Boost Brain Health: Your Sleep Defense Against Alzheimer's Transcript

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Introduction to Alzheimeru2019s and Sleep

Welcome again to the Sleep Deep Summit. New Approaches In Treating Sleep Apnea And Insomnia. I'm your host, Dr. Audrey Wells. And our next speaker has some phenomenal information about anyone who is dealing with Alzheimer's disease or is worried about dementia in their future.

Dr. Heather Sandison is the founder of the Solcere Health Clinic and Marama, which is the first residential care facility for the elderly anywhere in the world.

And today we're going to talk about how Alzheimer's disease relates to sleep. Welcome, Dr. Sandison. Thanks so much for having me. I want to get started with the concept that Alzheimer's disease actually can be prevented with certain lifestyle practices, with diet.

I wonder if you can explain to the audience how that might happen. Because this is great news. It makes me feel empowered for sure. Yeah, it's exciting.

And so Marama is the first residential care facility for the elderly of its kind. And part of what it is, is it's an immersive experience in this approach, in this lifestyle based approach to both prevent and even reverse dementia.

So what we saw, what I saw in my clinical practice was people getting better. And I had been told, you know, throughout my entire education and through some of my career that there was nothing you could do to help people with Alzheimer's.

It was just a downhill slide to the end of life and get your affairs in order. There's there's nothing we can do. And then when I was trained by Dr. Bredesen and I started seeing people get better, I realized that that wasn't accurate and that there was actually a lot of hope in this space and seeing really advanced cases of Alzheimer's improve.

Lifestyle Approaches to Preventing Dementia

Made me think, Oh, my gosh, what about everybody who has an advanced this far, everybody who's in that prevention stage or in that early stage of cognitive decline?

Like what's possible for them. And that's been really, really exciting. So we were able to published in the Journal of Alzheimer's Disease in August of 2023, a trial, a prospective trial where we took 23 participants through a six month intervention that included changes in diet changes and exercise changes and stress management strategies, and certainly a prioritization of sleep and high quality sleep.

So I know we're going to get into the details of that, but just to kind of set the stage. I want everyone to know that when people have mild cognitive impairment, even moderate cognitive impairment, they about 74% of the time was how often we were able to show measurable improvement.

So 17 out of these 23 participants with measurable cognitive impairment had measurable improvement. After six months of this intervention. That's incredible.

And I think that, you know, it's really reassuring that something can be done to reverse that cognitive decline, because it's one of the scariest things I can think of about aging.

And I've certainly had these experiences in my sleep practice where somebody has some measurable cognitive decline, and then if I can correct their sleep or treat their sleep disorder, they see improvements and they're really happy about it.

So, Dr. Wells, just in this past year, I've had two patients that I want to share these stories because it's just so compelling. We use a MOCA square.

This is the Montreal Cognitive Assessment to put a number on someone's the degree of someone's cognitive decline or cognitive impairment. And a perfect score is 30. It's a worksheet.

Some of you may have seen this one page worksheet where you identify zoo animals and you draw a clock and you copy a box and tell the person administering it you know where you are and what day of the week it is.

And this 30 point questionnaire or worksheet, it's normal if you get a 26 and above, so you can get a few of these wrong and still have normal cognition.

But once you start to get down into those low twenties, down into the teens, this is measurable cognitive impairment. And I had two women who came into my office in the past year with MOCA, scores of eight.

So this is significant cognitive impairment diagnosed Alzheimer's. And these are women who are dependent on their loved ones to get places right. They're not driving anymore.

Certainly they're not cooking for themselves. They're probably not doing their own laundry. Maybe they can fold the sheets, the poles, but they're not doing any complex task around the house, including cooking for themselves, feeding themselves.

Maybe they're getting dressed on their own. Maybe they're going to the bathroom on their own. It's hard to carry on a conversation. There's short term memory loss.

There's there's it's hard to conceptualize. And certainly executive function as being is being affected here. And both of those women came back after 6 to 9 months and had significant improvements.

And even one of them had a MOCA square jump from 8 to 16, more than double, and the other went from 8 to 15 about the same. And both of them started using their CPAPS Both had got diagnosed with sleep apnea, started an intervention.

Sleep Apnea, Cognitive Decline, and CPAP

And I think that that was one of the biggest things that they did, although both of them changed their diet, they didn't do this drastic change in diet.

They both got started on bioidentical hormones. They both got started on other supplements. It wasn't just the the treatment of sleep apnea alone, but that was certainly, I think, one of the biggest components and why they were able to make such a big jump even when they had such a progressive disease.

And it was really this wakeup call to me that when I saw that, I started testing every single cognitive impairment patient for sleep apnea. That's a really smart thing to do because I think sleep apnea is so much more common than people realize.

And I like to highlight it as a breathing disorder, even more than a sleep disorder, because that makes it more of an emergency. If you if you like to think of, you know, keeping your oxygen levels in the normal range, that is what is disruptive to sleep.

And it turns out breathing is really important, even if you're unconscious in sleep. So I love that story and it's something that I've seen a lot. Once you correct the breathing, let somebody oxygenate during sleep, let them sleep better.

The brain can respond in a in a way that's healing. That's such an interesting perspective and a great way to share it. Right. We all think, oh, we can do without some sleep.

We can mist and sleep here and there. But if you say breathing, we all get that like you die if you don't breathe. Both of these women, I'll say they were not the stereotypical sleep apnea patients.

They were thin. They were relatively active. Nobody said that they snored. They were not classic, you know, male, overweight, snoring patients. They just didn't have that look or that that when I was doing my intake, they didn't scream sleep apnea, but it made a massive difference.

And so maybe I mean, I'm sure you've spoken to that. It's like it's there's not a typical sleep apnea patient in my mind anymore. There's a lot of research now to look at different endo types or kind of pictures of what sleep apnea is.

And, you know, the fact that some of the screening questionnaires ask are, you know, are you male, are you overweight? Do you have a big neck? I think puts in people's mind what a typical sleep apnea patient is.

I like to highlight that 20% of people with sleep apnea do not have an issue with their weight. And age is the second biggest risk factor after weight.

So especially after menopause, women become more susceptible to problems with sleep apnea and unfortunately, home sleep apnea testing nowadays is not always able to pick up sleep apnea or even characterize the severity appropriately.

In other words, it might underestimate severity. So I'm really happy to hear that, you know, these these women that you treat are able to get CPAP and use it for their sleep quality because it can turn things around.

Thank you for sharing that. Yeah, measurably. I mean, one of these women, she came in with her son and when he came back, he was describing, you know, he'd been really upset, of course, about his mom's trajectory and it was really impactful on his life.

He had a super flexible work schedule because she was so dependent on him. It's just the two of them. And he remembered her, you know, cooking for him and when they were living together.

And he was really sad that, like, at least my mom used to cook for me and help me out. And of course, she cooked for him growing up and then I saw them back.

He who was like, you wouldn't believe what happened last night. She got a carrot from the refrigerator. She got the carrot peeler out of the drawer. Then she peeled the carrot, sliced it up, put the carrot peeler in the dishwasher.

And she, like she had she didn't cook a full meal, but she had gone through these steps and in the kitchen. And this was the he was in tears around this because this was his mom cooking.

And even though it wasn't the same as it had been, it was progression in the right direction. And he also was just sharing how in the grocery store as she meets people's eye, you know, she makes eye contact and she'll have a conversation and ask people how they're doing. And he concluded with like, I've got my mom back and that is such a powerful experience and so important.

And I just think of all the people who aren't taking the step to get that sleep study done or to get the the other testing that can show us why there might be cognitive decline happening instead of resigning yourself to like, okay, we're on the downhill slide.

This is going to be rough. There's more that you can do. And this sleep testing, I think is really paramount in that. It's such an important message to give people this hope, because one of the problems with dementia is you're kind of losing who you are and that's super scary.

So if you're able to recover that and not only get your health back, but it feels like you get more time back in the person that you think of yourself as or the person that relates to family members.

You know, I, I love seeing that in sleep medicine. It's one of the most gratifying things to help somebody feel more like themselves by being more awake because they're sleeping with better health.

You know, I wonder in your line of work, you probably see a lot of folks who have insomnia as well. Mean how does that. Yeah. Population in a stress, right.

Like why are people not sleeping? There's a lot of different reasons. I'm sure you've discussed that. But also stress and long term sleep deprivation.

Sleep Changes With Age and Menopause

So I work with, you know, some CEOs and, you know, executive level people who have spent a lot of time depriving themselves of sleep because it's like, okay, I can sleep when I die.

I can sleep when this project's over. And so they defer sleep. And we know from the science that even people in their twenties, thirties and forties, just one night of sleep deprivation, how has the impact of measurable accumulation of beating amyloid in the brain?

And so it's really important that we don't let that accumulate over decades. Now it's normal for all of us to be making beta amyloid. I think there's been a mischaracterized characterization of these misfolded proteins.

They are they're they're antimicrobial. They're there to protect us. They become a problem when too much is formed, right. When there's too much to protect yourself against, when you're having to attack and defend constantly and you don't get enough sleep where you get that gland static or rinsing of the brain, then you you end up with accumulation that can lead to structural damage and of course can lead to cognitive decline over time.

We've all had the experience of being jetlagged or of, you know, staying up and pulling an all nighter to study for an exam or something and feeling horrible and like our brain doesn't work and having to recover from that.

Now, if you put you accumulate that over decades, it just gets worse and worse and turns into something that you can't recover from. You know, I like to think of it as every night of sleep is like a vote for who you're going to be in the future.

So if you have a positive vote with a good night's sleep, that can definitely affect the last ten years of your life. If you keep voting that way over time and the reverse is true, if you're having these negative votes accumulate because of sleep deprivation, then the last ten years of your life may be made more difficult as a result.

That's, you know, a great explanation of the beta amyloid protein. And I've seen the research on that. Even in young people with a bit of sleep deprivation, you can start to measure for that beta amyloid.

And I hope that that is a message that people can really let land on them, that sleep is that important. Yeah, it really is so crucially important. And I know you mentioned how sleep naturally changes with age.

And I actually I'm I don't mean to turn the interview around on you, but I want to learn today and this time that I have with you, like, how does sleep change with age?

You mentioned that post-menopausal women have a have a different risk profile. And I'm in my mind, I'm like, okay, is it because of the hormones do something, the muscle laxity?

So like, I just would love to pick your brain for a minute about how, you know, what the physiology does as we age and what we can do to to support people getting good sleep as they grow older.

Yeah, you may know that I'm a little bit particular to women because I am a card carrying member of that group. You know, a woman, a woman sleep over the course of her lifetime changes a lot.

And it's multifactorial, of course. But when a woman goes through menopause, there is a change in sex related hormones that affect the way she sleeps.

And aging is a factor, too. Just the tissue laxity can really impact how the airway closes or opens during sleep. And so it's a combination of factors that kind of accumulate around that menopausal stage to lead to poorer sleep, not the least of which is the hot flushes that are associated with menopause.

But, you know, when you look at sleep over the course of your life and especially in adulthood, you establish how much sleep you need at around 25 years old, when the brain stops developing.

And that is the amount of sleep that you need to function well for the rest of your life. So I think a common myth is that older people don't need as much sleep is that's something that you have.

Certainly heard that. And I think it's it's harder for them to get the sleep they need. That's exactly right. So it's tougher for older individuals to maintain sleep, but they still need the same amount of sleep that they did back in their mid-twenties.

And another thing is older people seem to tolerate sleep loss better than when they were younger. So it doesn't tend to be as symptomatic as before. And that's not to say it's not just as frustrating, but people tend to have some advance in their sleep schedules or they're going to bed earlier.

Early morning awakenings tend to be more frequent and longer with some frustration and getting back to sleep. But you know, as much as folks can support the methods, the lifestyle practices, that light exposure, that points toward healthy sleep, the better off they'll be.

And I'm sure that this is addressed in your lifestyle program. Yeah, absolutely. And even just you know, hearing you say that, that was validating because we use progesterone.

Progesterone is a hormone that cycling women make plenty of. And this is part of why sleep deprivation becomes an issue. Yes, the hot flashes which are caused by a drop in estrogen, but replacing with bioidentical hormones is does help women's sleep significantly as they go through menopause.

And even on the other end, I always ask the woman, you know, are you having trouble with sleep when we're trying to figure out how to do her hormone replacement?

Because oral progesterone can make people drowsy and help them get to sleep. And this it's a it's involved in the gather pathways and that's, you know, Ambien and clonazepam.

Some of these benzodiazepines are also using that GABA pathway, you well know. But those are really hard on our brain, whereas progesterone, which can give us some of that same sleep benefit, that's actually helpful for our brain.

It's one of these hormones that we have receptors in our brain for both estrogen and progesterone. And when they drop, women also often experience cognitive changes along with the sleep changes.

And it's kind of a chicken and the egg, right, as a sleep that's causing me to not be able to think. Right. Or is it the hormones themselves? But often replacing them is very, very helpful.

And then lifestyle wise, yeah, we're we're always talking about kind of this bedtime routine. And what is your environment in your bedroom look like? Light, sound, temperature.

There's so many factors that we can think through. And then, of course, you know, what are you doing with your time?

Improving Sleep With Routines and Supplements

Are you watching the news about war and across the world or are you watching something peaceful and calming? Are you even watching anything or you may be reading instead?

Do you have a prayer or meditation practice before bed? Everyone has a nighttime routine, right? We all brush our teeth, hopefully, and put on some pajamas and get into bed.

But that that nighttime routine can be, you know, a minute long. Or we can add, I think, of this as anchoring to what we already do. Right? We already have these habits.

At the end of the day. So how can we anchor additional healthy habits to them? This can help with behavior change. It's like, okay, if every time I brush my teeth or take that medication, I'm also going to do a ten minute meditation or I'm also going to get do a, you know, read the Bible, whatever it is that that appeals to you.

If we can anchor these behaviors to that last thing we do at night, we can often optimize our sleep totally. And I think that, you know, when people describe sleep problems, there's either a brain issue or a body issue.

So with the brain, it's like monkey mind that's bouncing around agitation, can't get to sleep. And from a physical body perspective, there can be issues like pain, discomfort in some way.

Agitation in the body exists as well. What are some of the techniques that you use for people who have difficulty with getting to sleep or getting back to sleep in the middle of the night?

Yeah, depending on what's happening, I think of. And of course you're the you're the expert here, but I'll tell you what I do, and you can cry when you go or add to it.

So if someone's having trouble getting to sleep, I think about progesterone, if they're female, melatonin, magnesium. And then there's there's lots of helpful herbs that also come up.

And then some of the other amino acids are GABA or CNN taurine glycine, some of these calming amino acids and that that can help with falling to sleep if someone is having trouble staying asleep.

I ask a little bit about what's going on. Like, do they have any idea why do they they they wake up ruminating and worried. Do they wake up kind of with startled almost.

And if there's a lot of stress, I think of Phosphatidylserine as something as a as a supplement that people can add. Phosphatidylserine helps us to break down cortisol.

And so if we take it before bed, the hope is that you won't hit that threshold of cortisol rising that will wake you up until morning. And then the other thing that I find can help some people is five HTP for serotonin.

It can help support some serotonin in the brain and help sustain sleep. I think of melatonin as helping us get to sleep. And and serotonin has been somewhat helpful in sustaining sleep, particularly if it drops too low.

So using amino acids, for the most part, I think of a safe and an effective often if you can get the right one and they're not too expensive to try. If you are on on an SSRI, if you are on a mood stabilizing medication, then five HTP is something you'd want to discuss with your doctor.

But those things can help along with, you know, a warm bath before bed and setting up the environment so that you're not disturbed as much as possible.

All good tips. And, you know, if I could wave a magic wand and fix one sleep problem, it would be those middle of the night awakenings because they're so frustrating.

And, you know, for anyone who would like kind of a back story on that, one of the reasons it's so hard to get back to sleep is because you've already satisfied some of your sleep need in the first half of the night.

So you're not as hungry for sleep, so to speak. And oftentimes, you know, it can be entirely normal to have a brief awakening. So it takes about 3 to 5 minutes to really be cognizant of your awakening.

And that's normal after you finish a sleep cycle. So with your last period of REM sleep, you might have an awakening. The problem I find is some people are really resistant to that normal ness of the awakening, and right away they get frustrated because, oh, my gosh, here we go again.

What time is it? Oh, if I go to sleep in the next 30 minutes, then I might get two more hours. You know, there's that calculation that goes on, but sometimes I find it helpful to spread a person's sleep periods into two distinct times.

Do you ever do this in your practice? Well, I read a study at one point that this was a normal to have two sleeps. And so more than more than anything, what I do is normalize it when people have that kind of especially, you know, now that it's getting dark earlier, going to sleep a little earlier and having a little break in the middle and then going back to sleep is not altogether abnormal for when I understand and some people depending on your maybe your chronotype or you know who you are, who you are as an individual, that might be the best thing for you.

And I remember reading that like this was a time where they thought fertility was at its peak or people would be really creative and writer read. And so I have given patients that suggestion if they're really struggling to kind of reframe it, be like, All right, what, what can I can I do something then?

And I enjoy that time to myself. Is there a way to embrace it versus try to fight it? You're exactly right. I mean, I think it can be a gift that you give somebody just to kind of take the stress out of something that might be occurring naturally.

As we age, we lose the ability to suppress nighttime arousal. And if you look at the at the literature, like the writings in the preindustrial age, it actually describes a second sleep, which means people go to bed.

When the sun went down, sleep for a few hours, wake up, have sex, do talking or, you know, tell stories and then go to sleep for another few hours. And they would accumulate enough sleep over a longer time period, but still have like a low level of stress and actually even enjoy the time that they spent awake in the middle of the night.

I think it's always worthwhile when considering folks who are getting up into their seventies, eighties, nineties to consider risk of falls in the middle of the night.

This is sometimes something that I talk about, especially since, you know, I like people to have low light in the middle of the night. I wonder if you can kind of give some tips for maintaining safety in the middle of the night?

Yeah, absolutely. I mean, grab rails are one of my favorite things. And I think putting those in before you think you need them so that they're there for you.

And then I've heard I've had patients in that age range tell me that they sleep better with a little bit of orange or amber or even red light.

Middle-of-the-Night Awakenings and Safety

And it was it was hers that maybe this is because our hunter gatherer ancestors were around fires. And so it can actually improve sleep, not just inhibit sleep to have a little bit of, you know.

Right. Obviously, we want to avoid blue light. We don't want a really bright blue light in the middle of the night. But to have some amber light versus no light might actually make an improvement in your sleep.

Yeah, I actually recommend this little portable device that puts out a reddish orange light and it has a lanyard on it. So you can just put it around your neck and walk around to go to the bathroom or to navigate stairs or whatever and it doesn't seem to interfere with telling your brain it's time to be awake and improve safety.

I love the idea about grab rails even before you need them. That's a great tip. Yeah. And and then with the light, do you feel okay if people have it on all night?

Like if there's a nightlight that's in plugged into the wall and it's in that orange or red spectrum, do you feel okay with those? I think it's something yeah.

I think it's a personal preference. If you don't have great sleep and you have some ambient light in your bedroom as you're trying to, you know, maintain sleep or get to sleep, it's a worthwhile experiment to see if darkness improves things.

Some people are quite sensitive to light, but that is something that tends to get less and less as we age. For people who have their cataracts out, you know, just be aware that there can be a big shift in how you perceive light once your cataracts are treated.

So, you know, the light in the room, I think number one is safety. But if you're having sleep problems, it might be worth it to make it dark and see if that improves things.

And how do you feel about measuring and what do you what do you recommend? Okay. You've got an oil rig on. I've got an oil rig. I know what to think about the data.

How do you how do you recommend people interface with that? Do you. Yeah, I'm so curious. I've got a couple of interesting numbers. So Aura, I think has one of the best wearable devices and it's really unobtrusive, right?

I hardly know that it's on. And it's a pretty sleek design to wearables in general are about 70% accurate. Somewhere around there they're really good at determining when a person falls asleep and when they wake up.

And then the things in between with sleep stages and, you know, awakenings are a little bit nebulous at this point, but I love it that things are improving with time.

The technology is always moving. So in the future I expect things to get better. One interesting stat from or is that people who have the ring wake up and look at their app, their aura app 90% of the time in the morning.

And that's for me, just elevating sleep into a better awareness so that people can take action with that. So if you ate late, consumed alcohol, had a rough day where you your stress was it managed you might see the effects of that and make a change in response.

So yeah, I'm a fan and I love it when people want to talk about wearables. Is this something that your patients use? Many of them do. And many of them ask, you know, if we're going to use one, which one?

I think as people, if they lose weight, sometimes the the ring isn't as comfortable as it is. You know, you're not so bony. But there's always the question of like, how accurate is it?

And it has the O2, but it's an average O2, so it's not a way to pick up sleep apnea. That that's something that comes up now. Is it a way that if somebody is wearing an aura, could we say, okay, let's look at your your average O2 and if it drops below a certain level, then we need to elevate, you know, how quickly we get the sleep study done.

Is there a way to use it in that way at all? I would exercise a lot of caution about that. I don't think that we're quite there yet.

Wearables, Diet, and Fasting for Brain Health

So the the sleep trackers are not great at being sensitive to sleep diagnoses or even I wouldn't make a change to these therapy as a result of the sleep tracker.

I just don't think they're sensitive enough at this point. But things are always improving. And I think some of the things that we wear, whether it's a continuous glucose monitor or a wearable sleep tracker or step, you're starting to talk to each other and that's a little bit exciting.

Speaking of a continuous glucose monitor, I know that one of the things that you do is regulate meals due to intermittent fasting. And how does that relate to sleep?

Yeah, we recommend an organic ketogenic diet and sometimes with intermittent fasting, it really depends on the weight of the patient that we're talking to.

Right. Many people will go into ketosis because they're looking to lose weight. And yet often when we're talking to an older woman, you know, we spoke about women and hormones, women are two thirds of Alzheimer's patients.

And so this is a disease that drastically affects women more than men. And women tend to towards frailty as they age. And so we need to be really careful that we don't promote too much weight loss.

Now, in combination with exercise and hormone replacement, especially testosterone replacement, what we really want to see is a shift in body composition that, you know, make sure that we go from fat to more muscle.

And so there's we avoid falls and we're healthier generally, the diabetes is there's less risk of diabetes. And also we improve cognition. What we're looking for with a organic ketogenic diet is when detox right.

Getting getting a lot of the toxins out of this food by using organic. And then too, we want that metabolic flexibility. We want patients to go back and forth between burning fat for fuel and burning sugar or carbohydrates or glucose for fuel, burning fat or ketones as fuel in the brain.

It has a bunch of benefits when it burns a lot cleaner. So we produce less oxidative stress to we're more efficient at making fuel making ATP out of ketones than we are out of glucose as we age.

Even if we aren't diabetic, we lose glucose and insulin sensitivity in the brain when we get older regardless of our diabetes status. And so using this is incredible.

I mean, it just blows my mind. The body is so amazing. It's like a hybrid, right? You can burn sugar or fat. And yet many of us just choose not to do that.

Maybe we're not aware that that's an option, but our hunter gatherer ancestors did that. And now we have glucose available 24 hours a day, seven days a week in abundance.

But when we ask the brain to burn ketones, it actually prefers that when both ketones and glucose are available, the brain will preferentially burn ketones.

So it burns cleaner, it shifts mitochondrial function, you get this more emetic effect. So it's a key. The ketogenic diet is a fasting mimicking state where you actually get rid of some senescent cells.

You signal to produce new cells. And again, that that reduction in oxidative stress. So there's a there's just a ton of benefits. It's a brain healing diet.

And the side effects, for better or worse, depending on the individual, is weight loss. So we just need to mitigate for that. And fasting can help. One of the things that we never skip in terms of fasting is a three hour fast before bed and that is because if you're digesting at the same time that you're trying to rest, it's your your body is split in terms of its objective rate.

And so we really think we see what we see clinically. And I think the literature supports this as well, is that people sleep better, they have better quality sleep if they have a fast before bed.

And I'm sure you can speak to that even more than I can. You're exactly right. I mean, you covered it very well. And the digestive hormones that we have, even the hunger and satiety signaling hormones, probably have a circadian rhythm all of their own.

Closing Thoughts and Resources

Now, I'll say what's hot in the news right now is GLP-1, and we don't know yet whether that has a circadian rhythm, but other hormones do. And so I'd be surprised if that wasn't borne out in the literature.

But the truth is, the awake state is associated with eating and the sleep state is associated with not eating. So I totally endorse what you're doing.

That's fantastic. Well, I feel like we've talked about sleep, we've talked about eating, and we've talked about moving. So we've kind of hit all the things that you need to be human.

And once again, I think it's so really it's so hopeful that there's things that you can do if you're at risk for Alzheimer's disease or experiencing some cognitive decline.

So thank you for bringing that message. I'm wondering, Dr. Sandison, how people might find you to learn more or even to work with you. Yeah. drsandison.com is my website and we'd love to have you sign up for our newsletter.

I have a book coming out in June of 2024 called Reversing Alzheimer's. So you can sign up for updates about that. And that is going to be essentially it's an at home guide, a step by step guide for what you can do to optimize your brain health really at any stage.

So that that is what I'm hoping to put out into the world and support and help people to optimize cognitive function and also to know that there is it's actually overwhelming almost how much there is that you can do to support your brain as you age.

I love that. And from my point of view, sleep is the foundation of all healthy health practices. So thank you for bringing that message to us of hope and empowerment.

It was great to talk to you today. That's a privilege to be here. Thank you for having me.