Introduction to the Alpha Zone

My athletes that are super good have beautiful looking brains. They're very coherent, especially my long distance swimmers and my runners that get like that high, that natural sort of like runner's high or they're called, you know, they're in the zone.

They practice being in the zone. Yeah. And that's the zone is what we're showing you. The zone is the athletic form of meditation, being locked in, no distractions.

When you drive and you pass five exits, you go, Oh my God, was I watching the road? I passed five exits. We all done that right before. You're going into that alpha state.

It's actually a very efficient state, but it's kind of a near meditative state. So, but that's the place you get need to get to where you have those six.

This is Dr. Talks. So I'm going to read about Dr. Kevin Murphy, and he's a board certified pediatric radiation oncologist.

Dr. Kevin Murphyu2019s Background and PRTMS Overview

It's a highly specialized field after residency, really treating tumors of the central nervous system in brain and spinal cord. and was a director of that program at University of California San Diego and was an expert in novel technology such as stereotactic radio surgery and intensity modulated stereotactic radio surgery and hypofractionated stereotactic radio surgery to really treat tumors in both adults and children.

He received his bachelor's from University of Notre Dame. and then did his master's in neurophysiology at Purdue. And then went to medical school at University of Chicago and then did his residency in University of Chicago.

So spent a lot of time in the Midwest. And I'm curious what brought you to California. He's co-authored many books and chapters and peer-reviewed journals and has extensive amount of research in the field of radiation oncology, neuro-oncology.

But what really brings him the renown that I think he so well deserves is he has created and I would say invented personalized TMS and the technology around it, which is called peak logic.

and has really sought in the past 12 years, I would say, 25,000 patients. Correct. And what was it, 98,000 sessions? 98,000. 98,000. And without much further ado, I would like to again thank Dr.

Cameron Murphy for making time here Thank you for the nice info and for me being here and all the folks that came in tonight. A couple of thoughts was, there's a lot to show you.

So I don't want to go in one direction that's not for the whole group. So I do a lot of treatment for autism and I also treat military personnel. So it's kind of a very broad reach.

So I might go into some of that background, and then I can always jump around for those only to talk more about any one of those stuff. It might be the best way to do it.

And I'll speak for about 20, 30 minutes max and then answer questions. And part of the question in Q&A, I can go into the details of some of the things that you might see highlighted in this display.

So PRTMS is the personalizing of TMS, RTMS. The R is repetitive, which means to do it over and over again. The

P is means we're going to adjust how we do it based upon the patient's brain.

So we look at your brain weight pattern, then we adjust our prescription based upon your pattern and your response to successive treatment. As we treat the brain, the brain changes and we adjust on the fly and try and create more of a personalized program for each patient.

Transcranial through the skull, so it could place a paddle under scalp magnetic fields are used because they go right through your bone into your brain very easily, unlike current and stimulation is the S.

So PRTMS is this process that we've established in adding the P essentially to an existing technology called RTMS. And I'm going to speak to you a bit about some of the brain optimization ideas and how we're taking this out of the mental health world and more into a brain performance And this started really with me being a cancer doctor.

As mentioned, then I was a pediatric oncologist treating brain tumors, focused on these radio surgery techniques to ablate lesions. In the old days, we had a bite tray and a mask, and these little types we would treat and take away their tumors, oftentimes curing them.

In the case of this mask system on the right, I helped develop the mask, which became the most commonly used mask now for for radio surgery, there's no bolted head frame required like in the old days on that black and white picture.

We used to put screws in the skull and screw a frame to your head and then bolt you to a table. That was kind of brutal. So that was just the way it was done because you had to mobilize someone to the point that they couldn't move because you're going to hit a spot and ablate it with a high dose of radiation.

The mask system allows us on the right to open the face and it's much easier, of course, and more tolerable. And then you can track the face topography or the map of the face and a move of the patient and realign them based on their anatomy.

That allows no x-ray dose to be given. And that really helped change this feel. And I think I lecture maybe in 30, 40 countries on this. These machines were brought all over.

They're called linear insulators. And as the patient's immobilized, it moves around the patient. These lead leaves are yellow, open and close and create an exit for the beam to get to the target.

And each projection, it changes as the tumor changes from each projection. And you're accumulating dose over and over again at the same spot. But there were some side effects to that therapy.

We're trying to fix the brainwaves around those areas of tumor and of radiation. Just a few disclosures here. This kind of goes into that other work I was doing.

While I'm doing this, I'm a Navy veteran. I'm working with the veterans. I'm working with snipers and with operators and some of the agencies trying to help some of the performance ability.

And that led to some work I'll show you with with Special Operators Command, which led to the Air Force Research Lab, which has a lot of research for the DoD on performance improvement techniques.

Though I highlight this because it's on behavioral, cognitive, and psychological performance enhancement, not that they had a problem. They were trying to make these operators better.

And I think that's a brain health initiative that I want to just keep putting out there. Your brain's either tuned or it's not. If we tune your brain, it performs better.

All this inner brain tune. And over time, through all kinds of reasons, our brain gets out of tune.

How Personalized TMS Works

And so the goal is to tune it back. The work we did was involved. This was a mode vehicle we drove around. It looks like a hallmark white van. We had the machine in it.

We took it to the firing range and we were shooting and watching the change in their performance based upon their tune of their brain. And we saw better physical fitness scores, quality of sleep.

Sleep It medication went down and that led to more funding through the special operations groups, which led to Walter Reed doing a study with us, which is ongoing right now on chronic pain and opioid addiction.

So here again, some of the guys were going off their opioids for pain control. The idea was let's do a study on that. So that's currently enrolling. The process I'm going to show you is FDA approved.

All the devices are FDA approved. Our software went to the FDA and they're They didn't even recommend if you have a shrivel ID. So we're basically taking an already existing device and just modifying the dose.

And so far in Walter Reed, we've had about 80 patients plan to be enrolled. We've had about 12 enrolled so far. We're already seeing improved sleep, decreased migraine, and chronic pain is going down.

So again, these are all different things. Why does migraine and pain and all these things have to do with just doing TMS? We're treating the brain. So we're just treating the anatomy.

And in behavioral therapy, we oftentimes treat the mind. The mind needs to be treated, but so does the anatomy. The anatomy is the piano being tuned. You got to tune the piano.

You can then go on to lessons and learn how to play it with your coach and your team. But we're also going to fix the anatomy itself and take out the arrhythmia.

in the brain, which is what we see a lot in a lot of our patients. We're doing work with Mass General in Boston and also a trial with Mayo Clinic potentially here for MDD.

So the process that is involved is a, I think we have this, you could pass it around if you have one handy. wireless Bluetooth electroencephalogram. So on the left there is a, looks like a spider, on the head it looks like this, is a cap that has sensors in 19 different locations, like little microphones.

And those sensors are taking the reading of the frequency of the brain below each sensor. They're simply listening on the surface. It's a passive test.

Four minutes later, we take all the data from each location, and we plot the data. So we're simply looking at your brain over time as a function of speed and power.

Those are called spectral EEGs. And if you wanted to show that, these are $25,000 devices. So be careful. Yeah, but it just shows you how there's a lot of obviously sophistication with this device and they have a state of the art program here.

So I'm just think it's important to show people how simple how light this is, how easy it is. There's no pain to put this on. Our children can do this without problem.

Autism kids can get these on their heads. So anyway, that process then takes data, goes to the cloud. We process through our servers and put a protocol back into the computer for our doctors to treat.

So this is a vital sign. When you think about medicine, we have vital signs for your heart and for your lungs, for these critical organs, but not for the brain.

How crazy that we have gotten this far and there's no vital sign for the brain. I know that'll be one of your questions later. That seemed like an uncharacteristic way to think when I first looked at this process.

Why aren't we looking at the brain wave pattern? When you get the data out of these EEGs, you get waves. That's where the word brain waves comes from.

So left to right is one second in time. The peaks tell you how many times per second is the brain firing. Here it's firing three or four times a second.

That's deep sleep. Here it's firing five to seven times a second. That's light sleep. Right around eight hertz, our brains awaken and we become conscious at eight to 15 hertz.

And when we ask you to go to your conscious place, not sleeping, go to your place where you're calm, Not asleep. And tell me what your brain looks like.

What's your brain speed when you try to go to your best calm place? Where do you go when you go in this alpha state? The alpha state is the same state as the flow state, the meditative state, a prayerful state, a mindful state.

So you hear about those different words being used. They're all about the alpha state. And it's where our brain spent about 80% of our time when we're not doing something.

We regress back to this alpha state. It's similar to a car at a stoplight that's got an RPM, the engine's running, but it's purring, waiting for a command.

That's the alpha state. If it's sputtering at the stoplight, I'm in trouble. It's sleeping. If it's revving on the top, it's also not good. It's going too fast.

The top part, where it's the beta and gamma waves, you're going 50 times a second. Oversampling your environment, that's anxiety-based states. This down here creates depressive-like states.

It's too slow. So if I see this during your wakeful hours, you're underperforming. If I see the higher states, you're overperforming. Overperformance could be anxiety-based issues, impulse control, anger, hot temper, all those different things are the high end.

This is apathy, lack of focus, I want to go to bed, I'm tired, don't care. It's pretty hard to not feel that way if your brain's going that speed. You got to fake it.

You got to fight through it and say, I'm going to fake it anyway. I'm tired as can be, but I'm going to act like I'm not. But your brain's saying, we're beating six times a second.

We're sleeping. Good luck. So for patients that have a depression and anxiety, do you just see them rapidly shift between the two and then there's very little time kind of spent in the middle, or what does that look like?

I have an example I'll show you, but yeah, it's a good question. So you can have both. Your brain can sputter and then rev, and sputter and rev. And if that's happening in my attention span area, then I can't pay attention, but I'm also hypervigilant.

How's that possible? I got both? On one hand, I can't pay attention, but I'm also hypervigilant? I can't make a decision and I procrastinate, but I'm also impulsive.

How? Because you've got slow wave function saying I can't pay attention or I can't make an impulse change. And then I can be impulsive too. And that's a problem with PTSD.

We see in our patients that have both a high and low wave form at the same time. The engine sputters revs, sputters revs. And they're not spending time in that nice calm state.

Make sense? So all this data is interesting. It's math. You could take it and plot it over time and produce what we wanted to show you as a single picture.

When I first started doing this, the old EEG reports would go through pages of circles and colors and numbers and no one knew what it meant, even the doctors.

And I wanted to look at one view and say, I want to see the entire brain right now. I want to know, what is the peak frequency when they go to their mindful state?

What's their alpha state? You can see a peak wave here in the middle. That's their state. And I want to know, is there any energy or color left of the peak or right of the peak?

And if there is, these are neurons going too slow, going left. These are sleeping. Any color going left. These areas have very little on the very bottom, have very little area going left.

The ones that have more have more neurons sleeping. If they're sleeping in that area, that area's not performing, or it's underperforming. If it's going the opposite direction toward beta, it's going too high to the right, like on these T4 leads, that's causing excessive speed, in this case, auditory processing that could lead to noise sensitivity or tinnitus in the ears, ringing in the ears.

EEG Brain Mapping and Frequency States

So, again, this forms a map. In medicine, we call it a homunculus. The homunculus is telling you that each part of the brain is responsible for a certain behavior or function.

And they're just on the right top. The first lead is impulsivity. So that cap on your head is now being plotted for you. Front, middle, and back. The blue is the front.

The green is the middle. The red is the back. You're seeing all 19 brain locations on that cap being displayed. Probably should have said that first. And so the blue being these leads up here, the green being right here, and the red and orange being in the back.

The area on the left prefrontal cortex right here is an attention span. If I'm going really fast in my attention span area, I'm hypervigilant. If I'm going really slow, my attention span, I can't pay attention.

Again, if my impulse area is fast, I'm impulsive. Or I tend toward impulsivity. If it's slow, I procrastinate. If it's both, I do both. And most of us have a mixture.

We don't have this one waveform. We got some areas not behaving and some areas overbehaving. And the goal when you meditate is trying to put all those things into the center line here, where they go to a single file pattern and become quiet.

And that's the alpha state, which we're trying to induce. So if you don't have that, we give it to you. We find out what your closest waveform is to that ideal space, and then we add more with our magnetic field.

So we're kind of reinforcing your quietest position, your most meditative state. We could probably do what takes you weeks and weeks of meditation in 20 minutes.

Because we're cheating. We're saying, I know where you go when you do meditate. I know the number. I know your RPM at the stoplight. I'm going to tune your engine to the exact RPM that you go to when you are meditating and make sure all the neurons are playing the same game.

They're all marching on the field at the same. I use the analogy of a marching band a lot, where the marching bands, in this case, that peak in the center.

And the sideline here, left and right, is the left sideline going too slow, right's going too fast. And so the band members that are moving off that center line are making noise.

They're not playing with the band, they're playing the wrong song, marching at the wrong speed, they're going toward the sideline. They could be going to the other sideline going too fast, but they're not playing with the band.

They're making noise. So signal is the peak. Noise is everything else. Everything else is noise. You want better signal and less noise. And like any system, you don't want static on your phone line.

You don't want it on your TV. There's no value to noise. So the process takes the EEG, it's processed, and then we treat for five days, repeat the first step and do it again, and we change the protocol and keep repeating this process as we tune the system left to right.

So these devices that do this are transcranial stimulators. The one that we have here is the newest state-of-the-art machine called an Apollo, and our software is actually built into this machine.

The other machines were actually kind of research machines that we used to use and then became clinical. This is more of a true clinical device. We like this.

This is a very, very sexy machine. It's got a touch screen to it and our software is embedded and it's quick and it's very easy to train folks on this.

And this is what's here in the back room. You should take a peek at that if you haven't seen it yet. So what's different about this than the standard TMS?

Three things, three main things. Lower amplitude, less intensity, so it feels hardly sensate to your skull. You can hardly feel, and those have been treated, so you can hardly feel the magnetic pulse.

We treat multiple locations because we can, because we're going low energy. So now the magnetic field can be placed anywhere on your scalp, and we're not going to hurt the patient or cause any injury whatsoever.

Never happened to 25,000 patients. It's not going to happen. You can't even feel the field. And then we treat EZEG as to adjust how we do it. So we're making sure, as your brain changes, we're fine-tuning you and following along.

This is a little math. There's going to be no math in this lecture. I'll show you one little math equation. signal to noise ratio. You may have heard about it in your histories.

Signal is the power and the actual ideal alpha in this case that I'm going to try and magnify. Everything else is noise in our brains. So what we do is we take a blast injury.

This is a patient that was blasted. A breacher, military person who got too close to the blast injury, thought he was far enough away, but wasn't. It scrambled the brain.

That's your typical PTSD patient now who says, can't think straight, don't feel good, don't sleep well, nothing's right. The system's really out of whack in a sense.

It's like taking your computer and smacking it and it's glitching and you're wondering why is it glitching? Because it was blown up. And the waves didn't stay in one single line.

The band members are all over the field playing different songs. Very noisy. In four weeks, you can see a wave being recreated. You're reestablishing the marching cadence.

And by six weeks, it's almost back to a nice single file pattern. And as I'm doing this, symptoms are going down. We're tracking their attention span.

They're tracking their sleep. All those other symptoms are getting better. Another example of a concussion. On the bottom left here, the back of the orange areas is where a back of the head trauma occurred.

We knocked out the drum majors in the band, and the rhythm starts to really get out of order going anteriorly toward the blue. And you see a broader peak, and you see a lot of noise, and you can see left to right how we're going toward recovery to move someone toward this tighter waveform.

It's just a pure math experiment. Your brain is math. This is your brain not on meth, but your brain on math. So we published this work on concussion.

These papers will make available to everyone. We published a PTSD paper with the Stanford VA with Casey Fairchild and Jerome Savage. We published a paper on autism.

And the same for a group in India and a center in India doing work. And they just published a paper on autism as well. This slide gets everyone a little interested and anxious if you're a psychiatrist or a psychologist.

because it shows a lot of different things. And this really can be antagonistic, frankly, to some people to see, wait a minute, okay, you had me until you showed this slide.

And now you're saying you treat everything. So now I know it can't be real, right? As a medicine, we're all specialized and you're not a PTSD doctor, you're not an autism specialist, right?

And my answer to that is they'll have a brain. So I'm just treating the anatomy. Sometimes in medicine you treat what's different about the patient. Other times in medicine you treat what's the same.

The commonality here, it's called a homologous structure, is the anatomy of the brain. We all have the exact same anatomy of our brain. There's a skull, there's a scalp, there's a gray matter, white matter junction, there's a CSF.

It's all identical, just like your heart anatomy is identical. So is your knee anatomy. So is your brain. We're treating the anatomy. So it could be an autism patient, it could be a sniper, it doesn't matter.

Their brain can be tuned. Their behavior is different based upon how they get tuned. They may not all respond the same. Their responses might be different, but they respond in some way because they have a brain.

So that's not treating the mind, it's treating the anatomy. So that's a very big difference in what we're doing here. And there are non-responders. There are patients you try and treat and brain waves don't move.

There's all kinds of reasons why. I can ask them the question and answer. You can ask me those things. But there's a lot of reasons why they don't move or they don't stay.

So I'm going to show you a couple of final things on autism that you've seen sort of what a good wave looks like. They're missing their wave. The red box here is showing you the front cortex in blue.

The top two leads are attention span and impulse control, executive function, then language, mood, social skills, motor planning, auditory processing.

It's all turned off. All the band members over here on the sideline parked going to sleep. They can't perform. It's impossible. Their vision system is on a little bit.

That's the back of the brain. And so a doctor is fooled. The patient's sitting there staring at you. Well, he must be awake. Eyes are open. That's what we call awake.

But the front cortex is not awake. It's at four in the morning, dead asleep. And so how do you behave if your eyes are open, but you're dead asleep? You behave aberrantly.

What do I do? Stimuli is really overstimulus to you, just like we're all overstimulated by light or noise when we're sleeping. But their eyes are open and they're being told to perform.

We're like, how do I perform? This whole area that does it is not even awake. So all they want to do is video games and video things, right? Because that's what's working.

And as parents were taught, we'll take that video away. And the kid's like, now what do I do? You took away the only thing I've got is my vision system, and you pull it away from me?

That's the temper tantrum when you pull away video from a kid who's only got a visual cortex to work, right? So I always tell parents, don't take it away.

That's what they're using. Add to it. Let's talk about what characters are on that show you're watching. Are they happy or sad? Let's bring what you're doing well and add it to the front.

That's a really big thing in autism. and some behavioral disorders, we had to be more of a yes and a therapist, a yes and provider, and kids especially.

It's easy just to say, yes, and we're going to do what I want as well. We're both going to win here. It's called cooperation. It's called the ability for reciprocal relationships.

They need to realize that good behavior gets rewarded.

Treating PTSD, Concussion, and Brain Injury

and that there's a yes here, but there's also an and. The end is you also do this for mom. It has to be a very easy and, like yes and pick up your shoe.

Cookie, sure, pick up your shoe for me and I'll get it. So they see a constant immediate reward for good behavior. What instead we do is we're taught to like sort of stop them from hurting themselves and getting in trouble and everything's a no.

And I want you all to imagine going to your job every day and be told no 50 times by your boss, how you would feel, the anxiety you would feel. Like everything's a no.

You see that, right? So the goal would be yes. And, and that's what I would suggest for those. So I want to show you autism for a second. This is my son, this is my son Jack.

This is about 10 years ago, 12 years ago. So Jack's nine years old. His car scores in the forties. He has really no eye contact. That was his big thing.

And then about a very, very little language. This is about six months later. When I started this whole thing, he's going around the world showing pictures of my drawings, my handwriting, T-shirt pictures.

Can you all kind of hear that? So really, the obvious thing is eye contact. Then he starts talking. So that's how I changed my career. So this is his handwriting.

His handwriting when he's nine, before treatment. And then by about six months, he was writing this well. And then by nine months, he was writing like this.

So he's doing behavioral therapy. He's doing PT and OT. But he was doing PT and OT then, too, to a four-hurt brain. So you have that kid in your office and you're spending hours with the kid who's completely asleep.

And nothing is really getting in. Very little is getting in, in those cases, unless you wake up their brain. You've got to wake up their system. It's not receptive, like you are not receptive at four in the morning when you're sleeping.

When you kind of are stumbling around at night and you kind of wake up and you're going to go back to sleep, you're about six hertz. This is where he got to about maybe two, three months down the road.

And by the time I got him about nine months, he was about nine, 10 hertz. And now the same handwriting and the same OTPT was flourishing because it was a wakeful brain being receptive to the therapy.

So anyway, that was a little personal story there, but this process grew across the country pretty rapidly. This is an old slide. There's probably 50 or 60 places doing this.

25,000 patients treated total. About 98,000 of those spectral EEGs you saw, that rainbow pattern, we treat about 500 people a day across the country and we're in various parts of the world right now doing this work.

I treat a lot of athletes and performers and people that are looking for performance improvement. Just that little tweak for the athletes, getting their golf game a bit better, their contact a little better on the baseball swing.

Some of these things are just, they're looking for such small little things and it all takes sometimes with that small little additive change to help them.

And that's kind of a quick little skinny. I know you got some questions. I left a lot. This was kind of a shortened version for the 2030 minutes. So thank you for your attention on that.

You can look up the link tree. You can take this PRTMS website. You can also see our papers are all on there. We can deliver those to you. But if you go on our website, go to manuscripts, you'll see all the papers I mentioned.

Thank you. Wow. Thank you. I just love how you have explained something so technical in such a beautiful figurative as well as visual way. And I remember looking at EEGs as you described, looking at EEGs in the hospital, especially when we had patients with seizures and looking at hours and hours of tapes of those rhythms.

And now coalescing that information in a quantified way. That idea that you basically created and have implemented How did that come about? How did you come up with the idea?

I mean, you talk about standard TMS. If you could kind of give us a little bit of information about standard TMS, the comparison with PRTMS, which is personalized.

What have you noticed is the difference as well as the outcome difference in the patients you're treating. Well, I would just say that, so when I was treating my brain tumor kids, we would radiate and then have to have some side effects with the area that was adjacent to the tumor.

So under stress, neurons slow down, getting stressed. The response of the neuron is say, I didn't like what you just did, and I'm going to slow down. So when your heart beats, since you beat a minute, your brain's beating 10 times a second.

If you traumatize it, it'll go nine times a second, or eight, or seven. It starts to go to sleep. and hunker down and says, you're hurting me. I can only beat seven times a second right now.

You're drinking or you're not sleeping well or you're taking a drug or you're stressing me out. And the neurons response is to sort of hunker down for like the long winter and go to a slower state.

And if it's in your attention span area, then you can't pay attention as well. Wherever it is, it causes a deficit over time in the area of the brain that's doing that.

So in radiotherapy, we'd radiate a tumor and then right around that target, there'd be some edema and there'd be some swelling and some other debris that was causing a, like a watershed zone of fall off of frequency.

So the target area was dead. Right outside it was two Hertz and then four Hertz and then six Hertz. And you got

further from your target. You had more and more normal frequency, but that whole hemisphere might be off now.

So now you cured a tumor, but the kid's entire left cortex is at six hertz or less. And so the goal was kind of bring those neurons back online and pull them back to a higher frequency.

That's what we started doing. Placing the paddle right in the area of injury saying, wake up. You've gone to six hertz, it's not your fault, but I'm going to make you go 10 hertz right now.

And we pulled the weight back up. And that started to work. And so that led toward other neuroindications because I was seeing pain go down. I was seeing kids ambulate better.

and they're speaking better, and their apraxies were going down, and their hemiparesis was changing. And I'm like, this is crazy. These areas of the brain are, you're bringing back online these bystanders, which have gone sleepy on you, and you're putting them back on the field to march with the band.

And all of a sudden, they perform better. And there's two reasons why that happens. One is that the noise is reduced. The other is that they're marching with the band again.

It's a double whammy when you lose a neuron that's doing work, like playing the trombone, and now it's playing like the trombone on the sideline making noise.

You lost them playing in the band, and you gain them making noise. If you restore that, you take away the noise and gain power of the signal by putting it back on the field.

So one of the negatives of behavioral therapy that we get stuck with is medication management, which is required in some cases, in many cases. But the entire band gets the same drug.

You can't pick and choose who gets it. You're all getting the same pill. And some neurons are like, I'm marching on the field just fine. I don't need a stimulant.

And I got neurons on the other sideline going, I'm going really fast. And you gave me a stimulant. I'm going to go faster. It's called a side effect. Or I can then sedate those fast neurons and the slow neurons get the same sedation.

And that's called a side effect. So what we're saying is, where do you go when you're nice and calm? What's the frequency here? It's a math equation. What's the end of the equation?

I know the number, and I might give you more of that. It's a long answer to your question. Wow. Well, I think that the science behind this, the technique behind this, the story of why somebody would even need treatment, I think that all come in, become important, I think.

One of the questions that I think I asked you before and has to do with, well, there's, you know, having a symptom, having a condition as such, it is a result of something.

It's a result of something traumatic. It's a result of something injurious, humor, whatever, you know, a stroke. Does doing TMS and say even standard TMS or even PRTMS, what's the benefit of treating something that has either genetic conditions to be that way and the frequency being affected or was as a result of something significant like trauma and even deep-seated complex trauma that happens even early in childhood.

How long and how much and what's been your experience with the outcomes in those cases? Well, a quick way to answer this would be talking about There's two models of how the brain operates.

One is the substrate model. The other is the frequency. Substrate is, what's the fuel supply? Is there enough sugar, enough oxygen, enough neurotransmitter to make these two neurons talk to each other?

That's fuel supply. The second thing is, what's the frequency? I know that I've got enough fuel supply, so is this neuron and that neuron on the same wavelength or not?

Is that walkie talkie and that walkie talkie on the same channel? If they're not, they don't talk to each other. I don't care how much fuel I have. I could have 50 gallons of gas or 1,000 gallons of gas on my gas tank.

If my timing's off, the timing's still off. And here we are changing like the fuel pumps and the fuel injectors and the fuel lines and the gas. The timing's off.

It doesn't matter how much fuel you have. Sometimes fuel is insufficient. You have to add fuel like a drug, like oxygen, like sugar. But oftentimes it's not.

So the focus of medicine has largely been, we'll add some substrate to it and fix it by throwing some neurotransmitter at this or something. And in some cases, that's helpful, but we want to fix the timing as well.

So it's kind of a way to separate the difference between those kinds of things. So having both chemical and electrical. Electro-physical, yeah. I mean, think of your heart being arrhythmic.

Autism, Development, and the Case for Personalization

and your brain being arrhythmic and how much better your heart feels when it's rhythmic and not arrhythmic. So when our heart palpitates, we have sort of changes in our beat.

It's not very effective. It's lost efficiency. A rhythmic system has more efficiency. That nice tight peak you see top to bottom and the people that are meditating is highly efficient.

Noise makes it inefficient. The more noise, the more inefficient. so you mentioned about I'm a veteran there we go good for you what's happening you were talking about medication and come to find out to use the therapy the medication has been putting a band-aid on a lot of the anxiety the depression that I've been suffering from And as I was going through therapy, the psychologist discovered that I have what you call chalbotrons that I was unaware of.

Joining the military, going into combat, it's based on Copadeng. So my question for you is about the sympathetic, parasympathetic nervous system. Is that related to the diagrams PRTMS?

relationship and as far as healing is concerned through that type of parasympathetic. Not exactly, meaning that the parasympathetic and the sort of adrenaline parts of our body and our brakes and our pedal are also part of the story, whether we have an acceleration or deceleration of those chemicals, right?

This is the mothership that controls everything. And if I'm oversampling, meaning I'm going, this is PTSD example, the blue box are all neurons going slow.

Should be flat line there. It's all going very slow and it's going fast in the red and the bands all over the field. So imagine a marching band doing this or doing this, right?

So this system has an imbalance. So you may have to give stimulants to wake the blue neurons up. and give sedatives to bring the fast neurons down. That's why you see polypharmacy, a mixture of stimulants and suppressants in a lot of our veterans, because they have both.

Because the problem is, when you give that drug to the band, they all get it, meaning they all get stimulant, whether they need it or not. The guys in the red box don't need stimulant, so they have to be sedated.

So chemical mediation and drug mediations is a fuel supply issue. So you're kind of giving another example of what fuel supply would be. Is there a positive or negative pull on that fuel?

What we're saying is that somewhere in the middle there of that marching band is this frequency. I want to pulse you there and make the slow neurons wake up and make the fast neurons go down simultaneously.

So depression goes down and anxiety goes down as well at the same time because you're making those neurons go back to the middle of the field and march in place.

I can't really feel as anxious If my brain loses the beta, loses the red box, if that area goes down, you don't feel as anxious, you don't sample your environment.

Another way to explain this is the frequency, which is left to right on this axis, this is zero hertz, this is 20 hertz. So two, three, four, five, six, seven, eight, 10 hertz, up to 20 hertz this way.

The frequency is how many times per second does your brain sample the environment? So if I'm sampling with you and talking on 15 hertz, I'm sampling at 15 times a second.

If I'm sampling 50 times a second, I'm hypervigilant. I'm oversampling it. If my motor planning area is going 50 times a second, I'm bouncing my leg like this.

I'm going to do something with the energy that's going too fast. So if it's too slow, the opposite, lack of interest in things, lack of ability or things of choice.

But yeah, you're bringing up what a lot of law doctors talk about as this parasympathetic system and so forth. Think of that still as a fuel issue. So how do you replace pharmacology?

I think it's a mixture. Yeah, I think it's a mixture. Yeah, I think it's a combination. I mean, of course, you know, lifestyle, functional health, sleep health, nutritional health may have an impact as well.

But yeah, I mean, what you've discussed as well is that medications tend to kind of lubricate the whole system and they may be lubricating the functional parts as well in a way that's not functional and really reducing that frequency when it shouldn't be in a very general way.

But I'm going to ask you the question I think that said this and that we asked me as well is when it comes to something like complex trauma that happens in early childhood or in early even before children are born or because you've taken care of children with autism as well.

And that impact, what is already present or not present if they don't have something like a good alpha frequency and not born with something like that.

What has been your experience with that? And as for your own child, right? That treatment that you were able to provide for your own child, what did you notice through that treatment that he received?

Well, I mean, my son had missed five, six, seven, eight-year-old development. So anyone here see Austin Powers, the movie? When he wakes up out of a deep freeze, and he's like in the 70s, and he's like, hey, baby.

And everyone's like, dude, it's like 20 years later. That's kind of what happens with these kids is that once you wake their brain up as a nine-year-old, he looked around the room like, who am I or who are you and where am I?

Like, there was this realization like, I'm now present, I'm awake and I'm wondering who you are. I recognize you, dad, but now that, you know, you've always, I've seen you before kind of thing.

The idea, I'm just coming out of this deep freeze. He missed five, six, seven, eight, nine-year-old development. Never happened. He was on the sideline the entire time.

So imagine taking a new kid and we need 365 every year for years to help train kids to have compassion and empathy and playful dates and things like this that they do.

Imagine not having any of that. Just missing it all. So there's some gaps there. So he kind of woke up and kind of had the mentality of a four or five-year-old.

where things kind of got in the right. And he caught up. And he's catching up. He's in college now. He's going to do an astronomy master or major. He's got like a 4.0. He's a crazy brilliant kid.

Now that we got him in the situation he's in now, it's amazing. I was very lucky. But he still has some of those social anxieties, and some of the things he missed, hard to make friendships still, and notices there's still some things he struggles with.

And he might always, because those never really occurred. Kind of like language. You take language away from a kid until they're 10, 12, and they may not ever speak well, or have a full language capacity.

Because that area was really receptive at a certain time for language, and they kind of missed it. So there's developmental milestones that are really required that you have to replace and catch up with.

Wow. In terms of pediatric patients and also the younger brain that's also developing and has had trauma, what would you say about the effect of something affecting development or affecting or improving those milestones with this sort of treatment?

Well, the brain propagates its signal from back to front. So as we're sitting here right now, we're constantly processing our world back to front. We see, we think, plan, judge.

We think, we see, we think, plan, judge. And that movie is showing autism, where the front of the brain's not listening. The back of the brain's saying, hey, I want to show you something.

I just saw something. And the front's saying, I'm up here sleeping. I'm at four hertz. My walkie talkie's on a four hertz channel. You're on 12. We are way off, right?

We're not close to each other. You've got to move that front wheel up and speed up that front brain to listen to the back brain. So in development, we develop our brains from back to front.

Little kids, three, five-year-olds, have nothing but a little wave in their visual system. They can see. Then they see in color. Then they motor plan, stumble around, play sports when they're a little bit older.

By the time they're about three to eight, you see the green leads filling in. The front's still off. All the social skills, attention span, those areas are still weak in these young kids.

By about nine to 12, you activate the front cortex in blue. Then it starts to develop into a wave. in our late teens. And the top two leads, attentive span and impulse control, are still weak in our 18 year olds.

This is a very neurotypical display of a kid who's doing great, but has a little bit of ADHD, those top leads being weak. So the brain is intoxicated from the front back.

So if we have one drink, we lose our attention span, and then our impulse control, and then our judgment, and then our motor planning, and then our vision.

So the system goes from back to front under stress and intoxication. It goes back, I'm sorry, front to back. It goes back to front during development.

Make sense? So if you interfere with a system right here and cause an inflammatory problem, like an MMR vaccine, for example, And this kid is at that stage, and I give it a big inflammatory problem.

It stops developing interiorly. And all of a sudden, this kid has autism. And all the haters are like, oh, you can't say that. Vaccines are only good.

I said, no, they're not. Kids have peanut allergies. They got bee sting allergies. And they got vaccine allergies, too. It happens. It can't be 100%. There are some kids that are sensitive to it.

Sorry. It happens. I've had parents tell me for years, kids look at the MMR, and the next day, stop talking. I'm like, oh, that was a random event? What do epigenetics have to do with this?

So epigenetics are a study of how the gene expression changes or doesn't change with various stimuli, meaning are we making more mRNA? Are we phosphorylating various parts of our transcription process or not?

So when you make protein and you make mRNA, that process is upregulated potentially if the gene's making more of it because it's being told to do so. For example, a four-hurt neuron becoming a 10-hurt neuron has to learn to be two and a half times faster every second.

You're going to change the epigenetics of the system. It's got to build more mitochondria. It's got to build more electron transport chain or more ATP stores.

It can't just go 10 times a second on itself. So when I pulse you and say, but I'm going to make you do it, it's Oscar, right? Cedric, close. So Cedric, it's like, so I would place it on the head and I say, I'm going to make you go 10.0. The neuron's like, I'm a four-hurt neuron.

I'm only built for four. Why am I making you go 10 right now? The neuron has to be 10 times a second, because I'm making it do it. I'm depolarizing its membrane 10 times a second.

And after I do that, it goes, oh, no, no, no, no. I'm going to go back over here and lay down. I'm not built for that. Yes, you are. I'm your trainer.

You're going to lift this weight. If I push you and make you lift that weight, then the system says, I've got to build more amount of conduct to do this.

My genetics will turn on and say, I've got to start ramping up. This guy, this crazy guy, he keeps giving me a 10-hurt frequency, and I'm not built for that.

So what does it do? It goes, I'll go to five. I'll ramp up to five. I'll go 20% faster. And then a week later, I'll go to six. I'll go to seven. So the ways on the left will take me weeks to sort of gradually bring to the center because they're needing to change their epigenetic makeup.

The anxiety ones on the right side that are going 30 times a second don't need that. You will change gene expression, but a 30-hurt neuron becoming a 10-hurt neuron is an easy equation.

30,000-foot airplane going to 10,000 feet is easy. Going from the ground up to 10,000 feet is the hard part, right? You're going to move a lot more energy to get that system up.

But if you're going 30 hertz, the brain's like, I can go 30 hertz. 10 is a joke. I'll easily go down to that level. I'm built for 30. I'll do 10. Make sense?

So because of that, clinically, you see anxiety go down first. It will treat patients. And anybody who's been treated here, the first thing you're going to notice in the first week is your anxiety goes down.

Because the 30-hurt neurons become 20-hurt and 10-hurt neurons. If I have 30 hurt neurons, I'm sampling my world 30 times a second, then my pain's worse, my perseveration's worse, my worry is worse.

Everything is going to be over-sampled. It's in my auditory processing, I'm ringing in my ears, or I'm noise sensitive. Motor planning, I'm fidgety, right?

It's over-sampling the environment. It's going in beta, right? Yeah, because I noticed I've had five treatments so far,

TMS. And it was the ERTMSL. And what I noticed today driving here, traffic was really bad.

And I had the impulse just laying on my arm because somebody wasn't moving when the light was green. And I was able to kind of resist that. And that's something that's kind of different for me.

So I do believe that that might be the results of the TNS. And I would see if you listen over the last three or four sessions. Yeah, think of millions of neurons that were going too fast being slowed down in your impulse control area.

You're less impulsive, right? So it'll help you with that. And you'll notice that it's not, you can't fake it. Like your brain's not as anxious. You'll laugh when someone cuts you off next time going, You must be in a hurry.

That person might be in a hurry. Maybe their wife is pregnant and delivering a baby and this, I don't know what's going on, but go ahead. I saw the different conditions, but a different thing to be.

I was born with schizophrenia. This has anything to do with is it could help in that. TMS is being used for psychotic disorders. I think it's a great tool.

It's a tough patient base to take care of because they're oftentimes on lots of medications too. When I see a brain pattern like this, I'm seeing your brain plus your meds, meaning that's your brain on meds.

Oftentimes we don't get a clean view because someone's always on something when they come in. So in medication management or for psychosis, a lot of these drugs cause some really aberrant looking brainwave patterns.

And I can't tell whether it's the drug doing it or is it your native pattern. It's a mixture of both. So sometimes it's not as easy to read or to treat.

So that goes back to the drug question in general. I think that we need to manage the substrate but also the frequency. And so oftentimes our patients will reduce their use for certain drugs.

They'll need less stimulant, they'll need less of a sedative. The first thing we see, we take off our anxiolytics. So if I start to bring that brainwave down, you don't need the same anxiolytic.

the anti-anxiety medication. Which goes to the point, right, about why some of the psychiatric medications are seizure medications. Yeah, they're anti-seizures.

A seizure is an abnormal rhythm and here we're treating psychosis or our second or third line treatments for depression or mood disabilities with seizure medications.

Medication, Psychedelics, and Brain Rhythm

for the same kind of explanation, but very broadly and not really localizing it for any one particular abnormal rhythm in one particular network, you're really focusing on treating just the whole system and broadening it in that way.

But it does reduce the inflammatory-like pattern that is present in the EEG if you can see when you see it as such. One thing I think you're going to see happen more, and you'll see this in your practice, is that a lot of the loathing that people have about their own behavior is reduced when they see their own brain pattern, meaning certain brain patterns predict behaviors, whether you like it or not.

So it's not your fault if the brain's not performing. If our knee was not performing, we wouldn't blame you. We'd say it's broken. When the brain's not performing, people internalize that and blame themselves, right?

So here's an example of addiction. This is a patient, again, this is the patient that's been treated that has a nice waveform. Look at the top two leads in blue.

The first one's attention span. The next one's impulse control. So let me show you a kid with addiction. No attention span and no impulse control. None.

So how could that kid possibly pay attention? That's what he's starting with. Right behind it in the blue, that's anxiety. He's anxious and he can't pay attention.

Right below that is judgment and planning. He's not judging very well. He's not planning very well. And he's also fidgety. So I got a fidgety kid who has poor judgment, who's got prefrontal anxiety and his attention deficit and impulsive.

That's a set of prediction because it's not working. He's looking at this therapist saying, you don't get it. This thing up here is not performing. I don't have those waves doing that work.

It's impossible. And you see that and you see these kids kind of take a big breath and go, this is not my fault. Finally, someone showed me that my brain's not working properly, right?

If I don't change those waveforms, I don't change the behavior. I want to self-medicate, too, if I have that brain pattern. I need a stimulant to wake up, and then I need to set it to go to sleep.

I can't perform otherwise. So they're stuck with having to try and do it themselves. What can I get my hands on? He's 16, he gets his hands on stuff. He was a spectrum kid who now at 16, now he's a drug seeking and now he's got addiction.

He's trying to self-medicate a brain that never was operating properly. And I think what you see is they'll look at you and say, wow, thank you for showing me.

Dad, see, I told you I couldn't pay attention. It's not my fault. And it's true. And when you're like, yeah, I mean, sure enough. It's not you. It's funny.

You're absolutely right about how we think of the brain. We think of it as a black box. And you're either faking it, or you don't need to, or you can change.

If you really try, you're lazy. We tend to demonize the behaviors that are really coming from that black box, but really like looking at it and really seeing it, it really changes how you feel about yourself, right?

How you feel in the things that we can do to adjust that and that tuning, that re-tuning that I think can be really done. There's techniques to look at that and you don't have to necessarily just use medication.

I'm curious about, of course, ketamine and psychedelics and the effect that ketamine or psychedelics can have with something like TMS. What has been your experience?

Of course, we know the combination of ketamine and TMS and RTMS. There's good outcome and durability of response because, again, that neuromodulation is happening, there is that BDNF factor.

You're actually increasing or enhancing regenerative growth, both with medicine and, of course, with stimulation. But in terms of how the difference you would see with personalized CMS, where we're doing lower frequencies and we're really focusing on areas of change that continues to evolve, what would be your experience with that?

So most of the psychedelics that I've seen on our EEGs have kind of flattened the waveform and created a polypharmacy look. And it can sedate the patient temporarily, but it won't build an alpha wave per se.

It might be a necessary step to get the patient to a stable place, then do PRTMS. I think they should be done in sequence, by my choice. So we don't have two things happening at once.

If you look at polypharmacy, it looks like this. This is the brain getting stimulants and suppressants. Polypharmacy,

polypharmacy. Now by polypharmacy, these are people that are coming in on four or five beds.

But you can't read a brainwave. Now, it doesn't mean that they may not have had some benefit from some of the psychotropics or delics trying to get them in a more stable place.

But then I'd want to go in and make this into a rhythm and say, let's put you back to square and try and get that resonating as a rhythm. Because there's that capacity to regenerate.

Yeah, there's possibilities that you're increasing dendritic arborization and maturation of some stem cells and things like this by some of these pharmacokinetics.

So again, it doesn't mean that we think meds are bad and we don't use them. I think we need a mixture. And that's where you come in as the expert saying, let's try a little bit of that, let's try some of that, and let's do this therapy.

And then we can wean you off some things too. So you get as close to the ideal state as possible. So thirdly. Yeah. Depends on what you do. So the number one thing that determines whether this will stick like that is what you do when you leave my office.

Number one thing. I always tell patients, it's your head and your body and your brain and your life and you do your thing. For example, I treat UFC fighters and they go back and get kicked in the head and fight for months and come back and go, you know, we've worked for a while, but it didn't stop working.

I'm like, well, maybe it was getting kicked in the head 50 times. That could be it too. Let's talk about that issue. Maybe you should stop doing that.

So some of that is just, it's true. It's real behavioral change. Or they keep medicating or keep staying on the night shift. Night shift is brutal. If any of you here are on the night shift, change your job.

Change your job. I've had firemen go, that's my thing. I said, well, you're in my office though. and you can't get out your own way and you're horribly depressed.

Well, that's my career. I said, but it's the wrong career then. Do what you're doing because you're not going to get your brain fixed by being up all night.

Rhythmic sleep is one of the best things you can do for yourself. Morning sunlight, nighttime bedtime, nine, 30, 10 o'clock. I think I'm definitely going to institute that as a policy now in terms of that seven to nine a.m.

even from my own self and practicing that, you know, getting to that circadian rhythm and really matching your rhythm with natural and natural light. We tend to see a lot of sleep problems, both in adults and children.

And we'll get to you, Dr. Mr. Khan. But I think it's important to address the functional aspect of healing, right? I mean, there is a result, there's an insult that's happened in the brain.

and the nervous system and that can be healed, but really there we have to be able to recuperate and integrate and really sleep better, eat better, which is very simple.

A lot of patients say, you know, it's really just about being present with oneself and staying present with oneself, which is so hard as we step out of here and go in our inner our regular lives and so much distractibility.

So, Mr. Khan. I was just wondering, in terms of your study, two questions. First one is, how much ethnicity, culture, and environment have an impact on the study of the sample in which you're done?

And the second one is, what's the delta between female and a male in that sort of subset? We saw the development of the brain from a child to an 18-year-old.

There's no question girls are faster than boys. Girls develop that front cortex by 18. Boys do not. If they do, they're precocious. You'll see a little kid sometimes who comes in like a little old man who's 10 years old and is talking like a little man.

They got a full-form front cortex. Whenever I would see that, I'd like, cut your brain skin. And then sure enough, they're all turned on. They're not supposed to be 10 years old, but they're like right there with everybody else.

And they talk to older people. They don't feel comfortable with their own age group. You see it sometimes, and they're precocious. And that front cortex is building.

Men are about 21, 25 or so before you see those front leads turn on. Attention span and impulse control. Ethnicity, we have a center in Chennai, India, and Bangalore.

Same outcomes as here. Same kind of outcomes as anywhere I've looked at. We're in Vancouver, Saudi, Vienna, Austria, various places. And really, the beauty of this is the anatomy argument that we made when I first started is that it's agnostic.

Is the brain operating or not? It's like your heart anatomy, again, amongst different ethnicities is the same. We operate the same way. You treat the same arrhythmia in the heart, whether they're of any race or ethnicity.

Same thing with the brain. That's what I see. I would like to challenge that because, you know, I think, you know, when we talk about different cultures and the different mannerisms, we talk about neuronal priming early on, that the child can see what the mother is feeling, right, and just by the visual.

And that can be variable. I mean, from one culture to the next to how, you know, how love is expressed or how joy is expressed can be variable in different cultures and different practices.

Sleep, Light, and Lifestyle for Brain Health

And I would imagine that child, that old soul type of child has probably been exposed to something like that or that environment is there to really I think the nurture nature thing is what you're saying.

There's no doubt that nurturing matters. That that same child in a different environment may not have as much of a fun cortex developed. There's no doubt.

But it's also just an innate genetic reason where this kid developed quicker, had better access to nutrition maybe. Could have been a whole bunch of reasons why, but they did.

And it's not deniable when you see those kids. It's really fun to do their EEGs. I mean, if you even just think about eating disorders, you know, coming back to the United States after living 10 years overseas, I was shocked actually at the complexity of mental health conditions and the degree and the acuity, the ERs being full.

Suicidality and suicide attempts have increased dramatically. And I really do feel it has a lot to do with nutrition and the way people are living. And that has an impact on mental health.

I mean, eating disorders in general, just even micronutrient deficiencies can lead to so much dysregulation. And it's very subtle. And I would imagine, again, when we talk about root cause to something that leads to that type of brainwave patterning, I think we still have to circle back into to treat the root cause or to really think about that root cause or the conditions that person is responding to.

And I think even in treatment of any kind, asking like, what is it like for you when you go home? Because you may have to go back to that same sort of situation, I would imagine.

That's a key element. If you're living in a PTSD environment, we can fix your brain here, and you'll leave it in the same environment. We're not going to change your outcome.

So you have to change, again, what you're doing and the exposures you're having. Let us tune your brain, but then go back and damage the brain and get kickboxed again.

You know, I mean, so that's kind of the thing that I think you're getting to that there's, of course, there's a psychosocial element. There's a behavioral element that has to be corrected.

But this gives you a chance to start somewhere when you fix the brainwave pattern, at least gives the person the opportunity to want to kind of start over and reboot, so to speak.

And I'd also like to talk a little bit about the flow state, like what that flow state feels like. What does it emotionally feel like? What is that access to sometimes that meditation or prayer, you know, to the higher consciousness?

Have you been able to see that with these sort of treatments where people are able to really connect to some deeper parts of their world or their practices or their spirituality?

Well, I think that the coherent pattern you see with less noise begets all those things you just mentioned. You can get to those places easier if there's not noise.

The problem that most people have with meditation is that they have a lot of other distractions and noise and the pinball is bouncing around the head.

I can't. Go to a quiet mind. and be receptive, because I'm thinking of breakfast, and I'm thinking of what I have to do tomorrow, and I'm worrying about so-and-so.

And so those things are distractions. So the lack of distractions is what we're showing you. When that perfect meditator goes like this, she has no distractions.

Every area is saying, we're just sitting here, we're all in the same frequency waiting for a command. We're quiet. We're waiting for a command. That's what you want.

And then that's the state, I think, that gets you to the flow state. If you look at my yogis and look at my transcendental people I've done and my patients that do channeling and all these things, they have coherent tight single file pattern brains.

They know how to get there. My athletes that are super good have beautiful looking brains. They're very coherent, especially my long distance swimmers and my runners that get like that high, that natural sort of like runner's high or they're called, you know, they're in the zone.

They practice being in the zone. And that's the zone is what we're showing you. The zone is the athletic form of meditation, being locked in, no distractions.

When you drive and you pass five exits, you go, oh my God, was I watching the road? I passed five exits. We all have done that right before. You're going in that alpha state.

It's actually a very efficient state, but it's kind of a near meditative state. But that's the place you get needed to get to where you have those experiences.

Fascinating, I think, because when we're talking about maintaining that, again, that practice becomes even more vital, right? to maintain that tuned state and having, you know, resources to support that even outside of treatment, I think.

Any other questions in the audience? Yeah, I was hoping to speak a little bit more about the duration of treatment, like how frequent, how often, like when are they going to be, like, eaten at lunch or at breakfast?

So we treat generally daily five days a week for five to six, six, seven weeks, autism three or four months. So it

depends on the state and on their medication use and on their compliance and a lot of things, you know.

What you have to remove is an inflammatory process. So if they have a known inflammatory gut, that's not going to work very well. 26 feet of gut, setting inflammatory cytokines in your brain every day.

So you've got to fix gut health in most of these young people who have bad gut health. Leaky gut is a problem. You don't absorb A, D, E, and K. You have neurotoxic elements getting in your bloodstream.

So leaky gut is a huge problem. And we deforest the gut in these kids by giving them antibiotics, and they've got no proper gut flora, and they get leaky gut syndrome.

And now they're stuck on two food groups, and they'll eat chicken nuggets and, you know, one other thing or something, right? Because if you see any kid who's a picky eater, or off the bat, start considering there's a gut problem.

and say, let's best balance your gut first. That'd be my first step. And the other inflammatory other issues like COVID brain, Lyme's disease. I mean, there's things that we get, other viral infections, and they flatten your brainwaves out.

And you feel it developing in feverish and feel like crap and your brain is not working and you know it's not working. And then there's some permanent deficits that occur in patients like with long term COVID.

And I have examples of their brain, it's flat. I want to mention another health thing before we finish. I say this for the end because I oftentimes get the questions like, what can I do?

You told me all this stuff and now I need to go home. What do I do now? Sleep. So the best thing you can possibly do is find ways to sleep better. And the way you'd start that process is by getting natural light exposure.

no contacts, no glasses, no window, outside in the ambient light. All of your ancestors for the last eons, I mean, a thousand generations got natural light from the same star at the same time of day and it trained their brain and the retina and the genes in that area to respond to light frequency.

And it just is. You can't fake it and you can't get around it and you can't fight it. That's why night watch doesn't work. The light therapy we get in blue is this nanometer of light that's about 450 nanometer and it occurs between seven to nine.

Once a day you get this. It also occurs at twilight and you'll naturally want twilight light if you can help put your sunglasses on in the evening. Same blue light, you don't want it then, you want it in the morning.

The reason why you want blue light is because it hits your retina and says, hey, it's eight o'clock, it's 8.15, it's 8.30. I'm telling you what time it is because of the frequency of the light outside.

And what's that tell your body to do? Wake up. Turn on your basal metabolic rate. Increase your heart rate. Fix your HP axis. TSH, FSH, LH, all those things turn on with light.

Hormones are activated by light. And you suppress one hormone called melatonin. It goes down with light. That's why light wakes you up. You lose your sleepy pill.

Melatonin's your sleepy hormone. Everything else is activated. After you suppress melatonin, The melatonin starts to wear, that suppression wears off and 12 hours later you start peaking with melatonin at 9, 9, 10, 30 at night.

That's 12 and a half hours for humans after light exposure. You'll start making a burst of melatonin. That's when you're supposed to go to sleep. Your body's saying, here's your chance in the red box.

You got about an hour, and you better take advantage of it. And if you do go to bed when you're sleepy and groggy

like a puppy, like little kids do, then you're gonna go to deep sleep.

I'll put you in deep sleep using melatonin. I'll knock you down with that three, four hertz for a couple hours and give you some real restful sleep. If you don't take advantage of that, you get your second wind, you're over here, you're screwed.

It's one o'clock, I'm wide awake. brain. I was so tired three hours ago. How could it be so wide awake right now at one o'clock in the morning? Because the brain said you had your chance.

I gave it to you about three hours ago and you said no.

Q&A and Closing Reflections

So you get one chance every 24 hours. So I'll see you tomorrow, get light, and we'll talk 12 hours from then. There you go. You get your one chance. And you want to take advantage of it.

If you supplant it with your own, and a lot of things are activated by light, sleep, wake, cycle, feeding behavior, autonomic system, cortisol, a lot of things.

Light equals this sort of effect. And if you supplant it with melatonin, you suppress your own production. So a lot of people are giving up melatonin like it's candy.

and you're making the wave you have go lower. So the ability for your body to make it is being suppressed because it's hormone as a negative feedback loop.

So my age, 57, you can take it because I'm not making very much. I'm down here already. That's why older people don't sleep as well. They lose their deep sleep, and it's how your brain ages.

So if your brain is saying, look, last night, I only got 30 minutes of that deep sleep. I can't go to 10 hertz today. I'm going to go to nine. If you mess with me, I'll go to eight.

Remember, under trauma, I go slower. And that's how our brains age and how we go left into sleep. So to fight that, you want to really take that seriously and get rhythmic sleep, morning sunlight for an hour.

Not the sun, but the light. So the shade is fine. Sit on your patio and make your outdoor activities, eight to nine, no contact lenses, no glass of light, no window blocking it.

Got to be in the ambient light. I thank you. I think I love how you brought back two words, the body. The body is the most intelligent machine, I think.

As a former engineer myself, when I first started studying medicine from an engineering mindset, I was fascinated by what the body can do and already does better than any machine or any computer, even to this day.

I think it has the capacity to really recover and to really heal. But it knows. It knows what to do, as you described. Even in the dysfunction, it knows what it needs to do to slow things down or speed things up because it has to be in that state.

for whatever reason, again, that becomes a dysregulated state, but it can recover. And I don't think there's any human or any machine to this day that I know that can really do that at the microscopic level and at the cellular level, right?

So thank you. Thank you for bringing back to the intelligence of the body itself. Thank you. Any other questions? I think this has been great to have you and to really explain something so complex, which really makes a lot of sense.

I think the way you brought in the math and the science and really put something together that's, I think, very, very novel. And I think it will change the way we're treating patients as well.

And I think in a larger context, I think when you heal one person, you heal another and you heal another and you hear another. And I think that's the That's the most important part of this.

And I want to say, and I want to end with one thing that I've learned from a patient. When I see something special, I have to call it out. A patient said that to me.

She said, you are special, and you need to know that. And I said, OK, thank you. But no, no, you have to now tell that to somebody else when you see them special.

Thank you, Dr. Murphy. You are special, and you need to know that. Amazing, amazing work that you've been doing. Thank you so much for sharing that with us today.

Yep, thank you very much. Thanks for all their attention. Good questions. Thank you for tuning in to Doctor Talks. We hope today's episode has enlightened and inspired you on your path to optimal health.

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