

A MEDICAL PERSPECTIVE ON FREEDIVING WITH JANI VALDIVIA

- Luca: [00:00:00](#) Welcome back everybody. My name is Luca Malaguti, and I am your host here at The Alchemy Podcast. Today's guest is for me, arguably one of the most interesting people in the freediving world. Please welcome Jani Valdivia. Jani is originally from Peru, but lives in Florida. He is a freediving record holder holding the records for Peru. He is a neurosurgeon. He sits on the board of multiple committees, including dan.org, advising the world of freediving, including, uh, organizations like AIDA and CMAS on the best practices and approaches to freediving. He is a gem for the knowledge that he can provide to our world. And in this episode, we discussed so many things about edemas and DCS and diving deep in the mental state of freediving, and most importantly, the current level of medical quality we have and knowledge in the freediving world. So please welcome this incredible human being, Jani Valdivia to the Alchemy Podcast. Enjoy.
- Luca: [00:01:34](#) Yeah. I mean, you, I, I think what you wanted to talk about was something you said the, you said over our call the other day was the current state of freediving medicine. Maybe we can start with that.
- Jani: [00:01:51](#) Yeah. I mean, I feel like the, um, first of all, it's, it's an honor to share some experiences and knowledge with you and your audience. And I feel like the current state of freediving medicine is, it's an infancy, you know, to, to put it in a way because there's, so, there's a fair amount of basic science published already decades ago. Uh, but clinical papers are still coming up. And in science one is supposed to, and in, in this sport of free diving, where most practitioners of free diving tend to be scientists in a way, because we all tend to grab scientific papers, read them, try to analyze them, and try to use that on our

training, whether you're a scientist or not. If you're a free diver, you are a scientist in a way. So currently we're trying to grab all that information, trying to translate on how to make the sport safer or fun, and how to get deeper or longer or faster in a way. So the current state of freediving medicine is, I will say, in its childhood. I think I, I think that's a fair statement, um, in its childhood. Because, uh, we know, we know many things from, I'll say most is experience. Some are, uh, anecdotal evidence and some is scientific. Right. Um, but I feel like it's, it's safer to assume that it's in its childhood because it's safer to assume. We don't know much. Does that make, if that makes sense to you. When, when we assume that we know a lot about a subject, then we have more blind spots than not. Does that make sense to you? Um, I take it as I, um, I'm, maybe, maybe I need to explain myself why, uh, I take this approach. Uh, I do surgery, and in surgery, especially neurosurgery, one needs to be extremely cautious on the decisions. It's, it's, I would say, I wouldn't say it's easy to do some procedures technically, but once you do them so many times and you train for years, then it becomes second nature in a way. Just like in free diving, it becomes second nature to do a duck dive or a, a rescue or, or to safety someone. But then this, the decision making in surgery takes a long time to learn when to do something and when not to do something. In free diving I feel like it's the same. Um, it's, it's easy to learn the basic techniques in free diving into how to do this and turn and ascend and blow tap talk. And, um, but when, when to do something and when not to do, I think that takes years perhaps to, to, to master as something I haven't, I don't probably, I definitely cannot claim to, to have done. Uh, and the, the current state of family medicine is, uh, I, I believe it's in its childhood and it should be concentrated, uh, focused on prevention rather than, you know, some fancy research, honestly, because the way the sport is now is that minor miscalculations on decision making can lead to death, and, and that's the reality. So, prevention is everything to perpetuate the sport, perpetuate the image of the sport and the reputation of the sport. And perhaps it's a acceptance on into events such as, uh, the Olympics, for example. Yeah. So I feel like, um, the state of the art family medicine is actually our choice. If it, if it was my choice, I would, I would call it in its infancy. And it's, uh, I would say it should be focused on prevention, preventing preventing incidents such as lung baro trauma, blackouts, preventing repetitive lung baro trauma, especially, uh, that can cause permanent damage. So I hope that makes sense.

Luca:

[00:06:25](#)

It, it does, and I completely agree. It's, uh, prevention when we have yet to understand and know something is, um, is, is necessary a, a parallel, I often make one being a climber and a mountaineer myself, and being obsessed

with the mountains. I mean, you know, the high mountains is free diving, is that it's early stage the same way we were exploring 8,000 meter plus peaks in the forties and fifties. We were just pioneers. We were going up there and we knew nothing about high altitude, cerebral edemas, high altitude, pulmonary edemas. We didn't know about all these issues, that high altitude. We didn't have high altitude and hyperbaric medicine back then, or at least to the level we have today. And yet, it, it required an enormous amount of people to die, let's just say what it is. And they still, their bodies are still up on K2 and Everest, you know, people pass them all the time. In fact, they use them as landmarks. And, and it, it's almost as if the advancement of that sport, which was of course is a bigger sport, more understood, and there's also more money into it, but the advancement required all of that. Do you think free diving will have a similar trajectory in terms of we are reaching the point where we are at the 8,000 meter peak? We are at, we are at the, into thin air, the threshold where people shouldn't be surviving anymore at these altitudes, but at depth...

Jani:

[00:07:58](#)

Hmm. I can only give you my perspective from, I would say an amateur competitor. By no means an elite athlete. I, I'm mostly my perspective from a physician, I feel like the, the, uh, if you see the, the records in the last, I don't know, five years to 10 years, it's deeper and deeper and deeper every year. So deeper and deeper. And if you look at the statistics, uh, from an international, actually it's just public knowledge from the year 2009 to 2019, the incidence of, um, DQBO on depth competitions is somewhat steady. So now we're looking at, from 2019, let's, let's take, let's think about this 2019 into, let's say 2029 or or so, that will be 10 more years. I wonder, we're gonna see a, a plateau on the depth, perhaps not this year, but perhaps in five, the next five, 10 years. Because then, you know, it will, I feel like it will be a plateau, meaning it will be, um, deeper, uh, world records, but there will be a plateau because the human, the human body is, is made to do so much. We're genetically coated with our precious dive reflex that we are born with, and we unlock every month, every year with free dive. That it, but it can do so much for you. Um, I don't know. I don't know where, where the limit is or where the threshold is. I just, we just don't know that. So do we, will we know more? Yes, we will. And I hope that we know more safely rather than by accidents. So there's two ways to put safety stops in a sport like this, in my opinion, where you take a very cautious approach and you create safety stops before you encounter incidents, or you put safety steps after the incidents are all happen. And those incidents are not little, I mean, severe lung baro trauma or, uh, underwater blackout can kill you. So that's, that's my opinion. And again, I, I have to disclose this is not, uh, uh, official

material or, or statement from any agencies. This is just my opinion.

Luca: [00:10:32](#) When you say severe lung baro trauma, are you referring to immersion pulmonary edema, IEPE or some sort of it?

Jani: [00:10:42](#) No, I would say, I would say real lung baro trauma where there's a decrease in gas exchange and Yeah. You know, no, I'm not referring to immersion pulmonary edema, however, that's a good point that you bring, immersion pulmonary edema and lung baro trauma, there must be differences in the histopathology at the level of the tissue under microscope where you see edema or excess of fluid in the tissue, or fluid and blood on the alveoli. So we're, and respectively, right? One end is edema, one end is, uh, squeeze lung squeeze or baro trauma. Uh, but like, um, who said this? I don't remember who said this. I think Hippocrates said it is better to know the person who has the disease than to know the disease itself. Okay. What I want to say is, it's not just enough to know what is the edema and how a, a lung squeeze should look like if you are on a dive side. It's better to know how it affects you, me, or someone else differently. For example, if somebody has immersion pulmonary edema, and the person is 65, 67 years old, is perhaps hypertensive has a prior history of a cardiac event, is taking hyper, anti-hypertensive medications or diuretics, or has COPD, it will be a different picture. If you, for example, have a mild squeeze, you may be completely asymptomatic. You know what I mean? So in your case, if you go, let's say to 50 70, whatever meters you come up and you just feel like a tiny bit, you know, winded, that may be a mild, yeah. That may be a little bit of mild squeeze, and you'll walk it off, and in the next 30 minutes you'll be asymptomatic. But if you, let's say, let's go, uh, let's advance, let's go forward in time, 30 years from now, 40 years from now. And if you have the same symptoms, it may be more serious. You know what I mean? So raising awareness of how serious an event is, is important. It's not, it's not just one more squeeze. It's not just one more trauma. Yeah. The, the severity of the symptoms and the repetition of the symptoms are important in freediving.

Luca: [00:13:04](#) The severity and the repetition. So the, the, um, so almost when we analyze risk, when we do risk analysis, we talk about likelihood and consequence. It's kind of similar, the severity and the repetition. The amount and the intensity of it.

Jani: [00:13:24](#) And this is something I learned from someone else. Like, uh, it's not only important to ask the diver who's going to go for an event. Um, did you have a blackout or a squeeze before? Yes or no? Or, or you know, how many, but how many, how recent and how severe and how recent

absolute, because if someone had a, a squeeze, a mouth squeeze two years ago versus a severe squeeze two months ago before a competition, then that's important. That will, that will, uh, raise the level of risk. And, uh, perhaps the safety measures. Um, I hope that makes sense.

Luca: [00:14:08](#) It does. It does. Because when you say we still don't know so little, I've heard some of the best athletes in the world, we're talking about a hundred meter plus divers say things like, well, you know, the lung tissues, they actually heal quite rapidly. So it's not so bad a squeeze, but we don't know what kind of fibrosis, correct me if I'm wrong, but fibrosis of, of, of can occur in the lungs, essentially scar tissue on a long-term basis. Right. Is that one example? We don't know this.

Jani: [00:14:46](#) But potentially I'm, I'm not sure. I mean, I, I don't want to completely agree just because I know that the, a lead divers, like in that, at that level, they usually know their physiology very well. And they usually tend to read a lot of scientific papers very well. They, they know how to interpret them actually quite well. I feel like perhaps they're referring to the symptoms, the symptoms in, in, in, at their level perhaps go away fast. Why? Because a mild squeeze a mild per let's, let's say the right way, a mild lung baro trauma, or let's say a mild case of edema. How, how does it get cleared? It's not just, just sit and wait for it to go away. Your heart pumps blood away from your lungs and clears out all the excess of water in your tissues. The better your heart function, the better you're gonna do that. The poor your heart function, then, then, you know. So, um, uh, in, in that level, in that that cluster of athletes, elite athletes, their cardiovascular status is probably optimal. Therefore, mild case of squeeze edema will heal fast. Uh, but for the beginner or or intermediate freediver that perhaps not as healthy or as conditioned, then it won't be the case. And that's important to know for everyone. You know, squeeze and edema are not the same across all the age, um, uh, ranges, you know? So, uh, I think that is important to, to, to know

Luca: [00:16:25](#) That that's very important. Yeah. A squeeze in an edema is not the same for everybody.

Jani: [00:16:30](#) Mm-Hmm. No, definitely not. Um, definitely not if, yeah, I know for myself, when I just started free diving, if I felt like I perhaps had some edema, it took longer for me to feel normal than now, now that I'm perhaps more conditioned to it. And I just don't feel, I feel those symptoms. And if I feel some edema, then it goes away pretty fast.

Luca: [00:16:59](#) I feel the same. Yeah.

Jani: [00:17:02](#) You know, now, now that's not to say that having pulmonary edema is expected or is normal to the sport, which that shouldn't be the message either. Yes. What's normal is not to have any abnormal findings on your exam, no symptoms and no incidents. That's what's normal. And it's important to know to say, because we talk about edema and squeeze and blackouts, but let's not, let's not try to make it, um, even if it's a common occurrence in competitive free diving, let's not start to make it an expected occurrence, if that makes sense. It shouldn't, it should be avoided at all costs if possible.

Luca: [00:17:41](#) A couple of years ago, uh, as a fun experiment, already knowing a few things, but still intrigued. I was here in Canada, and I had a lung squeeze, a very bad lung squeeze. Within a week or two I knew I had healed to the best extent of my understanding my body. Hmm. But just for fun, and to use the free healthcare system, <laugh>, I went to the Vancouver General Hospital, one of the best hospitals in Canada. And I, and I went into the hi into the emergency room and the hyperbaric unit. And at the, at the emergency room, I told them my symptoms, pulmonary edema, hemoptysis, low oxygen saturation, and just using those words, I got pushed in advance. It was a great little tool. My wait time went from six hours to maybe one hour, and immediately I spoke to two respirologists, one which one who was a, a diver, and both that worked in the hyperbaric unit. And I recall the conversation of this respirologist, Dr. David Kim, which I stay in touch with, and he was truly intrigued about the lungs under pressure at free diving. And he was actually asking me a few things, and I felt very uncomfortable because I would just tell him what I knew from my instructors from the courses, from what AIDA and other organizations have taught me. But I was blown away. I remember I was blown away that this physician, this respirologist, this was some, this was all news to him, to a certain extent.

Jani: [00:19:12](#) Yeah. It's, I agree. I mean, the, the training, the training, I will say, well, let's, I'm not, I'm not gonna generalize, but I believe the training that we get on standard medical training in the western world is quite limited in freediving, because it's such a growing sport and perhaps not mainstream yet, at least 10 years ago. Um, so yeah, you'll find many pulmonologists, cardiologists that don't have much knowledge of how, what our bodies go through when we ascent. And I tend to have these chats with my colleagues a lot because they ask me, what do I do? And they think I'm nuts, <laugh>, you know? And, uh, they think neurosurgeons are nuts to begin with. They're not surprised that I do this. You must be crazy regardless.

- Luca: [00:20:16](#) Uh, this is the cardiologist saying this, right? Oh, you're a neurosurgeon and you're a free diver. You're crazy.
- Jani: [00:20:22](#) You definitely, that's, that that goes hand in hand. I guess they think, you know, because, but no, it's very mindful. I feel like, I feel like number one, uh, the awareness of free diving will increase in the next decade in regards to western medicine, prevention, management and, and follow up. And, uh, I know I always tell my colleagues that it's my, my biggest therapy for that is my biggest rehab, uh, because it's, it definitely keeps me, keeps me here in the present in the here and now. And it's, yeah, it's therapeutic. I mean, you, you, you, you know this, you know, every time you go diving, you feel whole better. You become Yeah. Better. I mean, in almost every way. And yeah, free diving is a big mirror. I always say that actually the ocean is a big mirror. Whatever you bring to it, it will be reflected back to you tenfold. Um, so if you bring, you know, anxiety and anger, then you won't dive nicely and you won't perform well. But if you feel, if you bring, uh, in my, this is my opinion, if you bring happiness, love all those feelings, then, then yeah, you'll, you'll enjoy and perhaps do a PB without expecting it.
- Luca: [00:21:41](#) I, I'm, I'm gonna use that as a quote and I will give you credit free diving is a big mirror like the ocean, and reflects everything back tenfold. That's, that's you, you should write that down. That's a good quote, Juan.
- Jani: [00:21:53](#) I, I, I put it somewhere. Yeah. I post it some somewhere that, that's a big mirror. It's true. Because I, I've noticed in myself, if I go and I'm not in the right state of mind, I just, you know, I won't perform well. And, and many competitors I know and I met, and they tell me the same, you know, you know, today, I just didn't feel like I was going to do it. And I decided to abort, and I just decided to call it and do not show, or just take the decision not to dive. It's not uncommon. It's not uncommon. Um, and it's an, it's, uh, as, as you know, the performance free diving is, uh, it is the performance of, uh, free diving, uh, dive, you know, it's, it's, uh, it's not based on drilling link. It's not based on the target. It's not based on, like, it is not like a hundred meter run.
- Jani: [00:22:47](#) You know, it's, as you, if you look at, at least on the competition recently, I've been, when you are leaving, when that, when a competitor is leaving the dive site and the competitor is entering the dive site, the usual word in exchange of words, it's not, do it. Give your everything, you know, just, just send, you know, it is more like, enjoy it. That's it. People are saying Enjoy it. Oh, what are you doing? Okay, enjoy your dive. Enjoy it. Because if you go in with that mentality, things will just flow and you'll be

present. So maybe I'm being less scientific and more holistic right now for you, <laugh>. Sorry.

- Luca: [00:23:27](#) The science of today might be the religion of tomorrow, Juan.
- Jani: [00:23:31](#) I know. Wow. That's a good, that's a good quote. That's true.
- Luca: [00:23:35](#) Um, I, I, I've, I've had a personal experience with that actually. I, um, I dove not long ago, just November passed my last competition, and my body was destroyed. I had just completely shattered my L five s one disc, full sciatica. Um, I'm still currently healing from it, getting much stronger, but at the time my body was wrecked. I couldn't sit down. I couldn't lie down. I couldn't sleep. I, I couldn't walk, I couldn't put on fins. And I find myself on the last day of the last competition of 2021, trying to go for the, uh, Canadian national record in bifins 84 meters. And I didn't have a coach. There happened to be a lot of current that day too, which didn't help the hypoxia. But I remember my mind being so good, my mind being in such a good place, having visualized done a lot of work, work in the mind. And even though my body was completely wrecked. I had done such good work in the mind, thanks to people around me, like Gary McGrath, Alice Modolo...
- Jani: [00:25:06](#) Oh man, really good. Amazing people.
- Luca: [00:25:07](#) Amazing people that helped my, that helped me with the mental game of free diving, you know, these people personally. And, and I was, and I was able to get it. I was able to get that record. It was a big moment for me. And, and, um, I, I still am trying to understand that. But, um, yeah, there's, there's, there's a big aspect to this sport, uh, that we know is the mental game.
- Speaker 4: [00:25:33](#) Oh, wow. It's, yeah, you're totally right. I think that I, I tend to, well, I don't have a lot of time to train myself and a little time I have to train, and I do, I do, I train. But a lot of times when I go to a competition, I feel like I'm undertrained compared to my peers. But I do a lot of mental work. And somehow you just, your body, just your mind tells your body what to do and unlock the muscle memory, so to speak. And, and then you, you, you, uh, you tend to be, be free of the terrestrial, so to speak. It's like something that will improve. It said you become free of the surface. You don't bring down what's up there. You just become yourself. You're your, you yourself, and your thoughts and your, and you know, I don't know.
- Jani: [00:26:25](#) It's a beautiful experience, uh, free diving. And what happened to me in vertical blue 2022 is, um, I, I had a eardrum perforation a month before the starting a month,

like a month and a half or a month before the, the comp. And so the first time I went into the water, like 10 days before the comp, I was very careful. And somehow, as you said, um, getting the energy of your peers around you at the dive site on the platform, it gives you a sense of, uh, security, uh, uh, a safety net, so to speak. Uh, I don't know. You feel like you're home and you, it makes you let go better underwater when you see peers that I know bring, bring that out of you, you know, that, that, that sensation. Uh, so it's, it's not meant to. It's like, uh, what, what she said. Um, Alinka said that I think once that it's not about the target. It's not just one performance. It's performing many little tasks in every little moment that reach you to the, to the per, to the, your targets or something like that.

Luca: [00:27:36](#) <laugh>. Oh, absolutely. Absolutely. Uh, the narrow based, focused approach, improving that 1% in every aspect, how marathon runners break down the marathon, the mind will collapse if they think about running the last two kilometers after running 40 kilometers or a hundred kilometers. So the mind has to given, be, given little tasks, run a hundred meters, run to that lamppost, run to that tree, and then it can complete the overall task. Yeah. Very interesting.

Jani: [00:28:10](#) Amazing.

Luca: [00:28:14](#) Juan, just wondering, 'cause I had the opportunity to sit down here by chance with a guy named Dr. Phil Ainsley. You will find his name on all those research papers out of the university of split. Mm-Hmm. <affirmative>. So a lot of research done out of the university of split on free divers, elite free divers. Okay. Um, they've done tests like extracting blood at 60 meters on some of our friends. Mm-Hmm. <affirmative>, we won't say who, but we know who they are. And then checking the iron blood levels, hematocrit checking, um, you know, the spleen contraction, things like that. Mm-Hmm. <affirmative>. And, uh, I had the chance to meet Dr. Phil Ainsley. He's a professor of exercise physiology at the University of British Columbia. How cool was that? And the top end researcher, he knows this stuff, but I did ask him a question. I'm like, okay, so we know, we talked a lot about pulmonary edemas and all that. But I asked him, Phil, what about the subconscious trauma on the mind? Do we know anything about that? So we do we have a baro trauma of some sort, perforated eardrum, or spitting a lot of blood. Okay. What effect does it have on the mind? Do we know anything about that? That's a tough one.

Jani: [00:29:31](#) <laugh>, what did he say? I mean, I can tell you my experience. I'm not a basic science researcher, but I can tell you some, my fortune perhaps, is clinical, please. Yes.

United medicine. And, uh, when I had my blackout before in competition, I, I, I, this is my personal opinion, I feel that, uh, every blackout is a, let's call it a hit. Uh, uh, it's, it's one hit to your nervous system. It's either hypoxic fit, uh, hit, uh, because we think, and it's commonly accepted that we black out because of hypoxia. Right? Now, there's a, there's a potential theory of other mental status because of CO2 toxicity, that I, it's not my, it is not my idea, but I heard it from elite, uh, at least one elite free diver. So regardless, it's a, it's an, it's a hit injury to your nervous system. We don't know the long-term effects histopathologically speaking on our brains yet, like CTE, like concussion. We don't know. We don't have an equivalent yet in free diving. So if we do a comparison between concussion and black free diving, blackout, right? Concussion is a very well defined, um, uh, condition where it's accompanied by, it is five in a trauma event, followed by a syndrome. It's called concussion syndrome, where you have insomnia, mood changes, memory changes, et cetera, for up to weeks, uh, if not more. Uh, or it can be brief. Now, in free diving, I believe something similar happens it's not only just perhaps after a bad blackout, perhaps, uh, changes in sleep, changes in mood, uh, changes in perhaps short-term memory. But it's, it has to be associated with some changes in mood. Um, perhaps feelings of guilt. And, and I'm speaking for myself, but yeah, when I had my blackout, I had feelings of guilt, insomnia. I couldn't remember where my keys were for I mean, 12 hours. Yeah. 12 hours. And it, it was not bad. I could function very well. But there's some changes. And I, I, I think saying that after a blackout, one would never have feelings of guilt or, or failure. It's, it's, it will be a disservice to say that that will be normal to, to just have a, a sense of failure that carries on for a day or so or more after something like that. Um, 'cause you failed, you failed your performance. Something's happens. And that's usually followed by an, a full analysis as an introspective analysis of what you did quote unquote wrong or, or a deviation from your plan. Yeah. Um, so, but then you will learn. And then the next, the next one is a, is a white card, or it's a clean surface protocol. And that brings sensations of, uh, achievement, you know, increasing your self-esteem. What I keep hearing from elite free dives is you should leave the dive side, uh, feeling like you want more. Yes. Not leave the dive side exhausted, like destroyed, but leave the dive site feeling like you want one more dive so that the next time you go to the same dive site as you train you, you just want, you just want to go really bad. You don't feel like, oh, maybe I don't wanna do it. I don't know if that makes sense to you.

Luca:

[00:33:14](#)

Absolutely. That's actually a topic I wanted to ask you about, because now we're talking about dopamine reward systems. And I've recently become obsessed with Dr.

Andrew Huberman. He's a neuroscientist, um, Uhhuh. And, uh, he, he's just got a really interesting podcast and called the Huberman Lab. And he talks about, uh, dopamine reward systems and how there's more parts of the, of the brain, more areas of the neural circuitry, uh, if that, if I'm using that term correctly, dedicated to the wanting than to the liking. So it's very interesting. And they did studies on mice, and they also did studies on drug addicts that when they saw the drug, they had this spike of dopamine, this of the one. And when, when they actually did the drug actually performing the task, uh, that wasn't the spike. So the actual big spike was when they wanted something. And, and this, I assume, revolutionary biology, the drive, the dopamine drive to make us keep going forward. Yeah. Survival, reproduction, anything. Um, and so that's a very interesting point. You just said. You wanna finish the competition by wanting more because you are actually training your dopamine reward systems in the right way.

Jani:

[00:34:31](#)

That's what I heard from a good friend and, and that was the right, uh, that was the right suggestion for a strategy. Uh, because I've seen, I dunno if you want to a competition like that level, I see elite divers doing one or two dives that day, and that's it. And you go home, you rest, you have these feelings of achievement. Calmness, you know, relaxation. And next one is one or two dives max, and then you go home. Um, so that is, to me, is, seems better to me at least then going and doing, uh, 20 dives, getting exhausted, and then, you know, having to recover. Uh, it's, it's a strategy. And I'm speaking only for myself. Obviously. I cannot tell you what's in the, the minds of my, my fellow free diving friends. But I, I can, uh, only assume speculate now that you told me that this is more of a personal experience, kind of chat that, um, we get a reward, we get a reward, perhaps not during the dive, but after the dive. Okay. Uh, during the dive, I feel like we have bradycardia, you know, central hypertension, MDR, all that. But I, I, I wouldn't assume that your levels of adrenaline or or epinephrine are high during the dive. I don't, I don't expect that. I may be completely wrong, but I, I feel like that's more like the after the dive, you know, when you come up and you get a white card, you got a pb come out of the water, take your wetsuit off, and then you feel like you wanna run a marathon sometimes. You feel like, you feel like extra, extra excited, you know, like, you wanna carry something heavy or something, you know, <laugh>, uh, it's, it's, uh, yeah. And it's, and then you see that's, that's therapy. Yeah. That's therapy for you. You know, it's, uh, the biggest therapy I could have. And it's cheap too, sometimes. 'cause you little gear, you know, it's just you, you know. So that's why I think that in, in, in the future, freediving will be, will be used for mental health. Yeah.

Luca: [00:36:43](#) Um, I found myself talking to Gus Kreivenas which I know, you know, I believe he's a very well known coach. And I found myself talking to him about an interesting subject. Again, like this podcast kind of goes on some weird tangents, but we talked about for men 'cause we're two men talking, should we be having sex before our dives? You know, uh, and and is that different for women? Um, so we, we ended up having that conversation very anecdotally, very, very anecdotally. I wanna mention, but it was an interesting point because we know in some athletics, uh, famous boxers, for example, have always said, no, you need to restrain. You need to build up that testosterone. But for women it might be different. Uh, uh, but I wanted to ask you something a bit more technical. I've recently read that in the mornings, the human body tends to have higher cortisol levels, which is not a bad thing in the right amounts. Cortisol is a stress hormone. It's a, I believe it's a, um, it's a, yeah, it's a stress, it's a hormone. And it also has, uh, higher levels of certain neuromodulators known as epinephrine, adrenaline, and dopamine. But in the afternoon, we tend to see higher levels of serotonin. So my nerdy question to you is, should we be diving in the morning? So should we be diving in the afternoon, in the morning when we have more of that natural drive instinctive, or in the afternoon when we have less epinephrine, adrenaline dopamine, but higher levels of serotonin?

Jani: [00:38:23](#) Wow. Uh, yeah, it's mean.

Luca: [00:38:30](#) It could be an anecdotal answer. It can also be a very anecdotal answer.

Jani: [00:38:35](#) I mean, I'm, I'm try to be very careful with what I say, because scientifically, I, I don't think I have any grounds to state anything about that. But I'm gonna imagine we're having a chat and a coffee chop. So, uh, absolutely. I mean, uh, for what I've seen in competitions, most divers will, I mean, most, most, uh, performance dives or they happen during daylight. Uh, they don't, they don't start at 6:00 AM usually they start either at 9:00 AM or 10:00 AM. They don't go past, let's see, let's say 3, 3 30 pm In most competitions I've seen, and I haven't seen it, I haven't seen them all, obviously. And, um, you, you cannot choose in a competition necessarily where you, at what time you're gonna dive, because it depends on your announced performance, your ap and then the judges or whoever's doing the, the, the, the start list, they will assign your slot to, to whatever time. So it's not your choice really. Right. Usually the separate, let's say three, three sessions is, uh, where would that be? Mid, mid middle session or in deepest session, in a shallower session so that the safeties get time to catch up and prepare and condition. Right. I mean, during training then there's no

rules. Um, I would assume that the midday will be best, uh, because you have had breakfast, you, you know, at least two or three hours before doing a , you know, performance or a PB attempt, and then you have time to recover in the afternoon. But in regards to neurotransmitters, like serotonin, I don't know. I don't know if the fluctuations must be so significant that, that it will affect your dive. Obviously serotonin will be great, right. Because theoretically that's the happy, happy hormone, happy neurotransmitter, right? So, and oxytocin as well is a happy hormone, oxytocin, right? Yeah. So I, I, I hope that in the future we get to measure all that, you know, I just daydream of that <laugh>.

- Luca: [00:40:55](#) That would be really cool if we can put those something on us and measure that as we dive.
- Jani: [00:41:01](#) Yeah. I know that you could probably measure that on the saliva or urine. Oh, it's just a matter of getting funding, so.
- Luca: [00:41:08](#) Right, right, right. In the meantime, I am sorry, Juan, if people will start texting you and asking you if they should or should not have sex before their dive <laugh>
- Jani: [00:41:18](#) <laugh>, I definitely don't wanna say, I don't wanna step on that. That's a no-fly zone at the moment. <laugh>. Oh yeah.
- Luca: [00:41:28](#) Um, Juan, something else I really wanted to ask you. 'cause you made a really good point that you said before, most people actually don't black out just because of hypoxia. There's more to it. We know about carbon dioxide toxicity as something Mm-Hmm. I believe it was even Eric Fattah that used to mention this, um, uh, a couple years back already. And, uh, we've seen some horrible CO2 toxicity from people deciding to do dynamic performances after breathing pure oxygen. That's a terrible idea. Yeah. And there's a couple of interesting research papers from the scuba world about CO2 toxicity, but my question is, if, let's assume the lungs, man, our lungs are like amazing and the blood shift and the mammalian dive responses, maybe that's not the limit. Maybe the equalization is not the limit either. Is thus the limit for the human body, truly, CO2 toxicity or nitrogen ssis, more importantly, decompression illness related to nitrogen. Do you think that's really like when we're gonna hit the wall as human beings at depth?
- Jani: [00:42:39](#) I mean, DCS, uh, well, let's call it, let's call it the right thing. Decompression illness encompasses decompression sickness and arterial gas embolism. That's a big wall because that can, that can kill you. That can give you long-term sequela. And, um, that's one thing. And that's, that's a no-no. I mean, let's be honest. We, we

have to avoid that at all costs. I, I think the limit for depth free diving in general, in general would be just, uh, a, a number of things. It's not just one. Uh, seems like equalization is for me, and most people, like the biggest one, when you want to go from let's say 50 meters to 70 plus 80 or 90, or whatever, you know, equal equalization is your limit. Uh, because as you progress, your body gets used to by equalization is the, the usual, I would say, uh, reason to abort the dive during free fall. Um, but the limit in, in the future will be a number of things. You'll be, I mean, who knows, cerebral blood flow is the number one factor that needs to be maintained during a free dive, because that keeps your brain supplied with oxygen and blood. Yeah. So all the changes that happen in us within, uh, during diet effects, maintain cerebral blood flow within a range that per, uh, permits, uh, the awake state consciousness, anything that will impair cerebral blood flow will be a limit to free diabetes. Whether it's hypoxia, CO2 toxicity, hypotension, dehydration, or, uh, a faulty, I won't say faulty, but abnormal dive reflex from either, as I said, dehydration or kidney disease or medication. So I believe it's more like a number of things rather than one cause.

Luca: [00:44:40](#) So many people will know the term ischemia, which is a cut, a cut of blood flow to a certain organ, uh, cerebral ischemia being a cut of blood flow, like you said, to the brain. So you're saying that an ischemia can be caused, uh, because of different things?

Jani: [00:44:59](#) Uh, yes. So an ischemia is actually, is, is actually in, in, in any, in regards to brain, is not just ischemia, because ischemia involves lack of blood flow, but hypoxia changes or anoxic injury is not necessarily lack of blood flow. It's just lack of oxygen. And that can happen, um, if, uh, you know, we see it on, unfortunately, it's, um, regrettable cases where somebody has a cardiac arrest and they get, uh, they get their circulation restarted with CPR. But if there's lack of oxygen, you can still have an noia that can have permanent damage in the future. So, uh, it's not ischemia per se, it's, it's as, uh, anything that would impair delivery of oxygen to your brain.

Luca: [00:45:57](#) I mean, we've witnessed loss of motor controls. We've witnessed blackouts. Uh, sometimes they're even funny, sometimes the person wakes up within four seconds and, oh, okay, lesson learned, move on. Maybe we tend to brush it under the table. But this past year, you know, without saying who, when and where, this past year, I, I witnessed, uh, for the first time somebody being paralyzed in half of their body. I was essentially the first responder, and I'm touching their toes and their fingers, and they are, they are awake, they're present, they can breathe, they're breathing oxygen, but they can't move. And that to me

was like, holy, this is, yeah, this is real. Luckily the person recovered, but...

Jani:

[00:46:42](#)

So this is a very important point. Okay. So there's many sources out there in the diving world that are an assistant to the diver to know how to do a neurological exam. If you have time and patience to carry a cheat sheet made of plastic or vinyl next to you on your weight, then you can pull it up at any moment and follow the steps and do your neuro exam. But that's, that's not only cumbersome, but it's not practical. The way you identify neurological changes in a diver upon surfacing is number one, observation and examination. You have to know if a diver's looking good or not. And now you don't have to be a neurologist. You don't have to be a neurosurgeon or even a physician or any in healthcare period. And this is why I designed this mini neuro exam that I submitted to, to AIDA, uh, that, and that is, uh, used sometimes it basically is an acronym to just do a really quick gross neuro exam on anyone without being a physician. And he has the acronym letters, uh, MFSCO2, which is mask, fins, snorkel, CO2, any free diver in the world will know those words, right? Mask, fin snorkel co O2 mask involves memory and motor control. So you ask the diver, uh, where are you? Where are you? What's your address? Who's your coach? Then you test motor control. So you ask the diver, squeeze my hands, uh, flex your biceps, do a chicken wing, raise your arms, uh, standing up in two toes, and if you see any discrepancy right on left, any asymmetry, then you write down, that's one point. Then find more skills. You ask the divers to do this. If you see my screen, yeah. Touch your index or with your thumb really fast. Um, find more skills and then feelings. So you, you grab the snorkel, for example, and then you brush the snorkel gently to the diver face and limbs and torso on both sides. And if the diver tells you that something feels numb or feels weird, then you, you also write one point. Now, s and I have to credit Dr. Kerry Hollowell for reminding me to add this to the acronym S is for speech. If somebody comes up and starts mumbling words or not, not understanding speech and not expressing speech properly, that's also one point. You've seen this, I think. And then CO2 C is for coordination. If you have somebody to walk on a straight line and they can't, and they're losing their balance, and that's not, that's not okay. O is for orientation. Are you oriented and placed, uh, time in person? Where are you? What's the year, what's the time? Uh, and then two is for your eyes, if your eyes have an abnormal gaze or pupils are unequal, and that tells you that something's wrong, the purpose of doing this is not for you to say, I am diagnosing arterial gas embolism. It's not to I am diagnosing DCS or DCI. It's the purpose of this is to say there's something wrong, period. When there's something wrong with the diver that comes up from

depth, and there's risk factors for DCI fast rate or cent, uh, long born on time, you know, that, uh, deeper thighs or shorting, resting interval, then you can say, number one, you are not diving anytime soon. Yeah. Number two, how are you feeling now? Is it getting better or worse? It's not getting any better. It's possibly DCI, therefore, you gotta evacuate and go to a chamber or go have some treatment for recompression. I'm gonna make it really broad so it's not just chamber, but just make it really broad. Some treatment for recompression, right? Yeah. Yeah. So the sooner you do that little step recognizing and acting, the better for the diver is the best for that, the better the outcome. And that diver may be able to walk home and have holidays forever. But there's, but if you're not able to recognize and catch that, the diver may, um, may end up with a permanent damage. So that's very important. It's very

- Luca: [00:51:01](#) Key. As we, we saw almost, uh, several years ago with Carlos Coste Herbert niche pioneers, like some of the most amazing human beings to have ever foot walked this planet in terms of what they've done with their bodies. But mm-Hmm, <affirmative>, they almost paralyzed themselves for life, period.
- Jani: [00:51:23](#) Anyway, I, I think I went on a tangent, but I wanted to make a good point.
- Luca: [00:51:32](#) No, this is great. mfSCO2, this is amazing. And I, I, I just, I actually don't understand how this isn't being taught to all instructors everywhere around the world right now. Like, I think we need to, as the sport progresses, we need to increase the level and the standards of instructors. Like, I'm sure you would agree with me. Sometimes you've got some free diving instructors, and it's amazing the little amount of information and knowledge they actually, and skills they actually have as the sport advances. Maybe we need to, not just the physical skills, like you should be able to do this depth like that as an instructor, but the knowledge, I mean, we, we gotta bring it up. This is, this is serious.
- Speaker 4: [00:52:16](#) Yeah.
- Speaker 3: [00:52:16](#) You agree with that?
- Jani: [00:52:17](#) Mean, yeah. Yeah. I do. I do. I, I, I feel we need to separate that in levels. If you have an instructor, you just wanna learn how to hold your breath. I mean, it's very simple. Yeah. And all agencies give you the basic tools to be safe. Mm-Hmm. <affirmative>, I mean, I, I think that's the first statement. But if you want to, let's say, do push like 6, 7, 8 atmospheres, that you need a different level of expertise if you want to coach someone or instruct someone, not that

I do, but I feel like one would need different skills. Um, and that little acronym, if you remember it the way I told you. Yep. I mean, you can do a neurological exam in five minutes. And why I know this, because my job is to, to, to examine people and know if they need surgery or not within five minutes, if I get a consultation, I run, I'm, I just gauge it. I know what to ask for. Okay. No, you're good. No issues, or No, let me call the OR and let's take you back for an emergency. So that's important. And I feel like that skill should be shared with everyone, regardless of your background or your profession. So you can save a life if possible. Yeah. If you save one life, it's in, it's a lot. Right. Um, I have to credit, you know, I have to credit, um, Johnny Sunnex, you know, when I, when I was in Dominica back in 2015, I think, uh, I started thinking about this acronym and I share it with him, and we were like bouncing ideas. So I, I have to credit that 'cause that, that, that, that thought, uh, was born there in Dominica. Like, many things, many happy things as you know.

- Luca: [00:54:04](#) Many rum, many rum punches at Dale's <laugh>
- Jani: [00:54:08](#) Gosh.
- Luca: [00:54:09](#) Big shout out to Johnny. I mean, he's, he's, he's a very safety conscious guy, very knowledgeable, uh, instructor, trainer. Yeah. He's helped a lot of people. Amazing human being. Yeah.
- Jani: [00:54:21](#) Yeah. Thank God I went there.
- Luca: [00:54:23](#) Yeah, me too. Me too. Second home, Dominica second home. Right?
- Jani: [00:54:28](#) It's, it's crazy. Beautiful there.
- Luca: [00:54:29](#) Yeah. I like it. Uh, Juan, this is awesome. MFS CO2 M, memory, motor control, F fine Motor skills, s speech. Shout out to Dr. Kerry Hollowell. I think I've listened to a podcast from her. Uh, or, um, Ted talk. Yeah. C coordination, O2 orientation and two, uh, well, the two, two eyes, two for the eyes. That's great. Yeah.
- Jani: [00:54:55](#) And I mean, you can, you can use whatever acronym you want, but the, the idea is to do it fast. Mm-Hmm. <affirmative>. And to try to recognize what may be wrong. And it's difficult because let's say you're in a boat and you have a bunch of, uh, bunch of people that are spearing, and once you come up and you get a bunch of fish, and then you start popping beers in a boat, that's not uncommon. Then how do you get, how do you guess what's, what? Is it the beer? Mm-Hmm. <affirmative>. Or is it a real, something real? Yeah. Right. If you're in the middle of nowhere, like in Dominica, like, you know, you're

in the platform's a beautiful paradise. There's no doctors around. Somebody comes up. How did you know that? When you saw, uh, the potential this there or wherever you saw it, how did you know? Because you had some awareness that something was wrong. Yeah. And you need that. That's all you need. Simple stuff. Simple steps, you know, in medicine and like in everything, the, the more complex, the equation, I feel like sim simplifying that equation makes it, uh, achievable, you know?

- Luca: [00:56:02](#) Absolutely.
- Jani: [00:56:02](#) Makes the problem easier. So...
- Luca: [00:56:05](#) And this can be used in other situations. This reminds me a lot of, if you live with somebody who's elderly and is susceptible to strokes, you should know this kind of stuff. There's a, there's a similar, there's a similar scale to identify, oh, someone's having a stroke, uh, speech, facial distortion, orientation...
- Jani: [00:56:27](#) Yep, exactly. There's another acronym for that.
- Luca: [00:56:29](#) There is another acronym for that.
- Jani: [00:56:32](#) Yeah. It's, I I just designed this one just because it's, it's like every feedback will know what those letters are if you just recite it like that, like a poem. Right. But, you know, it's important that not only you need to know when something's abnormal, but you need to know if it's new. And this is something very important. If you see somebody come up and they cannot smile very well on one side of the face, you ask them to smile on one side is not, you have to know if that's new or not. Because if it's new, it's not new, then there's no big deal. Yeah. It's been there for months. You know, if a pupil is bigger than another and the diver tells you that's been there for years, then probably no big deal. But if it's brand new after an, an incident, just a dive, then that, uh, raises your level of awareness and may trigger evacuation or some sort of therapy. Some sort of therapy. Um, yeah, that's, you know, it's interesting. Free diving encompasses so many things like logistics, risk assessment, physiology, science, medicine. It's a beautiful thing.
- Luca: [00:57:35](#) This has, this has been amazing. I think we've, we've, we, we've covered a lot of really interesting topics, man. And we could probably go on and on, but...
- Jani: [00:57:48](#) Uh, if we were in Dominica, if we were in Dominica drinking rum punch, I'd tell you we'll be like going for hours, <laugh>.

Luca: [00:57:57](#) I tell you what, we'll have a, we'll have a follow up one for sure. Okay. <laugh>. Yeah. I will be there probably January onwards for a few months training. So if you're coming down, oh, we will have a run punch and we'll have a couple more of these discussions. 'cause I think people not only dig this kind of stuff, but I think people gotta know this kind of stuff. Period. Um, Juan, the last thing I did want to ask you, I'd come across a paper Okay. About myoglobin concentrations. I'm, this may not be your expertise, but I'm sure you, you might be able to give some ex insight. Mm-Hmm. Myoglobin concentrations in seals. There's a couple of interesting papers on this, and why myoglobin, the protein to bind oxygen to the muscle tissues is so much more effective than hemoglobin as a protein. And why seals can do nine minute dives on exhales to counter the buoyancy. Um, crazy. And geniuses like Eric Fatah in the past have assumed that by, have tried that by doing empty lung dives without a wetsuit under ice, could be a way to promote myoglobin genesis. Uh, I'm just wondering, man, if we ever hack the myoglobin, like this is like something out of some marvel, if you want to be a free diving superhero kind of thing. If we ever hack somehow Biogenetically the myoglobin thing, could that truly make free diving for humans? Limitless. If we could have 20 to 25% just like seals, and I acknowledge there are 50 to 60 million years of evolution in between us and seals and stuff, but I'm just, I'm kind of just, you know, theorizing...

Jani: [00:59:58](#) I'm gonna keep imagining we're having a chat on a coffee shop.

Luca: [01:00:02](#) Yes. Yes, we are.

Jani: [01:00:04](#) Uh, yeah. I mean, perhaps <laugh>, perhaps, uh, I'm, I'm taking off my scientific hat. Perhaps we will have, you know, much higher stores of, uh, oxygen, oxygen carrying capacity in our blood. That would, uh, that would be, that would be one way to do it. But then how, how do you, uh, decrease CO2 though, you know, if you have that, then CO2 will be also a factor to limit you. 'cause CO2 in itself, as you may know, has, uh, documented effects on your nerve central nervous system. Your heart, it can cause arrhythmias, toxicity. It can cause seizures. So yeah, that will be one way to extend, um, our way, uh, our time underwater. Um, yeah, perhaps knows, perhaps we will evolve <laugh>.

Luca: [01:00:59](#) Maybe, maybe. But that leads me to another question, which now is more technical. Mm-Hmm. I've always said is one of the, maybe the reasons why we do free diving The blood brain barrier. Why only dissolved carbon dioxide can enter through the blood barrier, thus triggering the central chemoreceptors. But CO2 happens to be in

other forms as well, such as bicarbonate. And that to, to me, has always fascinated me in answering the question, human beings are made for free diving. Am I, am I correct in saying that? Hmm. That's more technical. That's, that's the science hat, right?

Jani: [01:01:41](#) Hmm. Well, it's well known that CO₂, it gets the deeper you go. If we talk about hyperbaric signs, the deeper you go, the more dissolve the, the solu. Well, the more amount of gases dissolved into liquid. So the more CO₂ is dissolved into blood, into plasma, and that's how it's carried for the most part. In, in blood. If the, uh, most amount of CO₂ is dissolved into liquid, then there's less, supposedly less partial pressure of CO₂ at depth. Uh, and therefore we have less contractions, perhaps at depth. 'cause I get so many contractions in a pool. I can't, I mean, it's, it's ridiculous. Yeah. But if we do a 69 70 meter dive, I'll get probably two on ascent tree on ascent. Nice. And that's about it. And it's surprising to me that that happens to me. But if I try to do a hundred meters in the pool, I'll be suffering. Perhaps I said the, the, the scientific mambo jumbo a little wrong, but there's something to be said about gases, uh, where we talk about dynamic disciplines and depth disciplines. Yeah. And you ask, uh, some, you know, some people, uh, can do both. And a lot of people can do one only. If you ask me to do the same distance in a pool, I'll be suffering through contractions way more than if I do that. So that's, yeah. Um, in regards to the blood-brain barrier, as you said, the blood-brain barrier is what keeps us alive. Because if there's no blood-brain barrier or the integrity of the barrier disrupted, then we can't have cerebral edema. Right. And that can kill you. Yep. Uh, cerebral edema. And that, that can happen in cases of, uh, hypoxia where the blood brain barrier can be disrupted. Um, inflammation, like systemic inflammation, covid, let's talk about covid, um, or other diseases like sepsis. Yeah. I can give you ceal edema, but no <inaudible> barrier has to be intact for us to be able to free dive.

Luca: [01:03:59](#) So, cool. When I, when I read about that, and obviously my knowledge is nothing, but when I read about that, I always, I always became incredibly intrigued.

Jani: [01:04:09](#) It's, uh, I do know for a, for us, um, I do know firsthand that hyperventilation, for example, will make your brain decrease in volume and hypoventilation will make your brain increase in volume. Why? 'cause we know that hyperventilation, uh, decrease in CO₂ will create, uh, will promote base constriction, cerebral base constriction. Right. And that will decrease. So let's say if we're doing brain surgery, I'm just talking about surgery now. We're doing brain surgery and we are doing a tumor surgery, or we're working on a microscope for trauma, for example,

and we see s severe re edema in surgery. A good way to decrease CE edema temporarily only and fast is to hyperventilate the patients. So you, we ask an anesthesiologist decrease the respiratory rate to, let's say 30 or 28, or even 26 a minute. And that will, uh, or no, I'm sorry, I'm sorry. Not, not decrease the, uh, increase the respiratory rate to drop to end tidal CO2 below 30. Okay. Okay. Yeah. 30 29, that's when we're hyperventilating. And well, a actually anything below 35, but 30 is a sweet spot where you, you actually see the brain decreasing in size Wow. In surgery. So it's real, it's very real hyperventilation. Not only is breathing fast, but it can be changes in volume, changes in frequency, or both. So any man, any manipulation of your breathing that will drop your CO2 below 35 is in lowest normal. It is hyperventilation can affect your, uh, cerebral blood flow and can make you more prone for blackout. That's, that's a, that's a big message there. That's good. I hope, I hope in a hundred years that still stands. Yeah.

Luca: [01:06:08](#) Hyperventilation drop in CO2 and we actually see a reduction in the brain size.

Jani: [01:06:15](#) Yeah. And surgery is very, is well known in neurosurgery that if, if we're having issues with brain, brain edema, ologist drop al CO2, it's 35. Okay. Drop it to 30, drop it to 26. Wow. And you'll see immediate changes in the brain right away. And that's the way to save the patient. But it explains what I see in free diving. Yeah. And I did a little, I did a little experiment that I posted on the page that you mentioned. I grabbed to measure my entire, my expired CO2, which is almost the same as my blood CO2, and then, um, uh, pulse oximetry at the same time. And I did normal tidal breathing. Both were normal values. I did one big exhale, like almost like a sigh, like Yeah. Almost like you are on the line and you're trying to relax before your official top. And my CO2 dropped below 35 only with one exhale. If I did two, it dropped like to 26, 25, very low. So my message is everyone reacts differently to their own breathing patterns. And you could have inadvertent hyperventilation. So you cannot, you may not notice, but a little extract cell may drop you over the, over the top or below. Right. And then that can increase your risk of, um, uh, that can change your pH and as you know, change your pH, change your hemoglobin affinity to oxygen risk of blackout risk of, yeah. That's important to know.

Luca: [01:07:52](#) CO2, an important vasodilator probably even more important than, than oxygen, A very important blood chemical molecule. Right.

Jani: [01:08:01](#) Very, very important. Yeah. CO2 is our best friend. Because it's, it makes us go up, right.

Luca: [01:08:09](#) Sorry, uh, one, you were saying those numbers 30 or 35, just the units, is it in millimoles per liters, or?

Jani: [01:08:17](#) No, it's 35. It's, it is, uh, I'm sorry. It's 35 to 45, uh, for CO2. I think it's millimeters of mercury. It's a pp it's a c like a partial pressure of CO2 essentially millimeters in mercury. So the CO2 is, um, range from 35 to 45 millimeters in mercury. Yep. Hopefully in the future we'll have more tools so that that will be available for free divers, like easily, you know...

Luca: [01:09:04](#) You say borrow from a friend, and you actually mean long-term borrowing from the hospital. It's okay, man. It's in the name of science.

Jani: [01:09:11](#) Nope. No, no, no. I returned that. I returned it <laugh>, I returned it <laugh>. I, uh, and I did all these little experiments just because I wanted to understand my own self. After that blackout, I said that was my mission to discover why I, why that happened to me.

Luca: [01:09:35](#) Juan, this, this has been awesome, man. I think, I think we could definitely end it here. Maybe when we see each other Dominica we'll do round two. Um, yeah. I just wanna finalize it by introducing you again. Uh, Juan Valdivia, um, you're a member of AIDA Medical Committee, director of the Free Diving, the USA Free Diving Federation medical director, neurosurgeon in Tampa Bay, Peruvian national record holder. But more importantly, you're one of the few people on the planet. I hope you acknowledge this, that is like both a deep free diver and also somebody that really understands the mind and the human body. Uh, there's not a lot of people like that as the sport is slowly growing.

Jani: [01:10:17](#) Yeah. Thank you. And that's, that seems like a lot. I don't, I cannot claim that really understand the human body. I believe that I can understand the human body as, as most, most healthcare professionals. And definitely understanding the mind is like, wow, that's a big, that's a big stretch because I can understand free diving stuff, but I, the mind is, uh, its own Pandora's box. I do know that, you know, something, I, I, I learned from per performing in free diving, which I cannot even claim to perform as people I really admire, uh, elite divers. But, um, there's so much your mind can do to your body to surprise yourself doing a PB or doing a big dive that you thought the day before you were perhaps not ready physic, physically wise. Yeah. Um, I started, I mean, maybe I can leave you with this, uh, esoterical message that, you know, I started reading, um, uh, Kar this, uh, famous philosopher, and when I read this, um, this quote of him, uh, that, uh, in regards to your thoughts that you, your, your awareness and your thoughts are not the same, then you immediately, I was immediately able to separate any

performance anxiety, any work anxiety, any, any scenario thinking like quoting another elite freediver. Um, to separate every single thought that comes through your mind from yourself is a big clue for me to, to be able to perform like that. Because once I was able to, to acknowledge and be aware that my thoughts are not me, then I was able to perform freely without thinking of the past, the future, just this. And there's nothing more beautiful than doing a white card on a, on a deep dive, on a almost a PB range, where you fully enjoy that free fall. There's not, there's very few, few things that are as beautiful as that. Um, and then another quote from Han, uh, famous, uh, Buddhist monk and writer, he said, um, he said, come home to your body. You know, it was a, a mantra. I, I, I would repeat like, before, come home to your body, be nice to just like, come home. Like not, there's no need to go outside yourself to get external targets or external goals to reach the plate or come home to yourself. And that's what I keep repeating with not, not, not thinking about oxygen and this, and cardiac output and blah, blah. It's just, I just told that to myself and I hit the plate. So there's something to be said about your mind and free diving, it's a big deal. And that, and, and, and I hope more people will be able to discover more about that, you know? And thank you. Thank you again for letting me chat with you. And I hope I didn't say anything, uh, compromising or anything, or, or, or out of place. But, uh, it's, it's, uh, uh, uh, thank you so much for letting me share with you. Okay. No.

- Luca: [01:13:37](#) If anything, we didn't say enough for this podcast, Juan, next time we're gonna have a few rum punches, and then we're gonna get into the, into the <laugh>.
- Jani: [01:13:47](#) Wow. That's, uh, that'll be quite Oh yeah. That will be great to be in, uh, Fri Air, right? Yeah. And they, they don't have, they don't only have rum punch there. I I, I almost never drink, but uh, they have something called, um, they have something called Bush Rum. And that is just crazy <laugh> Oh, such a beautiful memories of Dominica. I hope I see you there next year. Yeah, absolutely. You know where to find me if you have any questions or if anybody wants to, you know, I, I love critique and I love, I love critique. If you wanna critique what I say, please do. That's the only way I will learn.
- Luca: [01:14:26](#) That's amazing.
- Jani: [01:14:27](#) You know, the, the only way you will learn is if you, if you get feedback, just like the only way you evolve is through adversity. So if you want to critique me, please reach out. <laugh>,

Luca: [01:14:39](#) Man, I love that. How more scientists like you are not in positions of policymaking. It, it baffles me. You know what I mean? How someone like you can still be humble and still be like, Hey man, I actually, I don't know that much. I need to keep learning. Like, that is so inspiring, man. Honestly, like my background is in engineering. And, uh, it, it just made me realize, wow, I got outta school. I actually didn't know anything about the world. I gotta go learn. Mm. It's crazy.

Jani: [01:15:08](#) Yeah, that's true. I mean, me included. But, uh, cool, man, this has been very cool chatting with you. Uh, congratulations on your podcast and everything and, uh, hope to see you soon. Okay.