back, you kind of touched upon it about the relationship between high blood pressure and coronary heart disease or the plaque buildup.

Can you describe it a little bit more in detail? What that means exactly and why high blood pressure causes the plaque buildup? Sure. First, there was an observation.

You know, Franklin Delano Roosevelt basically died of hypertension in the 1940s when therapy was very limited. Then President Eisenhower had a massive heart attack in 1955.

Reason I go back is because that's when we started to put major funding into research. What's the big deal about high blood pressure? And that was the National Institutes of Health and the Framingham Heart Study, and probably it was by 1970, the Framingham Heart Study had concluded, if we take a population of people that have heart attacks and we take a population of people that don't have heart attacks, high blood pressure is much more common in the heart attack group, and it is a risk factor along with smoking and diabetes.

That's how we learn these things. We observe and follow and do studies and try and reproduce it. Those things seem so basic nowadays, but they weren't well known.

In the 1940s it took about 20 to 30 more years. Then is why does it injure the heart? And that's not as clear. A lot of

people think it actually is mechanical damage.

You know, your heart ejects blood 100,000 times a day. It leaves the heart. There's two holes right above the heart. They're called coronary artery openings and they allow blood through the pipes right back to the heart.

And the force of the ejection is what gets the blood down the arteries. But a blood pressure of 170 over 105 is a bigger smack. It's like, you know, I just punched my face.

I'm not crying. But if I had had one 7105, I'd be in a little pain and I don't do that very often. I'm married 42 years. I'm used to a little fun and a little pain.

That's a little joke to my lovely wife. Never make a public joke about your lovely wife. But you know that accelerated biomechanical injury or at least impact on the lining of your heart.

Arteries, as called your endothelium, is believed to be one of the major triggers of atherosclerosis. It gets injured and then there's cholesterol and LDL and lipoprotein a or blood sugars high.

And you start the process of atherosclerosis since. But high blood pressure is one of the major triggers and the front artery of the heart. Some people have heard the name Widowmaker, but it happens to be like the straightest shot from the heart right into the front of artery.

And that's probably why it is the one of the three heart arteries. It most commonly gets clogged up because just a straight smack in the face. Yeah, absolutely.

Yeah. It's a thing. You also mentioned the aortic dissection. I had a patient, actually, just a new patient. Survive in your dissection last fall. Really fascinating story.

Credible? Yeah. I mean, very fortunate. And getting back to what you described in the heart was are there any specific heart related symptoms that hypertensive patients should be particularly concerned about or aware of?

You know, they have high blood pressure, maybe something they should be looking out for. Yeah, good question. Of course, if they've clogged their heart arteries, they might experience we call it angina, tightness, pressure, squeezing, typically on exertion that it was unusual.

I was walking my treadmill uphill a little fast and I got a burning tightness of pressure. Never ignore that report that to your doctor, go to the emergency room.

Symptoms and Warning Signs to Watch For

It could be mainly shortness of breath. You know, it's unusual. I was doing housework, yard work, going up and down stairs and I just didn't normally feel out of wind.

But now I'm out of wind that maybe the high blood pressure. And there may also be there thickening of the heart muscle I call hypertrophy. Absolutely. Yeah.

It's kind of a related story. I had a patient many years ago who is active. He said, you know, mow his lawn typically not a problem because suddenly I just can't.

He goes out on the energy and I get shorter. But he had no other symptoms. I'm like, Well, there's a problem. So it is stressed. And sure enough he had quite a bit and occlusion end up having a stent and went on his merry way.

But yeah, it was. You do need to be attention to like I was fine until you weren't fine. Really good things to think about. And so I think also when we think about not only our health, which I know you've done your own summit and doing a summit about, but what about lifestyle?

Lifestyle changes like diet and exercise? Is there anything specific they can do to help reduce hypertension? How does that happen? Why is there one better than the other?

One particular exercise? Anything. There goes so many. And you know, we obviously have a whole variety of prescription drugs for high blood pressure. And that's usually what a family doctor or an internist is going to do.

A cardiology just in the traditional medical model by you know, you talk about and I talk about the root cause. And it is a combination of lifestyle and genetics.

Briefly, there was a company out of the Mayo Clinic that with a little cheek swab, you could send in the sample and get an analysis of how many blood pressure raising genes you inherited from your parents and how potent a factor that was.

And even what medicine most likely was going to control your high blood pressure. It was a really interesting approach. They seem to have gone on kind of a pause for a minute.

They must be regrouping. I hope they relaunch. But until we get that kind of sophisticated analysis and all that, we know that lifestyle is a huge portion and certainly 70% of Americans roughly are overweight or obese.

A big factor. Partly it's the food you eat to get obese. I mean, if there are high salt, processed fast food, you know, frozen pizza kind of foods are very high in salt.

And you should be reading the label and maybe search an article on where salt is hidden in foods like breads and chicken are two for sure and always luck.

I always fall over in a frenzy when I look at the hospital vegetable soup in my cafeteria and it has more salt than the Brooklyn chicken soup. I talked about it in the morning.

It's your whole day's allotment of salt in one bowl of soup, and it's in a hospital cafeteria with sick people or people visiting their relatives that aren't necessarily healthy.

So weight is a big issue. Salt content is a big issue. Sleep is a huge issue. I mean, very scientific. You know, we've got our iPads and iPhones and our TVs and all the rest cable and we've got all those lights going.

And we have undiagnosed sleep apnea because we're overweight. And you have a poor night's sleep over and over and over. You have sleep apnea undiagnosed over and over and over.

Lifestyle Changes for Lowering Blood Pressure

You'll have high blood pressure, of course, do the opposite, get a good sleep hygiene, drop some weight, get a home, sleep study, treat your sleep apnea, your blood pressure may come down with that lifelong therapy diet.

You know, we have plenty of good evidence based science that a whole food plant based, brightly colored diet is the best diet on the planet. There's a couple foods, particularly ground flaxseed.

I tell my patients, you know, it's probably the biggest nutritional deficiency on the planet that people don't know. You need omega three in your body and you don't make it and you got to get it.

And one of the best sources is two tablespoons a day of ground flaxseed in there, smoothie on your oatmeal and a salad. There's so many benefits to ground flaxseed one is it lowers blood pressure, beats beetroots greens, leafy greens, watermelons, pine nuts.

They all contribute to more of a chemical called nitric oxide. So there's kind of a a blood pressure supportive diet using plants. And there is also a government endorsed diet for high blood pressure called the Dash Diet.

Diaz Sage Dietary Approach to Stopping Hypertension. There's some data that blueberries, lower blood pressure, so there's more lifestyle. And I got to mention garlic.

Garlic in your diet, garlic as a tablet, garlic as a supplement. All have data for lowering blood pressure and then, you know, then there's some other lifestyle things I can't leave out exercise during exercise.

Your blood pressure should go up a little bit. But for the other 23 hours of the day, your blood pressure is on average lower. So if you don't have a plan to at least hit that 150 minutes a week of moderate exercise at the American Heart Association recommends are 75 minutes a week of vigorous exercise.

Those are the minimums. I mean, 75 minutes a week is only 15 minutes a day, five days a week of vigorous exercise. You got to hit them. You got to do them.

And then there's, you know, kind of the Wu that has some evidence. There's some data that aromatherapy with lavender and frankincense, a lower blood pressure that's actually studied published data is a good one.

Meditation and published study data. We chatted for a minute before we went on about a device that helps you sort of meditate or sort of get a mind set breathing practice.

And that's something called heart math icon. People can look up their website, AT&T math may become a little device that it's a breathing practice that may lower your blood pressure.

So and that's before we even talk about supplements, nitric oxide supplements, magnesium supplements, coenzyme Q10 supplements, garlic aged supplements and many others Hawthorn Berry, olive leaf.

There's a lot and there's a lot that are combinations that actually help people and work. Hmm. Can we get a little bit to the breathing and the mechanism of why that would lower blood pressure?

I have seen with patients like I was with a patient, elevated blood pressure did a for 70 cycles for four of the four, seven, eight breathing cycles, the systolic blood pressure dropped 15 points and I measured it myself listening with my ears.

And you describe what's actually occurring in the body that allows the blood pressure to drop? Yeah, it's all about what people are more or more in tune with, but like a balance between two parts of your nervous system.

And the nervous system is called the autonomic nervous system. But there's your fighter flight, sympathetic adrenaline part of the system. You hear a noise and it's dark outside in an alley and you're walking faster and nervous and breathing a little heavier.

That's the sympathetic fighter flight. And then there's that aspect called parasympathetic or your vagus nerve, the longest nerve in the body, vague us and that's your rest and digest portion of the autonomic nervous system that helps you metabolize your food and sleep and cause your heart rate to go down.

And it causes your blood pressure to go down. And it's possible now to get a clue about that balance, which second to second minute to minute is changing.

And all the time people wear bands and Fitbits and Apple Watches, and one of the original ones was a ring called the Aura Ring. Oh, you are a it's still available.

It's very precise and you can track that and what kind of balance you're and what your called your heart rate variability. And you can alter it by breathing exercises and heart mccombe and other that are out there.

So it turns out when you do this, there's many versions of slow, deep breathing. You are activating your parasympathetic rest and digest system, which helps relax your blood vessels and relax blood vessels, lowers your blood pressure, and you are deactivating your fight or flight sympathetic adrenaline system which sends to raise

your blood pressure.

So a four, seven, eight breathing pattern. What I love in through your nose for 4 seconds hold it for 7 seconds and it count slowly now quickly and breathe out through your mouth for 8 seconds and do that at least four cycles in a row.

Something made very popular by Dr. Andrew Christmas Santa while M. D. and Tucson, the guy with the big beard. I you know, I don't know that he created it, but he certainly made it popular.

There's box breathing in 4 seconds. Hold for 4 seconds out 4 seconds, hold 4 seconds. Very relaxing way to breathe. And again, this little device called heart mass is another one.

So these are all tools to activate your parasympathetic and deactivate your adrenaline system then? Yes, the proper way to inject blood pressure is jack in blood pressure.

Turn your machine off. Wait a minute. Check it again. Turn your machine off. Wait a minute. And check the third time. And I have my patients do that and they bring me their numbers.

And 160 over 90 is 140 over 82. And the third one's 128 over, you know, 71. And that's, you know, 3 minutes change and it goes the other way. Do, you know, get upset that your casserole in the oven burned because you got distracted by watching something on Netflix and you get all upset at yourself.

Your blood pressure is going to go up. It's very quickly responsive. Mm. Absolutely. Well, that gets me also I just had a question regarding blood pressure medications, right?

So can you speak a little bit to because I mean, obviously, I tell patients, you know, a lot of times they'll come in like, I don't want to be on any meds.

I'm like, Well, you need to be on some meds because we're in that place, right? Maybe we can use it as a bridge, maybe we can decrease meds or maybe even hopefully stop all of them.

But again, medications can be very helpful. Can you describe how anti-hypertensive medications can sometimes support heart health? And are there any specific ones more beneficial than others?

Yeah, there's there's strong data. Sometimes I talk about cholesterol medicines is like different buckets. You've got your statin medication and your injectable medications.

And the same thing with blood pressure. There's different classes of prescription drugs for a long time. The first two classes was diuretics, water bills, usually not the one people have heard of called Lasix, the strong one we use in congestive heart failure, usually milder ones like Dias side or hydrochlorothiazide.

And they're not bad, they're inexpensive, they're used all over the world. But they can raise your blood sugar a little bit. They can have a slight adverse effect on your blood cholesterol.

You have to watch your calcium in your blood, your uric acid gout risk in your blood. And they're good for kidney stones sometimes, but they can trigger other things that are a diuretic.

So diuretics are now using my third or fourth choice, but now my first choice. And the other group was beta blockers. Maybe the most well known are low pressure.

Topol ten. Alal There's newer ones that are better called Bivol. I used to be called by style. Like they're not really a first line choice. They are for other things, like after a heart attack or for racing heartbeats or for migraines sometimes.

But sometimes at the end of the day, you got to add one in at a low dose and see how that goes. And more

commonly we're using they're called ACE ACE inhibitors.

They've been around for a long time. My favorite is Ram Abril ten or 20 milligrams a day and there's one, another group very close by called the ARB RB blockers and my favorite is called Telmisartan Telmisartan 20, 40 or 80 milligram.

Well, and then there's some older drugs we pull in now and then when needed. And you can get off medication, you know, you can get on medication to lower your blood pressure, go on a plant based diet, start an exercise program, get better sleep use.

I did I think I mentioned briefly if I did an infrared sauna use maybe three times a week, has scientific studies at the University of Kansas, Missouri, for lowering blood pressure.

You know, if may a sedative before drop weight, take a couple of supplements, maybe you can go from two drugs to one drug, one drug to zero drug. It can happen.

You go to possibility. So, Dr. Khan, what are the benefits of routine heart health screenings and checkups with those with hypertension? Like, what would you recommend that someone does regularly?

Well, that's a great question. And, you know, there's so much discussion about longevity, anti-aging, peptides, rapamycin, metformin, and people miss that the number one killer in the world is high blood pressure.

Breathing, Stress, and Nervous System Control

And they're taking their metformin and their peptides and they're not checking their blood pressure. That doesn't work. If you want to go to health evaluation, whether it's basic, whether you're looking for advanced and you follow, you know, certain gurus, I'm always kind of chuckling when I see gurus online of longevity and they never mention heart health in general or high blood pressure checking and normalization, specifically, you're looking for good long term health.

There's got to be almost at the top of the list as normalize your blood pressure. And the only way you know that is if you check it. So there's, you know, get a home blood pressure cuff.

We talked about do brands in the beginning of this conversation. I use it regularly. I tell people, don't leave it in the closet. Don't leave it in a drawer.

Leave your blood pressure cuff on your desk, at work, on your kitchen table, on an end table, get an agreement with your spouse, your significant other.

You can leave it out even though it's not designer approved. If that's an issue, you need to use it regularly and and do it the proper way three times in a row, relaxed, you know, I still think there's some value from like rushing in from work and checking your blood pressure because most of the day you're not sitting there perfectly relaxed and optimized status.

And you might want to know if your blood pressure is 160 over 90 all day at work when you're a little more stressed. But we always say the proper way to do it is relax or time.

Zero. Number two, there are such things as hypertension clinics at universities. Usually what they will do is they will talk to you about a 24 hour ambulatory blood pressure monitor.

And many people know if you're having a different problem called palpitations, racing heartbeat skips. You know, it's very common to put on a 24 hour, 48 hour heart monitor to see how many skip beats you have and what kind of skip beats you have.

But a lot of people don't know that there's a similar device just for high blood pressure, not for skipping heartbeats.

And the usual version is there's literally a Velcro cuff on your upper arm with some rubber tubing and on your belt you wear.

It looks like an old fashioned Sony Walkman. If people are old enough to remember that and you wear that for 24 hours and every 15 minutes, the cuff is programed to inflate in the flight.

And that's during the day. And that's all night long. And people often hate that. All night long your cuff is going up, your cuff is going down. And it's and it's clearly scientifically shown.

You want accurate information on blood pressure that has meaning for how well you're doing and what your risk of long life. What's your risk of freedom from heart attack?

What's your risk of freedom from strokes? You want to have a 24 hour blood pressure monitor. Your blood pressure should be good during the day. Your blood pressure should be lower at night.

That's called dipping. And, you know, that cuff might do that 90 times or 95 times in 24 hours. That's a lot of blood pressure measurements. Turns out in my clinic in south eastern Michigan, we imported from Israel a very interesting device called a bio beet patch.

And I'm not an investor or owner, but it's basically a pad you wear for 24 hours on your chest. And they've patented and verified. You can measure blood pressure through the skin.

So you just wear the patch. You don't feel a thing, you don't know when it's going on and off. But every 15 minutes it's measuring your blood pressure all day and all night.

And immediately when you're done, you get a report. And we've really seen you know, how it influences the decision to have high blood pressure. Is it white coat blood pressure or is it just that you're in the office and you're arguing that it's always normal at home?

We can prove that it's always normal at home. For example, are you dipping at night, which is a pattern of healthy, more youthful arteries, or are you not?

So this is to me been a real breakthrough and it's available out there. It's well, you know, I'm going to be looking into that. That's fascinating. Well, let's just get a little bit more about, you know, like the stresses of the blood pressure kind of going on, you know, all night.

That's just a little. What about managing stress in your emotional well-being and its impact on your heart? Health is especially in context of hypertension.

Yeah, it's a it's a huge one. And, you know, probably Dr. Dean Ornish gets a big shout out of famous lifestyle Doctor Who for 40 years has been talking about stress, wrote books about stress and heart disease.

It's a big portion of his most recent book called Undo It. He's not the only one in the field. But, you know, it's always nice to have actually solid science.

And in 2012, a researcher, a cardiologist named Robert Schneider, M. D.

Blood Pressure Medications and Treatment Options

, and Iowa, who's very involved with the Transcendental Meditation movement, I published a randomized study, I think, if I remember to 112 men with heart disease, previous heart attacks, half were trained in transcendental meditation, 20 minutes twice a day, you get your little mantra, you sit quietly, you let things pass by.

And the other group just got some health. Education about stress reduction. At the end of five years, this group of heart patients that were meditating had 50% less risk of a second heart attack, dying, going to the hospital, going in

emergency room, you know, basically as powerful as almost any medication on the planet, just by some meditation.

Know, people say that's 40 minutes a day. You've got, you know, over 1400 other minutes a day. How does that a 40 minutes a day, 20 minutes twice a day really impact all those other days?

And it seems there's a function in the brain. People called neuroplasticity, but you can actually, to some degree, retrain your brain. So the next time a stressful and unpleasant situation comes up, you don't react.

The same way that you did six months earlier. You are a little more gel and you have less of a sympathetic, you know, outpouring, an adrenaline outpouring.

So stress reduction through breathing practices, yoga practices, Taiji practices, qigong practices are the real deal. You just got to commit to them and stick with them long term.

Very cool. Yeah, that's the new prescription meditation. 20 minutes twice a day, if you can sit there long. That's where I struggle. But I'm curious about because I know you're always looking at cutting edge devices like the product you mentioned earlier.

Are they any. Well, let's go back before that. I actually want to speak to sodium. Let's just clear that up. Can you just talk about sodium and why it causes elevated blood pressure, like just the basic premise of how that works?

Yeah, it seems to be that it actually causes arteries to get stiffer. There is a real scientific concept of our artery flexibility, which are young arteries, childhood arteries, teenage arteries and artery stiffness.

That's the term arterial stiffness, arterial resistance. And when your arteries age and they become calcified, we call that hardening of the arteries.

Arteries get stiffer. They can happen in the heart arteries, in the arm arteries, the leg arteries, aorta, your blood pressure going to go up and salt can be one of the factors in causing increased arterial stiffness.

So it also, you know, along with salt, you tend to retain water. So your overall blood volume goes up. It becomes a little harder to circulate all that blood volume and your blood pressure goes up.

So, you know, the it's a confusing topic, only that there are books out there called The Salt Fix. There are people, functional medicine docs that recommend Big Salt and Himalayan salt and Celtic salt and all the rest.

So you say, but you know, Doctor A or B or C says, I should triple the salt in my diet and, you know, 99% of hypertension experts disagree and would say, you know, maybe that commonly mentioned 1500 milligrams of sodium a day is a good goal to shoot for on average.

Absolutely. Okay, great.

Monitoring, Screenings, and Emerging Devices

And then I guess the last question is, are there any emerging therapies or interventions that are particularly promising for those with hypertension to prevent like heart related complications, maybe the one product you mentioned before or are there any others I know you like to.

Do all kinds of fine devices. You know, this patch that I mentioned called bio bead. It's patented. I've researched that I don't have any financial ties to the company.

I got to believe it'll be scooped up by Apple or Samsung. And we all have. There really isn't a good blood pressure watch right now. There are a couple you can buy.

Omron, the company we mentioned had one, but it was this huge thing and the actual of the actual ban would

inflate and deflate like a blood pressure cuff.

So probably not going to wear that down the aisle at your wedding. It's not a real handsome device. There's another one out there in the market. I've had three versions of it.

They always break. It's made in China. Not to be disrespectful to everything made in China, but it just kind of was a not high quality product. But one day I think we'll have a good blood pressure monitoring watch to alert you and that'll be a breakthrough there is another device that's very well researched, been around 20 years called resperate.

I want to give that a shout out, R E S P E R A T E, and it's a device looks like a blood pressure module and a couple electrodes you put on. And it's a breathing, relaxing device.

And they have peer reviewed science that if you're committed to use it 20 minutes a day, it's another breathing approach that some people really like.

My my mother has one and I have one at home that I will use now and then. And then I just thinking out loud, there's one other one that comes to mind called Zona, Z O N A.

And A and it turns out there was, if I remember right, some NASA astronaut research that isometric exercise squeezing, squeezing, squeezing. When you release, you actually get some of a sustained low blood pressure effect.

And it was tested in astronauts. And there's a device pretty pricey, again, maybe $300-$400, kind of like the resperate. The heart math is a little less expensive.

About $225. But the zona as in that several hundred dollars range. But if you commit to doing your isometric exercises and releasing, it's a tool backed by science, backed by NASA that can help some people.

So if you're just struggling, the final one, now that you mention it, there's a device you can buy for about $85 called Power Breathe. And it looks a little bit like an asthma inhaler, but it's basically just a plastic device for $85.

It probably cost $6 to make, but you're breathing in as hard as you can. It's called diaphragm training, inspiratory training, inspiratory muscle training.

IMT these things are coming back to me because I didn't look it up just before this. And you do that just 5 minutes, I think twice a day and they've got good actually published science that IMT inspiratory muscle training it's used for people that have some lung conditions like asthma.

Some athletes do it and believe they swim faster, bike faster because they have increased their lung capacity and strengthen their diaphragm. But it lowers blood pressure and that's probably the lowest cost of the four that I just mentioned.

I actually carry the power breathe in my office. And a patient this week just went home with the little box and going to try it and it definitely works.

The same is like the incidence for our using with like hospital patients to prevent epileptic ad electricity and such like. It's fair, it's not. It looks a little different, but the concepts are the same.

And I think the company makes that version too. Okay, well, that's the best thing. All right. So. Well, this has been phenomenal, as always. So, Dr. Kahn, thank you so much for spending time with us and sharing your wisdom with us today.

Thank you so much. You're doing a great job.