Introduction to Hyperbaric Medicine

– Well Dr. Borsand, Alexander Borsand. I'm so excited to chat about this topic because this is like anti aging medicine, regenerative medicine. I mean oxygen is is like the key I mean without without oxygen ourselves won't function.

So it's so cool. We're gonna be talking about hyperbaric oxygen therapy today. – Yeah, I'm absolutely excited to be here. I appreciate the opportunity to really help explain what hyperbaric medicine is and how it fits in that regenerative medicine world, – Awesome. And you're a medical doctor, you're a hyperbaric clinician certified International Board of Underseas medicine trainer, you know, so you're not just a clinician, you're actually the one training doing these things. You're also the current president of the Arizona hyperbaric society. So so this I mean you're you're the man.

I mean this is awesome. – I appreciate. I appreciate the introduction. And you know I really I fell in love with hyperbaric medicine and it kind of gotten deeper and deeper into the groups and societies because every bit of research we see we just keep expanding on it and we learn more.

And so I found that there's a real need for what we do and that really a lot of people are just not familiar with hyperbaric medicine, even though the history and the history of hyperbaric medicine, it goes back really in the U. S.

For decades the concepts of using pressure to treat patients. It goes back actually hundreds of years which is surprising. – So I'm curious because you know people think oxygen well I got an oxygen machine.

Got my tank and it goes up my nose and I breathe oxygen. So what what is the difference between pressure, hyperbaric, hyper pressure versus just kind of having a tank and you're breathing oxygen.

– You know, this is one of the most common misconceptions because almost everybody says to me, it's just oxygen therapy, I go get some oxygen, take it home or you know, go get an oxygen concentrator and sleep with it all night.

So the idea that you need more oxygen, well your red blood cells can only carry so much oxygen. And if you've ever had that chance to put a pulse oximeter on your finger and you say, oh we have 97, that means your red blood cells are 98% saturated with oxygen.

They can't really hold much more. Now when we add pressure, we actually force that oxygen not to your red blood cells, but into the liquid component of your blood, what we call your plasma.

And this is really interesting. We go back to a law in physics. It's a gas law called Henry's Law. This is actually how we make soda. So when you take a liquid and you force a gas into it, all those bubbles go into the soda, you put that cap on it and they stay as bubbles.

But then you take that cap off and all those bubbles, they don't just come out one at a time here, all of it's moving. So when I force more oxygen into your plasma and we get out of the chamber, all those little micro bubbles there in that same soda effect into your tissue. It goes into your muscles, into your skin, into your bones, into your nervous system.

And these are the areas that really need more oxygen.

How Hyperbaric Oxygen Works

And when we up regulate these areas, specifically your mitochondria, which I don't know if everybody remembers from biology way back when mitochondria is the powerhouse of the cell. When we give them more oxygen, they

make more energy. And this is not the felt energy, it's not a cup of coffee, what it really is, it's cellular energy.

And cellular energy allows your cells to do their job better. So I heard another clinician explain it this way. I thought this is a great way to explain it. Think of cellular energy as kind of like the currency of your body. We need to spend energy to do projects.

So if you think about kind of your your house at home, like your body. Well if you had more money, get more projects done. I'm working on a bathroom right now and we do the bathroom here and we're gonna work on the kitchen later because it's the most expensive room of the house. But imagine if you had 1200% more currency in your bank account, you'd be able to work on all these places at once.

Your body does the same thing. 1200% more oxygen in your tissue means more ability to go to all these places and affect all these processes at once. – So it actually increases the amount of oxygen in the cell.

And like you're saying the mitochondria is like that and the energy factory of the cell and without energy in the cell, nothing can be done. It's like, you know like you're saying Trying to do projects without any money without any resources and that's exactly what happens within the cell.

So it actually increases the amount of oxygen within the cell. So the Mitochondria can work harder and faster by 12 times. – Yeah. Yes, exactly. And so what's really impressed with that is you know, oxygen is in this whole process of making energy. It's the very last step.

And so when we talk about what we do here with hyperbaric and people ask me what else should I do? I said we have to look at that whole process of making energy. I can give you the final step.

The other steps are very important as well. The electron transport chain that makes energy this is why we take supplements. So people tell me why would I need a supplement?

I eat a healthy diet. I say yeah, absolutely. But if you had more you could do more and I'm a big believer in that. It's about optimizing systems. It's about yeah.

When we when people started calling bio hacking your body you have more energy. Your body can go through other processes and do a better job with them.

And that's what I mean. We'll get over here to anti aging. But everything that we did here in hyperbaric, we'll first start with divers and then it went into wound healing and wound healing is an ex an incredible process that requires so much energy and it needs energy to recruit cells. It needs to recruit, well, first stem cells to come in. And stem cells are these, you know, cells that allow messengers to be sent out ex zones.

I'm sure a lot of people have talked about just amazing ability in our body. But so we now have this energy. We're getting all the cells together and we start to build and what do we build to heal a wound?

We build collagen. And so if we're able to do that to heal a wound, what if we don't have a wound? But our body is still going to increase the stem cells, still gonna go to areas of inflammation and more importantly, it's gonna build collagen and that's a great aspect of anti aging.

I know we're all taking supplements to increase collagen or eating a diet that's rich in foods that promote that. So I love to talk about how it started wound healing and then how we started to understand these processes were great for healthy patients to do better. – Yeah, I mean like collagen obviously for people that want to look good, you know, their skin when we lose collagen and the skin, then, you know, things start to kind of droop, we get wrinkly lose collagen and in our joints we start to get a key and start to move towards arthritis.

You know, then that is when we start to feel the signs of aging is pretty much when we lose collagen. So then to have a way to really stimulate that that production of collagen naturally with our own stem cells.

I mean that is like the key to prevent, you know, feeling old and getting old. – Absolutely. I mean, I think that's a fantastic aspect of anti aging because a lot of people that I talked when we first talked about anti aging, they lump us in with aesthetics and they're like, oh yeah, you want to look younger. Great. Of course, looking younger is great. It's really not the goal for anti aging.

For the majority of my patients, my patients want a better quality of life and quantity having a longer life is only worth so much if you can't get up and do the things you want to do and that knee that hurts you that stops you from hiking.

Well, that has a cascade effect you've seen in your practice. I'm sure somebody with lower back pain disc Ernie ation, they just start to put on weight and they don't do the things they want, they want to anymore. In fact I had a patient the other day that told me, you know about all this hiking did for all these years.

I asked them about what what are you are you hiking now these days? So I don't really like hiking anymore. I was like that, I don't believe you, I don't believe that you went from this year's of enjoying this to not.

And he had gotten into his head that well because it hurts him. He doesn't enjoy it. I was like well no you still enjoy it. Just got to get you back to the point where you're able to do these things and take off that weight that is compounding the issue on your lower back or your knees.

So he is a hyperbaric patient. And you know we talked about how this can help disk Arnie ation and I don't want anybody to leave this conversation thinking that hyperbaric cures or herniated disc, It absolutely doesn't.

It gives your body the foundation to heal. And we have seen studies that we have seen herniated discs repair themselves to some degree discs have a fibrous component which is collagen that collagen in your skin. The collagen that's in your bones, the collagen that makes up almost every tissue in your body needs support.

And as we're able to support that area and help him work through some other steps, primarily physical therapy. Then we're able to get that to heal. So again I will always bring back hyper barracks one piece of the puzzle but it's a great piece.

– Yeah it's looking at I mean we can survive without food for x. Amount of days. Yeah survive without water for less days and survive with oxygen not very long, – Know what 6 to 8 minutes.

Yeah it is the most important nutrient in your body. Now I say nutrient because as a physician and you did mention we have a medical doctor but I also want to naturopathic education as well. Don't hold a naturopathic degree.

But that combination really helped me understand that things that were taught in al empathic medicine that people have the M. D. And what we learned in naturopathic medicine.

Wound Healing, Collagen, and Anti-Aging

You know there's this interesting I guess maybe dichotomy because you know in medicine oxygen should be a nutrient to the FDA. Oxygen is a drug. And it's mind blowing. You guys everybody listening right now you guys are all drug users. You didn't realize that every breath you take, you're getting 21% oxygen which the FDA has said well if you're breathing 100% that's a drug and I have to write a prescription for it. I'm hoping as we move forward with education and and educating everybody around us that we step away from that because what we do with hyperbaric. Very safe treatment minimal risk.

And we can talk about the risks. But we really want to talk about how much it can help, really just about every patient I have, there's very few patients that I talked to say this really isn't a good idea for you. Um it's supporting your health and then supporting the processes that allow you to get back to your normal routines, which is even more important. Movement is medicine more than anything else we do. – So we talked about the mitochondria, I mean, and that is like the the core of everything. And obviously the mitochondria exists within brain cells, exists within heart cells, exists within the and ophelia lining between blood vessels to make sure that the blood vessels

stay healthy and are pliable existing joints that exists. I mean, it's in every cell.

So it becomes like you're saying, yes, it you can't say that it cures everything, but it impacts everything. I mean, it is a foundational piece for everything. And you're you're saying like, the measuring of the blood, you know? Yes, we were measuring what the red blood cells are doing, but that's not telling us how much that are within the cell.

So, just Because it's showing 97%, and that is what's floating in the bloodstream doesn't mean that is what's in the cell and the tissue in the brain in the heart.

You know, that is where, you know, like hyperbaric has a step above almost the red blood cells because it's able to drive that oxygen into areas where sometimes, you know, the red blood cells don't get too.

– That's I mean it's such a great topic to start talking about. So it's interesting in this regard because we use hyperbaric to treat where there are blockages, you know, where the blood cannot get to.

And so one of the on label indications for hyperbaric oxygen is diabetic non healing wounds. So everybody knows that diabetics tend to get wounds. That's why we check their feet regularly.

And if we don't do something about it can lead to other complications, Even amputation. So why doesn't that wound heal? Well, diabetics damage their blood vessels called diabetic by constellation.

And that's simply because blood sugar is no different than table sugar. If you take table sugar and roll it in your fingertips, you can feel it it's sharp to crystal force that through your blood vessels, you tear up the lining, you get scar tissue, they stop working and stop supporting your nerves.

So now you've got peripheral neuropathy and a wound that won't heal when we put somebody into a hyperbaric chamber and we force the oxygen directly into that tissue.

I don't need a blood supply. I'm gonna save that tissue in the short term to get it to get back to normal to start healing. And in the long term we're gonna promote brand new blood vessels to grow to this area. It's called angiogenesis.

Your body does this process already somebody has a heart attack, their body starts growing these brand new blood vessels to support that tissue of the heart.

But it's a slow process. Your heart can't wait for that process to happen. Our diabetics can't wait for their blood vessels to grow naturally. So we support that.

We bio hack the system to allow blood vessels to grow faster to support them as their healing. And this is a great aspect about hyperbaric because you don't have to keep coming back.

I have a lot of patients that love to come back from maintenance. I have a lot of athletes that are here regularly. But for a number of my patients, we up regulate the processes, get the energy to that level of blood vessels to grow and then we step back and allow your body to heal with the brand new pathways we gave you and I think that's a really important aspect. I wouldn't ever want to tell somebody I have a therapy that's great for you. You have to come for the rest of your life.

It's it's unrealistic. And medications shouldn't be that way either. So it's I love that what we do there supports that aspect and you know, there's a study and I'm sure you've seen this study, a lot of people are in the field have it's called life without blood. And it's this is mind blowing.

They took their pigs and put them into a hyperbaric chamber and took out all of their blood and replaced it with saline and had them in a chamber at three atmospheres, the highest pressure we ever treat at.

And these pigs lived their heartbeats. They walked around, they moved, they could do everything they could do

normally as long as they're at pressure with 100% oxygen. You're giving every tissue the energy it needs and the nutrients it needs without any blood.

So if somebody has a heart attack, the first thing I want to do is put them into a hyperbaric chamber. Somebody has a stroke. The first thing I want to do is put them into a chamber.

And we're starting to see the research has been around for quite some time. We're starting to see the field in general starting to understand that hospitals are starting to understand it and we're starting to see a little more of those treatments.

And I know we're talking about regenerative medicine. But to me there's nothing more regenerative being able to save tissue and allow new cells to take over and save somebody had a heart attack from getting the point that they've damaged their heart to save somebody from a stroke.

To get to the point that they can't get back the majority of their function. Now if we have had a stroke and there's a part of our brain that's uh died.

You know, we haven't seen that come back yet but we've seen your a plasticity, the ability to create a bypass route.

Preventive Health and Regenerative Benefits

So yeah I gosh I could go off. You can see I get excited about these topics. Now you mentioned the mitochondria earlier when I was talking about it and you know, both could bring up just a quick picture here so people can kind of see this because I think this is really good to see. So I'm gonna share my screen with you for just a second. So as we're looking at this and I hope it's up here and available right now on the right here we've got a little picture of a mitochondria. In fact I'll zoom in on it.

So mitochondria the powerhouse of the cell and up here if you can see my mouse, the oxygen's at that very end step. And it goes to this transport system to make energy. So we can make energy without oxygen.

That's what's over here with like Allah assist on the left hand side we make two A. T. P. Or cellular energy units. Without oxygen we use oxygen. Make 36 units.

It's a dramatic difference. I mean I I when I really look at this, I think that when you really get down to the cellular level and understand what's going on, it's undeniable that that hyperbaric oxygen is is the step that almost everybody's missing or not thinking about in their wellness routine – And you're talking about like extreme cases like a heart attack or a stroke.

I mean these are extreme cases. I mean, yes, extreme but there are a lot of people suffering from it. But there are so many kind of preventative aspects with that.

So if you can then support regeneration in that extreme of a case for an individual that wants to do for wellness and not moving that action, then hyperbaric becomes a powerful tool to really help to regenerate heart muscle, heart tissue, brain tissue. To reduce the risks of these type of things taking place. I mean obviously you can't say that you know this therapy is going to prevent that because you you never know.

I mean there's so many factors at play but you stack the odds, you know, for you to not have to go in that direction. – Absolutely. So there's a teacher, a doctor Joseph Detour from my international Board of Underseas medicine that he likes to talk about.

The mechanistic mechanistic view here think of your body like a car and with your car that if you take care of it and run for a long time, if you don't take care of it, you're gonna be spending a lot of money fixing things.

So when you meet somebody that's got an older vehicle, hundreds of thousands of miles, you ask them, how do you do that? You know I did preventative maintenance.

That's what you should do for our body. It's preventative maintenance. So how do you do that? You change the air filter, you change the oil well when in our body our body does all these processes on their own, but we can do them better. And we live in a very imperfectly healthy world.

The best of us trying to get healthy still are out there being exposed to all sorts of environmental exposure, whether it's pollution or otherwise. And these are things that are always our bodies always have to filter out.

Why not give it a better ability to do so. So yes, I was talking about the extreme measures of the heart attack of the stroke. But If I can slow that process down, if I can give us every ability to to avoid it, wouldn't wouldn't you want to do that once you want your car to last 100,000 miles instead of 10,000 miles.

– And also you have in regards to the head. I mean you have these kind of post concussion syndromes. But you also have, I mean, and we know regards to NFL players, football players and and the impact, you know what that does with their kind of cognitive ability and functional ability, you know, from getting blows to the head.

But you also have just kind of kids playing, you know, they hit their head, you know, playing around and maybe they're a little kind of headache e after. And and but then two years later they have another incident and then maybe when they're 30 they have a kind of a fender bender and all these things kind of accumulate over time and and the importance then to address.

I mean recognize that they do accumulate And to address them kind of right at the get go when when your child hit their head, get him into hyperbaric after when your your son is playing football and and get hit and get gets knocked down.

You get him in a hyperbaric. Maybe he'll be okay right after, but 30 years later, you know, he'll have impact and he won't really recognize that it started at that time.

– No, you're absolutely correct. I mean here in our facility, we do treat a lot of athletes, but we also actually treat a lot of Children for exactly what you're talking about. Just, you know, hitting ahead a few too many times. You know, kids are active. I'm never gonna want to stop a child from being out there and playing sports and and living that life.

It's so important for them. Like I said earlier movement is medicine, but there are risks, have a hockey player right now that you suffered an extreme concussion.

I asked him how many concussions do you think you've had? And he said, well, you know, nine documented but you know, who knows what they were and the way it was affecting him the most was his mood depressed and anxious and he's like I, I was never depressed or anxious.

I have nothing to be depressed about my life is amazing. But these feelings that they're invasive, very short series of treatments. We saw dramatic changes for him. And so we have a post concussive encephalopathy program. That's what we see.

We're calling these post concussive syndromes and we're treating a lot of military with it. And I think it's a big part of what we talk about. PTSD tend to go hand in hand and then there's a person like you mentioned as well that you have a small fender bender and just suddenly they're not able to work the way they used to be able to do the things that they normally do to protect their health.

So we yes, we treat that regularly. So how does that help? How does it work? And this is new research and there's a ton of it out there that's peer reviewed and published.

But it really it goes a lot back towards stem cells. So most people have heard of stem cells, a lot of people and and even the medical community was was wrong about how they work. We used to think you put a stem cell in and it turns into the tissue that you wanted to. It turns out wasn't exactly like that stem cells are more of a messenger molecule and they grab all those things they need to put together the tissue that you do want to regenerate many tissues can not all.

Concussion, Brain Health, and Stem Cells

And so with post concussive encephalopathy, the first part is reduce the inflammation hyperbaric is well Document on that aspect and we can talk about, you know, many different mechanisms of how that works.

But it's really that stem cell mobilization. So there's a brand new study just came out recently that said within 30 minutes of it inside of a hyperbaric chamber at two atmospheres. So double the pressure that we're sitting here at right now that we already see stem cell mobilization that somewhere up towards eight times your normal. So I'm not giving you stem cells, it's mobilizing, take them out of your bone primarily and sending them to areas of inflammation in a series of 20 treatments that goes up to 800 times increasing stem cell mobilization. So if you can give your body this messenger molecule to go everywhere to hell, it's going to go to areas where there's the most inflammation or concussive patients against the brain.

But nobody lives with just a little bit of inflammation in one place. I know the majority of my patients tell me it's a shoulder because that's so common or a knee and that's not why they came to me. They came to me for something else completely.

I tell them I want you to pay attention to the shoulder in this knee because it's really easy to get oxygen oxygen into these joint capsules and that's where a lot of those stem cells are gonna go to first and if we see a change there, you're seeing the anti inflammatory side which leads to that regenerative side which is is such such exciting research.

I love regenerative medicine. You know you and I were talking at the conference recently A four M which is all about anti aging and yes, some people talk about aesthetics, there's plenty of that, but the vast majority of people are there about that supporting your body for really prevention and then doing everything I can to allow the other things to regenerate because most of us get towards regeneration after some damages happened.

– Yeah, we I mean one of the terms that has really it's really coming out is a term health span, you know, not really lifespan because we nobody wants to live forever and be dealing with alzheimer's or dementia or just not being able to be mobile and enjoying life.

So we need to re need to redefine it and look at health span and what are some of the things that we need to do in order to have a long held span. And obviously one of the most fundamental things is, you know, like we mentioned, how long can we live without oxygen?

Well not very long. So that becomes a foundational nutrient to make sure that has access to all areas within the body to all the cells, you know, for that regeneration. And then using these kind of tools becomes even more powerful when you when you look at it that way. So – Yeah it's what you're talking about, a synergistic effect.

So we're all taking supplements. I don't know anybody that really isn't. And so oftentimes we're taking things like vitamin C. Great, I absolutely love vitamin C. And it helps us build collagen.

It is needed to build collagen. You can't do without vitamin C. In fact, if you ever heard about how pirates would get scurvy because they didn't have vitamin C, the first thing they noticed they start to bleed at their mouth.

You see these pictures of videos of pirates and their teeth look terrible, you know? But they're they're collagen is breaking down because they didn't have enough vitamin C. So the vitamin C.

Is important. But if you don't have the oxygen or enough of it that vitamin C can't do its best ability. And that's just not just vitamin C. We start to talk about co Q 10. A lot of us take that that's on that same step inside of your mitochondria to make energy.

It's one of the co factors that's required. There's so many people talking about N. A. D. I'm sure in this summit you're going to hear people talk about a d quite a bit. I I really I love it.

I use it quite regularly but it's still is only one of those steps so I can take it on its own. I feel amazing with it. I take that and combine it with hyperbaric.

It's that synergistic effect and that's actually not just the supplements. Not that I'm hugely using antibiotics but there's a time and place. And hyperbaric oxygen therapy has a synergistic effect of antibiotics as well.

So if I can take less of a drug and get more of an effect. Isn't that the goal is that in medicine we always talk about use the minimum effective dose. And this even goes for radiation and chemo therapeutics. Now any oncologist listening to this now or they'll be talking this will say no don't use hyperbaric with chemotherapy and in there.

Right we're not doing that right now as a research aspect we under understand that we uptake a dramatic amount more of that chemo. We don't have that figure out how much yet your oncologist is gonna say well I want to make sure you take a safe dosage and I'm gonna say them I want to take as little as possible because we can make it better by giving you the energy to use that. So I think there's so much research coming forward that we're going to get really excited about with synergism in this and you know there's yeah so we can talk about that with almost any supplement that's in that same process that we use to help our D. N. A. So we're talking about B.

12 full weight if we're talking about things that help our telomeres. And we haven't even gotten the telomeres yet. So this is a an amazing new research.

You and I were sitting in the same lecture and we listen to a physician I believe in his late seventies. He's talking all about going through a process of making himself younger with hyperbaric. And it's interesting to think about making yourself younger. Your age is your age you have to get older but you don't have to be old. And this gentleman had just one uh I can't remember his triathlon. I believe it was.

– I would think so yeah and he was a winner at in his age group. The joke was that he was the only one in that age group but – I love it but that's amazing.

He's out there at that age that's that health span that we're talking about. He's active at that point where so many other people his age are sitting around watching tv.

Or using mobility scooters. And so where that all went to is he did a series of treatments in a hyperbaric to help his D. N. A. And so everybody's familiar with D. N. A.

We know quite well it's that beautiful double helix shape but the ends of our D. N. A. A lot of people weren't really familiar with are called telomeres. And the telomeres are there to protect your D.

N. A. As we age your telomeres get a little shorter and a little shorter, a little shorter. And if we look at somebody's D. N. A. We can get a general idea of how old they are based on their telomeres also based on locational data.

And otherwise our telomeres are different lengths here as they are in places like Costa Rica where for some reason they're dramatically longer. These places called blue zones. But so those telomeres as they get shorter and shorter, your D. N. A. Does start to degrade a little bit.

And so the things that we can see from that from simple degradation is, well the first thing we talk about is plenty goes or something you guys are probably familiar with is liver spots or age spots. And when you see somebody with them you know that they're older you don't get these at a younger age.

Well your D. N. A. Has started degrade. So if we can protect our D. N. A. We are truly anti aging because we are our D. N. A. Is younger. And we um you know the actual regeneration of this telomeres regenerative medicine we're talking about here.

So in this study that he discussed is a study done in Israel by Dr.

Telomeres, DNA, and the Hypoxic Paradox

Afridi really well known and well respected gentleman in the hyperbaric world. He took patients through a series of treatments and looked at their DNA as they went along and found that he was able excuse me able to increase the length of the telomere by up to about 37%. The average I think a little bit closer to 20%.

And I think at the lower end closer to 13% here in the U. S. A. Hyperbaric group out of san Diego. Sorry san Francisco reproduced the study and the results were a little bit less optimal than Dr. Fradlis However they're still seeing about again that 12 to 20% increase imagine your D. N. A. Being 20% younger than it is now. How much better it can do every process.

It's mind blowing research. It's the very first treatment medical treatment we know of that can do that now. You and I we both know there's other ways that we can promote our D. N. A. Health and other things we can do.

And people talk about fasting absolutely amazing for your D. N. A. And has an effect on your telomeres. There's some supplements out there that we're starting to do some research on and learn about how they can help your telomeres. But the only treatment that we know of right now really is the hyperbaric and it's about stress and gosh people hate it when I say this but I want to stress your body. I want you to stress your body fasting stress your body high intensity interval training stresses your body hyperbaric oxygen.

It actually stresses your body with a small amount of oxidative stress. And when you get out of the chamber your body's response to that stress is to protect itself and use all that oxygen. It's it's fantastic to read this stuff.

– Yeah. And then and with those that stress, I mean that signals and the activation of like stem cells of different cytokines for regeneration of tissue to break down old unwanted tissue that interferes with with the healthy function. And then the building of a new, you know, the atop Fiji that takes place when you do like a fasting, mimicking diet or fasting. And so I mean, and you can then stack these different therapies or strategies together in order to be able to maximize the effect. And then to have a tool, you know, like the hyperbaric, I mean, so just to kind of reiterate for people to understand what a powerful tool it is. I mean, we talk about the mitochondria, we talked about inflammation, you know, we have the term inflammation where, you know, the more inflammation we have, you know, The more aging we have. So if we can reduce that, we talked about, you know, the stem cell recruitment, you know how it activates.

I mean initially after 30 minutes by eight times and then after 20 sessions, you know like able to say 800 times. – 800 times. Absolute. That's been reproduced in multiple studies. That's a number that is.

It's it's really hard to even visualize how much of an increase that is and what kind of effect it has. And we're really probably just scratching the surface of understanding what that effect is. So, something you and I even talked about before coming on here before this was you get so much of the result from being in the chamber and you get the same amount, if not more result of being outside of the chamber.

This is something called your hyper Ox IQ hypoxic paradox. And I don't love to get into all the jargon of it. But this was actually the discovery of this was the 2019 Nobel prize in medicine. It went to a researcher out of Harvard for discovering something called hip One Alpha.

It's the hypoxia inducing factor. If I give you a lot of oxygen, I make you hyper ox IQ. And when you get out of the chamber you have all that oxygen. Your body, but your body says, wait, hold on, I liked having all that oxygen. And now you put me somewhere, I don't have as much, I need to protect my body with this.

So, I am going to become relatively Hypoxic and that's not enough oxygen. Now your body has plenty. It is more than enough. But by getting to that relative hypoxia releasing that hip one alpha were able to kick off this whole cascade that.

Like I said, this was just discovered in 2019 and it was such an amazing discovery! It became a Nobel prize. – That's incredible. And what does this factor do?

– Oh gosh, let me pull up a slide for that because it is it's so multifactorial, there's so much that goes on with it. Give

me one second to pull this up just because there's a lot of steps to it. Alright man, share my screen here with you guys real quick, so I don't want anybody to get lost in the details. The details are much less important than the general aspect of what we're talking about here. But so if you can see here on my screen, the first thing we talk about is again that hyper toxic hypoxic paradox and that hypoxia induced factor hip one alpha. And like I mentioned here, that was the 2019 Nobel prize. So they found that repeated, intermittent hyper oxy a so much oxygen may induce some mediators and some messengers to cells that allow other processes to happen. Again, that was doctor of friday out of Israel.

So the first thing we talked about is vascular endothelial growth factor. This allows us to grow new blood vessels. And I know that when we talk about blood vessels, a lot of people might think about why do I need new blood vessels?

Yeah, I've given blood just by my body. I've never really thought about needing new blood vessels. Nobody come in and said, you're not my doctor didn't come to me and say you need new blood vessels, we're gonna do a transplant.

But when we do have issues and really the number one cause of death in America still is heart disease. It's because of blood vessels. Our blood vessels start to get inflamed and they start to get sticky and they start to hold on to cholesterol. And we can talk about good cholesterol, bad cholesterol. We can talk about bad cholesterol being split into good and bad parts of bad cholesterol. None of that really matters except for the fact that if your blood vessels change, they start to become even more inflamed.

This process leaves this cascade. And if we can see brand new blood vessels grow, we protect tissue. So I had a patient that has come to me. He's done a number of treatments with me and very unfortunately he did end up having a heart attack.

And when he came back to me and said, you have done all these treatments, Why did I have a heart attack? I explained to him, I want to get out the anatomy.

I want to show you the blood vessel that you had the heart attack. And it's called the L. A. D. It's the widowmaker, big blood vessel that feeds the left ventricle. It's such an important blood vessel.

It's like a six lane highway. And we grant grow brand new blood vessels were not building new six lane highways were building bypasses little small blood vessels. Things like tributaries.

So I told him that you know I'm again I'm very sorry you had this heart attack. We're doing everything we can to protect our health. Probably had the heart attack because either hereditary component of your cholesterol or maybe all the years of eating the food that you didn't realize was so bad for you or you know until that time that you made that change in your life.

However what did your cardiologist say about the health of your heart after the heart attack? And so actually my cardiologist was blown away. He said that I had zero tissue death.

I said all right you had the most extreme heart attack. The widowmaker and none of your tissue died. Yeah I said that was all those tributaries, all that bypass that we helped grow to help heal us.

That's why new blood vessels are important. Now. We've already talked about stem cells a lot. The proliferation migration differentiation, that's all about the same factor and then gene expression. We get into that a little bit with telomeres.

There are other aspects of gene expression and that's a pretty in depth topic. But I'm gonna tell you right now that we can promote more healthy and natural gene expression and less of the gene expression that leads towards cancer.

Now I'm not telling you right now that hyperbaric oxygen therapy is going to prevent or cure cancer, we don't have

that research. However if we were able to promote our genes our D. N. A. To make the cells they should and not the cells they shouldn't in my mind theoretic that should reduce the amount of cancer we see.

New research will continue I think to show that I'm not gonna put my foot in my mouth here and say that's what it does. I can't wait to see new research.

I get behind any research out there showing that what we do is effective or ineffective and why I want to know that. And the last thing we talk about there that why this factor is so important is that metabolic change.

We talked about increasing energy and anytime we're sick I would say that we are in a low energy state. Why are we in a low energy state? Your body is using that cellular energy where it needs it more.

And if you've seen somebody that's chronically sick look at their skin, look at their hair, look at their nails. These are the processes that your body finds to be less important. We need to protect the health and grow where we need to grow. Bring all the energy there.

And our patients start to lose hair and their skin gets thin and dry. Their nails become brittle. These are all really good things indicators to look at whether you have enough cellular energy and when we give people hyperbaric the number of people that come back to me tell me my hair is growing so fast.

I'm like, yeah, I know I get it. My nails are growing so fast and so thick. It's mind blowing. It's nothing I would have thought would be a change. I'm in a chamber roughly four or five days a week and I cut my nails three times a week. I cannot believe how fast they're growing.

So I'm gonna skip afford to another slide here. I did want to see it. Here's the the actual publication. I would love for you to look up and see this type of information. I understand this stuff is is extremely complex.

But I like people to understand that it's well researched and is published in journals that we respect. And I want to make sure anything we see that is reproduced.

Treatment Frequency and Maintenance

So as as we talked a little bit about anti aging here, one of the things I mentioned earlier was that hyperbaric is truly anti aging because when we talk about anti aging medicine once about detection, go to your doctor see what's going on your health.

Go to your natural path. Get all of those panels to put together to understand what's going those processes. But it's about prevention. If we can prevent with what we're doing, then we lead to anti aging because we stopped those age related diseases and regeneration again is allowing these cells to restore.

So you and I both already talked a lot about information and we always will inflammation is something that we talked about in every aspect of medicine and if we can decrease it, we see better results.

– See that like that guy in that picture, that's what I want to look like when I'm 70, – I would love to as well. I think it's absolutely amazing what some of these athletes and some of these people have done, but now we're seeing it with the general population, they're starting to do things that have created a wellness routine.

And I think I mentioned it earlier. Your wellness routine doesn't just include going to the gym. It is brushing your teeth, that is for the wellness of your teeth and the wellness of your heart surprisingly as well.

And then after you brush your teeth, you get up in your physically active and then you might do something like meditation. Well, that's an amazing aspect of wellness and will do so much for us. So people have had these wellness routines are getting better and better and you are seeing men like this that are in their sixties and seventies that carry a huge amount of muscle mass instead of losing all of the mass.

And you know, I point to my father in this regard a lot. He's a physician as well and he's in his eighties. He rides his bike just about 20 miles every day. He's I think he's out skiing right now.

And I can barely keep up with him, so I think there's so much about all these steps that we can take to protect our health. So we really do have that that wellness that we feel is and as we get to that point of our 7th and 8th decades of life, so grab a bottle of water here. But – So what so what should a kind of a wellness routine? I mean because it it sounds like that if you're gonna do hyperbaric, you know, it would be good. I mean it's almost like you build up the momentum if you do one after another and and you just kind of create that saturation to really create changes. And then once you've done that for X amount of treatment that would be good to kind of step into like a maintenance program.

I mean that that to me that that would make sense. – That's exactly we talked about early on in treatment frequency is by far the most important aspect of what we do. More important than pressure.

More important than getting 100% oxygen versus 94%. Because These are questions I get a lot from people. They tell me I'm going to a center that uses oxygen concentrators, they only get 94 Or they're doing 1.3 atmospheres and and you tend to treat a little bit higher and I tell them that more important though is the number of treatments you're doing back to back, anybody that comes to me. I explained to them, I want you to do 3-5 treatments in a row. I want your first 3 to 5 treatments in a row because that's how you're gonna notice the difference.

And that's how you're gonna feel better about treatment. And if somebody tells me, gosh, based on my schedule or anything else, like I can't do that right now, I tell them it's not the right time to get started, let's find the right time that you can focus on this.

And then we start talking about what aspects they want to change. The majority of people that I speak with, we're talking about treatment programs, about 20 to 40 treatments. It's not a small aspect to bite off.

But it's kind of like going to the gym, you know, you go to the gym once a month, you're not gonna get results, You're the gym every day, You can see a dramatic difference, hyperbaric the same way as an additive effect.

And so it's kind of you know, we bring this oxygen way up here and then you leave and it goes down a little bit and you come back and goes way up even a little bit higher.

And then it goes down. But the idea is to create a steady state that's high up as opposed to you come to me and we get all the way up here and then I don't see you for a week and then back up and back down. There's gonna be some result.

You know, we're gonna see some change in information. People won't leave happy then then they're gonna leave and say, you know, hyperbaric didn't really work for me the frequency.

So the first 3 to 5 treatments. Absolutely. I want those right in a row after that, we might start spacing out for a lot of my patients. I pushed them, look how great you felt after five treatments.

Let's try to do the other 20 Treatments as close together as possible 4-5 times a week. Some of my patients doing six times a week, even in a wellness aspect.

Now, I've got patients that are treated on the other end of the spectrum for gangrene or or otherwise, and they see me twice a day. So it's a it's completely different in that regard. Now, once we get to maintenance, everybody's different.

My athletes, they have so much mitochondrial density, their muscles are huge, they're packed with mitochondria and when we up regulate it, it stays up regulated much longer. They feel great.

Their maintenance might be once a week, once every two weeks, some of my patients from It might be 2-3 times a week still. And oftentimes once we see results, even when I tell patients, yeah, we keep him back off even more.

They're like, I don't want to, I want to keep coming back and so that's been great.

I love to hear that from people. They feel so well that they would love to be coming to us that regularly. And that's why I do it so often, why my wife is in the chamber so often because once she got to that point and saw the changes, I couldn't stop her from coming in.

– And you have your own story as well. I mean you you were at a, at a place where you risk losing your arm and that is what drove you to hyperbaric oxygen there because you you were going in another direction in regards to uh, in your profession as a medical doctor. And obviously the, what was taking place with the arm, you had to alter that.

But the hyperbaric literally saved your arm. – Absolutely. And so this is a story that you share quite a bit and, And it changed my life has changed my career in so many ways.

I was involved in a crush injury and went through a series of seven surgeries on my arm and also even had to have an Elbow replacement, which was actually relatively rare during that series of surgeries. They kept on coming back to me telling me there's a possibility we have to take your arm. Well, I had been a surgical tech before medical school for for years. I've been in over 500 surgeries.

My goal for medicine and surgery uh, primarily because that's what I knew. My father is a surgeon. And, and that's what I saw.

Dr. Borsand's Personal Recovery Story

And I loved what surgery was because you go in, you put something together, they leave surgery and generally fixed. There's a healing process afterwards.

But there's a lot of job satisfaction to putting something together. And so when, when it happened to me and I couldn't be put together, we started to look at some other options and you know, here I am, I'm in the middle of my training and, and I, my whole career ahead of me is supposed to be surgery.

And now that's not a possibility. What am I gonna do? Well, there's a surgery said to me, you know, have you ever done hyperbaric? And I said, what's that? Nobody ever even told me about hyperbaric.

You know, here I am. I've completed my degree. I'm going to this field and nobody's ever explained this to me. And so I went to the center, there was a surgery center that had his chamber And I did 60 dives in 40 days. So, I mean, I was, I was living in that chamber and in fact it was the exact same style chamber we have here behind myself and I was going to very high pressure to try to promote my bone healing.

So I had an area of my bone that's called al Union, just didn't want to come together and grow, I had two failed bone grafts and so that everybody, everybody in surgery is like, you're gonna lose your arm.

And so when I went to hyperbaric, the first thing was well reduced inflammation swelling dramatically, so they can actually start to visualize some of these structures a little bit better. And then over that series of treatments, I started to form a bony matrix. What that really means, the bone started to grow together little pieces. And once I had that matrix, then we were able to put in a bone graph that was able to take place, take hold. And now, I mean I use my arm.

I do most things. Yes, I've got a little scar here on the inside of my arm. It might be a little bit hard where I'm sitting. I don't know if I can move it now, I probably can't.

You know, I have a large scar here you can see, but you know, I was able to get a lot of musculature back. My arm does 90% of what I wanted to uh have zero pay.

And when I go back to talk to people that were involved in those initial surgeries, I said, no way there's no way we

ever expected this to be possible.

I said, yeah, I knew nothing about hyperbaric, but it changes everything for me. I want to change everything for for your patience for my patients. And said, surgery is no longer the goal of my, my career.

I want to, I want to do what is so effective for myself to give it to other people. And you know, it's surprising because this is a long time ago at this point now it has been years and years and people still don't know about hyperbaric.

It is still just not discussed. Now, Jay Leno just went through major burns and he was very open about what was going on and showed the hyperbaric and there's more and more celebrities doing that.

Lebron James has a chamber that takes everywhere with him. Justin Bieber has been using a chamber and so for a long time it's been the elite and the athletes that could access this and now it's starting to become more available to the general public prices have come down dramatically from what they were when I was working in the hospital and their $4,000 a session is what they would charge your insurance. Well no wonder your insurance doesn't want you to do it. And you'll find centers now that you know, you might be 100 to a couple $100 a session and it it still adds up over time.

And I understand what I'm telling people that I I want you to spend on yourself to prevent yourself to get to the point you're spending on things you don't want to spending on a total hip replacement, spending on a knee replacement.

You know insurance might cover that total hip. That's not the only expenditure I'm talking about. It's not money it's your life. It's your ability to ambulance on the way you used to and so you don't go down those steps towards and we all know somebody a hip replacement.

Some people that get up, they walk out of surgery, it's amazing and some people it's years to get back to normal. I don't want you to have to flip that coin.

– No no no thank you so much for everything you're doing that. This has been awesome information and and yeah I'm hoping that all the viewers, the listeners that they recognize the power of hyperbaric oxygen therapy just like you know the power of oxygen. I mean we we all need it and to recognize that this is a a nutrient that makes everything better.

All the other therapies better whatever it is that you do you know it just makes it better. I mean I use it in my clinic along with when I do I.

Where to Learn More

B. C. Or ivy other I. B. S. And I just kind of drives those nutrients better in into the cells. And and so yeah thank you so much Dr. Borsand for everything you're doing.

– Let me I really appreciate saying that I'm really into to trying to spread the word about what we do you mentioned early on that I am with the Arizona hyperbaric society.

I am their current president and I work with a lot of other groups. I do a lot of training not just for other physicians but also to treat technicians or people who are doing home hyperbaric. I like to promote that aspect.

So people get a chance to learn more. – And where can they go to find that information? – Yeah. Let me share this with you here. So um here's just my my contact information to begin with.

If you can see that my clinic is called RX-02 Hyperbaric Clinic like prescription oxygen and our website just RX-02.com So you have that here in front of you.

If you'd like to email me my emails here as well, I'm happy to discuss with you when I can. And then the

international Board of Underseas Medicine runs a lot of training.

My next training here in Arizona is in January, January 12th I believe. And so if you go to HBOTcertification.com you kind of learn about what we're doing.

I don't expect everybody needs this type of training. But you know what you might be talking about this with your provider at some point said you know what if you want to learn more, here's a great resource above to help your provider learn more about this to really help treat you better and treat everybody.

– I love it. I love it. Well thank you so much. Dr. Borsand I truly appreciate this. – I absolutely love talking about it anytime. Alright, – Great. Thanks so much. – I think you have a great day.