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START OF TRANSCRIPT

**[00:00:03]**

Hi, my name is Carol McMakin. I'm a chiropractor from Portland, Oregon. And this next hour, we're going to be talking about fatigue. And I have a more global view of fatigue because I see so many patients with fatigue. So we're going to start at the beginning and look at all the causes of fatigue and how you as clinicians should approach it. So the first question is, what is fatigue? Well, fatigue is a feeling of constant tiredness, weakness, wimpiness. It can be physical, mental or a combination of both. Emotional causes of fatigue are actually caused by a combination of physical and mental. So emotions don't come from space. They come from particular neurotransmitters affecting specific parts of the brain that creates specific feelings that we name as certain emotions. So sadness or even joy or grief or anger, those emotions we have names for. But neurologically they are. It's caused by. Certain or transmitters affecting certain parts of the brain. So fatigue can affect anyone, and most adults will experience fatigue at some point in their life. Fatigue is a symptom, not a condition, and it has many causes. So the most common cause of fatigue, believe it or not, is sleep deprivation. That's the truth. There are three types of fatigue associated with sleep deprivation. There's transient transient fatigue is brought on by extreme sleep restriction or extended hours awake within 1 or 2 days. So if you have four hours of sleep and then work 12 hours a day, that's transient fatigue.

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You get over that. It's pretty straightforward. Not a problem. Cumulative fatigue is brought on by repeated mild sleep restriction or extended hours awake across a series of days. So nurses or doctors that work 10 or 12 hour shifts will. Experience cumulative fatigue. So they work three 12 hour days in a row. And then they have 3 or 4 days off. Firemen go through the same thing. So this concept of I work three twelves or four TENS that brings about cumulative fatigue. And at the end of the fourth day, you're pretty wasted, tired, fatigued. That's cumulative. It adds up, but you can make up for it on your days off. Then there's circadian fatigue, which is an interesting way of describing it. But it's reduced performance during nighttime hours, particularly during an individual's window of circadian low. So people that work night shifts have the most difficulty between 2 a.m. and 6 a.m. because that's when their adrenals are the lowest. So those are the three types of fatigue that are associated with sleep deprivation. Doesn't sound too bad until you find out what sleep deprivation actually does to your body. When you don't get enough sleep, you have an increase in appetite. It impairs memory and learning because your brain cleans itself out at night. It lowers your libido, which isn't too much fun. It decreases activity. It decreases activity because you're too tired to walk or run when you haven't had enough sleep slows reactions.

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So reaction time is important. If you're a police officer or a fireman, a medical physician, a pilot or a truck driver. This slowing of reaction time is really important, and it's why most of the research that I could find on sleep deprivation and fatigue came out of the airline industry, the trucking industry and medicine, because typically those are the people that have the biggest challenge with sleep deprivation. So the effects of sleep deprivation, this is a more personal way of looking at it. Irritability, You just get cranky when you're tired. Your stress levels are higher. Cognitive impairment, memory lapses or memory loss like you just. Don't trillion remember. Parts of days or things that you would normally remember. Impaired moral judgment. This means you just do stupid stuff that you wouldn't normally do. Yawning. That's when you're relaxed enough and not stressed that you can just start yawning. Hallucinations. There are patients that I have had who've had severe sleep deprivation, so they can't sleep for two, three, four days in a row. And they they will actually do lucid dreaming. So you're wide awake, your eyes are open. And what they call hallucinations in this slide is lucid dreaming. You're having a REM sleep dream, um, while you're awake or while you look as if you're awake. Symptoms similar to ADHD. And that's actually just because you can't focus your cortex doesn't work.

**[00:07:08]**

This cognitive impairment becomes ADHD because you can't focus. Impaired immune system. That has to do with the stress that's caused by sleep deprivation that turns your vagus nerve off and that impairs your immune system. Risk of type two diabetes is has to do with this increase in weight and increase risk of obesity. And if you remember from this slide, your increase in appetite. So you eat more when you're sleep deprived, hence you gain weight, your insulin resistance goes up and that makes you a type two diabetic. Increased heart rate variability and increased risk of heart disease. Why? Because you have increased inflammation. Increased reaction time is bad if you are a truck driver, an airline pilot, a fireman, a policeman or a medical physician, you need to make quick, accurate decisions and act on them quickly. And this increased reaction time is not a good thing. Decreased accuracy bad if you're a pilot. Bad. If you're a truck driver, it can extend to tremors and body aches. Growth suppression is not quite the right word for it. You make growth hormone during deep sleep. So in an adult growth hormone, 85% of growth hormone is produced during deep sleep. And your growth hormone in an adult mediates the transport of amino acids across cell walls to repair muscles. So you get body aches and pain. And if you're a child and you are sleep deprived for whatever reason, you don't grow as much, your body temperature goes down because you don't get deep sleep.

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You don't get deep sleep, you don't get muscle repair. And your whole endocrine system doesn't work right. And this is just another slide. So if you Google the effects of sleep deprivation, you're going to find these in many more images about irritability, cognitive impairment, memory loss, judgment, decreased creativity. So this concept of the artist who stays awake all night. Painting or writing? Yeah, that doesn't work. Increased stress that goes with irritability symptoms similar to ADHD. That's because of the effect on the brain, the gut impaired immune system, difficulty digesting, leaky gut, gross depression, risk of obesity, higher risk of injury, and a higher risk of cancer because your immune system doesn't work, right? Increased heart rate variability, risk of heart disease and stroke and hypertension because your body never slows down at night the way it should. Muscular, increased reaction time, decreased accuracy, tremors and the aches come because you make 85% of growth hormone is made during deep sleep. If you're not getting deep sleep, you don't get growth hormone. If you don't get growth hormone, you don't get muscle repair and you get body pain. Pancreas, increased risk of type two, type two diabetes. It's not so much the pancreas, it's the increase in weight and the increase in stress levels. Now, the irony for clinicians is we work with patients, those of you that do functional medicine or even traditional medicine or naturopaths.

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We work with patients to for, to correct fatigue. That's what we think of. They present saying they have fatigue. But more commonly, patients come in and they have leaky gut, they have insulin resistance. Their hemoglobin A1C is 6.5 or 7 point 2 or 12 5 and we're working with them to reduce their body weight, body mass index, their body weight, improve insulin resistance, address cardiac risk. Decrease highly sensitive CRP, which is a measure of cardiac risk, inflammation, hypertension, depression. And I don't know about you, but until I made this presentation, I rarely or never asked them about their sleep. How do you fix any of these things in somebody that thinks they can live on 5 or 6 hours of sleep? It isn't going to happen. So let's talk about sleep debt. Sleep debt is defined as having an hour or less of sleep for several consecutive days. And it needs a series of days of more than usual sleep for a person to fully recover from cumulative fatigue. So sleep debt, also known as sleep deficit, is the difference between how much sleep you need and how much you actually get when you sleep. Fewer hours than your body needs. You have sleep debt. The research shows that the brain actually remembers sleep debt for ever. So they did an experiment where they deprived, I think they used college students because they'll do these things if you pay them \$10 a day and they let them free sleep.

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And then average college student, let's say, needed eight hours of sleep a day. So for 14 days, they woke them up after six hours of sleep. So they let's do ten because I can do the math easier. So ten days they missed two hours of sleep per night for ten days. That's 20 hours of sleep debt. Do the math. Then they let the students free sleep, sleep as much as they wanted with no deadlines, no nothing. And they slept ten hours a night, not eight, until that 20 hours of sleep debt was made up. And when you're allowed to sleep freely, you will make up sleep debt for over a year. So sleep debt adds up over time and there's no getting away from it. It will negatively impact your health. So the consequences of fatigue associated with sleep, debt impaired standards of operation with increased likeliness of error, injury accidents, death, inaccurate flying. So this is from the airline pilots. It's why they require that airline pilots have 10 to 12 hours between shifts and they can only fly a certain number of hours in accurate flying driving. This information comes out of the trucking industry or performing any task. So this data point comes out of manufacturing. When they started collecting data on assembly line workers or any night shift worker missed radio calls, task notifications, indicators of equipment malfunction being missed.

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That's airline pilots and that's manufacturing routine tasks performed inaccurately or just missed entirely. Oops, poor decision making. Not good if you're a police officer or a doctor. Slow reaction to a changing situation. So the circumstances change and you are supposed to react or respond quickly to that. You don't notice that it's changing because remember how it is that your cortex doesn't work so well. So during deep sleep and during REM sleep, that's when the lymphatic system clears the. Soot out of your brain for one of a better name for it. Loss of situational awareness. This is a big deal with police officers that have to work night shifts. They're just not as aware of the situation as they should be. Forgetfulness falling asleep without knowing it. This one, if you read the book *The Promise of Sleep*. This we'll talk about later on in the presentation. But this falling asleep without knowing it, almost everybody has had the experience of driving down the highway and you notice it when you get to in Oregon, you get to Eugene and the next thing you know, you're in Corvallis and you've driven 50, 60 miles and didn't and don't remember it. That's called Micro-sleep. Your being asleep unaware with your eyes open. None of that is good. Sleep deprivation, you might as well be drunk. The curves are exactly the same. So if you are up for 24 hours, it's as if your blood alcohol is illegal.

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0.14. You have no business driving if you've been up 24 hours and the curves are almost identical. So as a clinician, what do you do with this? Well, the first history question for any patient with a complaint of fatigue, body pain, hypertension, weight gain, depression. Insulin resistance or elevated hemoglobin A1C or hs-crp. The first history question should be how many hours do you sleep at night? What time do you go to bed? What time do you get up? What do you do just before you go to bed? Screen time. Exercise. Watch scary movies. Read scary books. What do you do just before bed that might get your sympathetic and norepinephrine system jacked up as a reasonable phrase? What's your sleeping situation? Noise is. Is. Are you in a noisy neighborhood? Is there too much light? How old is your mattress? When was the last time you bought a new mattress? So when you consider people say, oh, new mattresses are too expensive. Well, when you consider the cost to your health if you're not sleeping well. Pay me now or pay me later. Sleep Disruptors. Small children. Pets. Noisy Neighbors. Body pain Pets. So I have friends that let their cats sleep in the bedroom with them. And it's like, not in my world. The cats go outside at night. I had a cat that used to bang on my bedroom door and didn't take too long of that until that cat went outside at night.

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She could go bang on somebody else's door. Sleep disruptors. You can't put your children outside at night, but adults with small children, infants, the the sleep deprivation experienced by parents with a one, two, three, four, five year old. That's such a common thing. And now you understand why you're cranky and irritable. How can we address or change any of these? Well, get the patient to wear earplugs. I don't like earplugs. How do you like dying ten years early? Oh, it's that bad? Yeah, it's that bad. Earplugs, eye masks. There are different kinds of eye masks that patients can wear until they try. Until they find something comfortable. Get a new mattress. Put pets outside of the bedroom. Cats are not allowed to walk across your head at 3:00 in the morning. And then as clinicians, we can create better pain management. But if you think of the consequences of loss of growth hormone, there's no way you're going to get a patient's pain under control until they get growth hormone so that their muscles get repaired. So we'll talk about pain management. Most of you know that I am a pain management specialist, so if somebody has radiculopathy or low back pain or neck pain, we treat those painful conditions with frequency specific Microcurrent. That's my technology. And so you get their pain down. Take two Advil before you go to bed.

**[00:22:44]**

Take a hot bath before you go to bed to relax the muscles, Use your FSM device or whatever kind of device you use before you go to bed. So create better pain management. So this is the clinical approach. This is serious. So you tell the patient, make sleep a priority. When they complain about their weight, their type two diabetes, their body aches, their cognitive impairment, their fatigue, the thing that you say is if you want to stay alive and healthy, sleep is your only priority for the next six months. That's what you say. I want you to listen to that again. You have a patient that's gaining weight, that's having body pain, that's having digestive problems, that is having brain fog. They're afraid. They're getting early cognitive decline. And the thing you say to them is, I want you to make sleep a priority. Sleep is your only priority for the next six months. I want you to keep a sleep diary. What time do you go to bed? What time do you get up and see me in? One month. Now, these days, there are gadgets that keep track of your sleep. There's the aura ring. There's the Fitbit. There's Apple Watch, I think does it. So there are any number of gadgets that help a patient keep track of not only how many hours they sleep, but how much deep sleep and how much REM sleep they get.

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The most important thing is don't do nothing. Don't do nothing. Most of us don't do anything about sleep. We dive right in to treating leaky gut because we have supplements for that. And it's easy to get a patient to take supplements, but you're never going to fix their leaky gut unless they sleep. That was a realization for me when I started making this presentation. Don't do nothing about their sleep. So at the first visit, do something to assess why they're not sleeping. So do a four tube salivary cortisol. If their cortisol is low in the morning and their curve is reversed and it's high at night, they're going to have trouble going to sleep because that's the only time of the day they feel awake. Check their TSH. But that also means check T4T3 and Antithyroid antibodies suggest sleep hygiene. I would change this word to insist on sleep hygiene. We write prescriptions for supplements. Supplements aren't going to do you any good if the patient isn't sleeping. So prescribe sleep hygiene. What are you going to do to reduce the noise in your room? I have noisy neighbors. How about earplugs? How about closing the windows, turning the lights down or off? Improving your mattress? Comfort. Get a mattress topper. If you can't afford a new mattress, buy a new mattress. Pay me now or pay me later. How much is it going to cost you in copays when you have a heart attack or you become a type two diabetic? Cheaper to buy a new mattress, reduced sleep disruptors that cats can stay outside and avoid alcohol.

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Alcohol makes you sleepy because it raises your blood sugar, but it actually interferes with sleep. And then we prescribe supplements. And some of you who are medical physicians prescribe. Prescriptions. For all sorts of things. You're going to prescribe metformin for insulin resistance when what the patient really needs is a is a prescription that will knock them out. So there's Ambien, Lunesta, Restoril, Sonata, Halcion. That one's a little intense. Trazodone, gabapentin, Flexeril nonprescription is where most of us start. Melatonin. I had a medical physician tell me that she put a patient on one milligram of melatonin for every hour that you want them to sleep. So this business of 3/10 of a milligram of melatonin doesn't really cut it. Melatonin suppresses. Cortisol. And if your cortisol is elevated at night, which you'll find out with this salivary cortisol. Testing. If it's elevated at night and you want to drop it like a rock. The patient can take ten, 20, 30. I had one medical physician tells me that he uses topical melatonin at 200mg and he says there's data behind it. I haven't checked that. So the dosage you're comfortable with really depends on your own research. Five hydroxy tryptophan turns into serotonin when consumed with carbohydrate, which is why piece of toast and a glass of warm milk is a good prescription because tryptophan is found in greater quantity in milk, and tryptophan is more easily absorbed in the presence of carbohydrate, which would be warm milk and a piece of toast.

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So if your serotonin So tryptophan turns into serotonin, if your serotonin is elevated, then melatonin will be spared because serotonin. Goes turns into melatonin, magnesium, not citrate that you use as a laxative. Magnesium glycinate is nice and a histamine histamine is a neurotransmitter that mediates alertness. So everybody knows that antihistamines are anticholinergic and there are some bad press about antihistamines, so you don't want to use them every night forever because they interfere with cognitive function long term. But histamine is a neurotransmitter that mediates alertness, which is why antihistamines make you sleepy. The other thing you can do to reduce neurologic inflammation is take Gaba chewable form. Liquid form. Gaba is hard to absorb if you take it orally as a capsule. So that isn't my favorite form of it. And then taurine, you take along with the Gaba because taurine helps Gaba be absorbed and become more useful. So do something. Start with sleep hygiene, start with testing. We do all sorts of testing. For leaky gut and antibodies to this and that. But for tubes salivary test would be a good place to start to find out why a patient can't sleep. So what are the other causes of fatigue? Sleep apnea.

**[00:31:09]**

Heart disease. Infections. Autoimmune disease. Hormonal imbalance. Both estrogen and progesterone. And testosterone. Histamine and IgG. Macrophage Mediated illnesses. The new diagnosis that is the most popular is Mast cell Activation syndrome. But mostly I'm talking about IgG mediated macrophage discomfort and food sensitivities. Traumatic brain injuries. Traumatic Brain injury patients and stroke patients sleep for recovery because that's how the brain cleans out the. Debris. And then there's sleeping due to hormonal imbalances that are associated with traumatic brain injuries. We'll talk more about that depression and then growth hormone deficiency. My approach is rule out the worst first and what is absolutely the worst. You're not going to believe it. It's sleep apnea. So this book changed my life. It's called The Promise of Sleep. William Dement is a medical physician, MD, PhD, who wrote the medical textbooks about sleep. He basically discovered the REM cycle. This is his consumer book. At the end of this book, you will become convinced. That sleep apnea is a fatal condition. It doesn't matter what else you have. If you have sleep apnea, that is what will kill you. End of discussion. It causes hypertension. Heart attacks, strokes and lethal accidents because people fall asleep with their eyes open and run into trees and bridges and other cars. Any patient who requires more than one antihypertensive medication is likely to have moderate sleep apnea. This is mine. I haven't seen it in the research anyplace, but in the last I read this book in 2000.

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One two. And. What happens when you have sleep apnea? I watched it happen in a post-operative patient. He was sitting the bed was head of the bed was up. And we had he was on constant blood pressure monitoring and he had a pulse oximeter on him. And he tilts his head over to the side and very quietly, gently snore. Just like that, just so it's not like he's stopped breathing. That's what people think of when they think of sleep apnea. John snores. And then he stops breathing. That's this. This was a patient that was just very quietly snoring. And we watched as his blood pressure went from probably 140 or 150 over 95, which is pretty reasonable considering the kind of surgery he had and his blood pressure went to as he was snoring, his blood pressure went to 210 over 140 or 150. And then he'd take a deep breath and his blood pressure would go back down to baseline. And he repeated this twice a minute as he snored very gently. His pulse went from 90 ish, which is pretty normal given the kind of surgery he had up to 140, 150. And when your pulse and blood pressure go up that high, it damages the blood vessel walls. Read anything written by Mark Houston. Hypertension and cardiovascular disease are caused by damage to the blood vessel walls. So you have your blood pressure go up, your pulse rate go up, stretch the blood vessels and.

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They don't ever get rest. So they present to the physician with hypertension. That's a problem. If you need a diuretic. Okay, fine. But I've had every single patient in the last 20 years who has come in, and they're always. They've always been males. If they require more than two antihypertensives. And I've had patients that are being on three. Nobody has ever checked them for sleep apnea. Every single time I order a sleep study. And they're tested for sleep apnea. They have it. It's positive and it's severe. As soon as you get their sleep apnea under control by getting them a CPAP. Hypertension goes down. They need one medication, not three. And any patient who had a stroke or a heart attack at night. The cause of death will be listed as a stroke or a heart attack. That happened at 5:00 in the morning, but they died of sleep apnea. This is this is serious stuff. So sleep apnea causes hypertension, stroke, heart attacks, weight gain, Type two diabetes because of elevated stress levels, insulin and leptin resistance because of the stress hormones that are elevated at night. Daytime micro-sleeps that result in daytime fatigue. Fatal auto accidents and even falls because as you're sort of asleep and you trip over that doorjamb that you always used to remember to step over. Clinical approach. What do you do about this? The first thing you do is rule out sleep apnea first.

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Sleep apnea is the most serious and routinely fatal cause of fatigue. And some of you may disagree with this, but I'll stand behind it. Sleep apnea is the most serious and the most routinely fatal cause of fatigue. Hospital sleep studies are expensive, inconvenient and rarely accurate because the patient is in a hospital sleep study room that they try and make look like a bedroom. But it's not. They have Google on their hair. They've got stuff strapped to them. And it's it's the worst night's sleep of their life ever. So that's what I mean when I say it's rarely accurate. There are in-home sleep studies now available through various companies. The two that I'm familiar with are the watch pat peripheral arterial tomography. It has a computerized watch, a pulse oximeter. We put it on the little finger because you're most likely to just itch your nose with your index finger. Then there is a sensor that goes up your sleeve and this little gadget is a microphone and a GPS monitor. So you think you sleep nice and still at night when in fact, as you're I have a CPAP so I can tell you what this looks like. I swore that I slept quietly on my side and instead, as my oxygen saturation dropped down to 87, 88 never got below 84, I don't think. But as the oxygen saturation dropped as I became apneic or maybe I snored, then I would change position so this little microphone would pick up the sound.



**[00:40:05]**

The GPS indicator would pick up my body position as I flop like a fish all night long. My side, my back, my other side. I never sleep on my stomach. And then the computer and the watch records. All of this, we download it. I finally now that I have a clinical practice again, I bought one as part of our construction and equipment budget. You download, you plug the the computer watch into. Your computer. It uploads the information from the night. You can assess both obstructive and central. And since I see since I see so many traumatic brain injury patients, I got the slightly more expensive version that test for central sleep apnea that's caused by head injuries. It's read by the computer and software on your laptop, and then it's also read by a sleep physician who will also prescribe the CPAP for the patient. Prescribing a CPAP is outside my scope, so I can't do that. But the doctor that works for this company will read the study, give you a formal report and prescribe the CPAP. When I looked up home sleep studies, I found the Z-machine. I don't know anything about it, but it says it does. General sleep, so correcting the sleep apnea is urgent. It is not something where you just let the patient blow it off.

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Sleep Apnea Solutions, CPAP and BiPAP. Depending on what kind of sleep apnea you have, central sleep apnea patients are generally need a BiPAP CPAP stands for continuous positive something pressure, airway pressure. So it's a constant stream of BiPAP gives pressure in and pressure out and patients freak out when you tell them that you want them to get a CPAP. So you overcome patient resistance by describing what the CPAP does. And you know how when you're giving a patient a serious diagnosis, you don't want to scare them even if you're telling them you have this mass that we need to look at, it might mean biopsying, but there's not conclusive yet. You know how you're kind of don't want to scare them. Sleep apnea is the exception for me. I do my best to scare the hell out of the patient because it's such a serious problem. So their objections are, Well, what if my air pressure needs changes? There are variable pressure CPAP units available. I have one that's set for anyplace between 4 and 20 pounds of pressure or PSI, and there are many types of masks available and it takes time to find the right one. And it helps if you tell the patient or have the patient go online and look at different kinds of masks. And it helps if you warn them that there's a learning curve for using the CPAP and for finding the right kind of mask.

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It takes 3 to 6 months and then I had to be willing to scare them into using a CPAP by describing their sleep apnea as a fatal condition. I swear to you, there are patients that want to use this little mouth guard thing and somebody has convinced them by what they read on the Internet that this little mouth guard thing is going to fix their sleep apnea. I don't buy it. Give the option of using a CPAP while they pursue alternatives. It is fine if you want to use a little mouth guard, but between now and the time that your dentist or whoever this guy is is going to fit you with this mouth guard, you're going to get a CPAP. If the sleep apnea is moderate to severe insurance will pay for it. Medicare, I think, pays for it. The surgeries that actually do something to the back of the throat to make it firmer by creating scar tissue, they're painful. They can be successful, but it takes a long time to get them scheduled. Then there's a painful recovery. I just. Uh, once once you have a positive sleep study and the patient walks out of your office. That patient left with a fatal condition and you didn't do anything about it. Now, nobody's going to call it malpractice because it's so common. But when it comes to sleep apnea, I am pretty fierce.

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Schedule the patient for a follow up in 2 to 4 weeks and press for compliance. What kind of unit have you looked at? What do you think? I have my favorite because it's the one that I use. But there are multiple different kinds of brands or travel brands. They're not all that expensive, and it beats the co-pay on open heart surgery. Speaking of open heart surgery, the next thing to rule out. So rule out the worst first. Sleep apnea is the worst. Rule out heart failure and heart disease. Say what? Fatigue is the most subtle symptom of heart disease that occurs prior to chest pain, angina, peripheral edema, or shortness of breath, especially in women. Once I had bypass surgery, well, once my plaque collapsed, I had a single vessel, single lesion, what they call a widowmaker in the left anterior descending artery. The morning after I got my stent, that opened that artery up. The fatigue that I didn't even know I was feeling went away. So dizziness, heartburn, just feeling cold, sweats, fatigue. In men, there are more. Common chest pain, shortness of breath. That's the first thing they notice. But they can also have discomfort or tingling in the arms, back, neck, shoulder or jaw. So those of you that are physical medicine practitioners, physical therapists, chiropractors, massage therapists, even when the. Discomfort that a male patient or a female patient has is in the arms, the back, the neck and in between the shoulder blades or the jaw.

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You might suggest to them that it would be a good idea to go check with their GP and get a cardiac workup just to make sure because the muscles in their back and their shoulders will be tight. It's referred pain from. The heart, the somato visceral response. These are a couple of papers. Cardiovascular nursing. High levels of fatigue were reported in 50% of men and 51% of women. And the challenge is it's such a nonspecific symptom, especially in women. It's just blown off. Fatigue is one of the two most common symptoms, along with shortness of breath reported by patients with heart failure. Activity and tolerance fatigue in patients with heart failure is defined as persistent tiredness and the perception of difficulty performing daily activities because of this persistent tiredness. Fatigue is often one of the first symptoms of heart failure, and it's commonly overlooked because it's viewed by both laypeople and health care providers as a vague complaint. So in my practice, any patient, male or female, over the age of 40 whose primary complaint of fatigue is fatigue, they leave my office with orders to have a sleep study in home, whether they think they snore or not. And. Written. I make a note of it in the chart and I hand the patient a piece of paper that says you should see your GP and get an EKG. Basic metabolic panel and a hs-crp and your lipids done to rule out cardiac dysfunction.

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You have to be pretty bad for an EKG to pick it up, but it's still worthwhile and it protects you from problems with malpractice because you missed it. The patient should be evaluated for heart failure. Refer to a cardiologist if necessary. Now, that's a challenge because most cardiologists, if you send a patient to a cardiologist with their major symptom being fatigue, it's going to be hard to get a cardiologist to take it seriously unless they have swelling in their legs, shortness of breath. All of the other symptoms. Ask about the other common mild symptoms that other clinicians ignore. At the end of this presentation, it is my goal that you will be the one that asks and you will be the one that pays attention. So this. This pay attention to this, can print it off of the Internet. It's under images for heart disease and fatigue. What are the symptoms of heart disease? Print it off. Put it on the wall in your clinic. Rule out infection and autoimmune disease. So why do I say that? Infection raises interleukin one. Autoimmune disease creates inflammation, and that causes fatigue, both mental and physical. Interleukin one, if you inject it into a mouse, the mouse goes and climbs in his little nest and he sleeps it off until the interleukin one is gone. This causes what they describe as illness behavior.

**[00:51:41]**

In mice, we call it. I don't feel good. I'm fatigued. Interleukin one increases when there's an acute or chronic infection and when there's autoimmune disease, central nervous system plays an important role in the perception of fatigue. Central nervous system processes and value values, sensory information and guides, motivation behavior involving decisions to discontinue activity or invest effort. This is from the Journal of Neuroinflammation in 2017. Interleukin one is the prototype of pro-inflammatory cytokines produced in response to infection and other forms of trauma, and the fatigue sensation following peripheral viral infection is triggered by neuroinflammation interleukin one. So when we used in Frequency Specific Microcurrent, we use the frequency 40Hz on Channel A and ten hertz on Channel B in fibromyalgia patients. We had data from a micro immuno chemist showing that interleukin one dropped by factors of ten and 20 times in 90 minutes. So how do you rule out infection in this is the clinical approach. So you figured out that they don't have sleep apnea, You've talked them into getting evaluated for cardiovascular disease. You've talked to them about sleep hygiene and getting enough sleep and making sleep a priority. So you've done those three things and they're still fatigued. Do you see the pattern here? You have to do those three things first. Even if your mindset is that the major cause of fatigue is dental infection or the major cause of fatigue is Lyme or Borrelia or Babesia or mold, until you've done those three things, you haven't really addressed the most serious causes of fatigue.

**[00:54:03]**

So the clinical approach rule out infection, blood tests. Challenge with that is not all infections evaluate y count. You can have a horrible jaw infection from root canals and your white count is going to be normal. You can have full on pneumonia and your white count is only slightly elevated. Send the patient out for a 3D cone beam. So one of your history questions on that history form that we all have should be, do you have any root canals? Root canals never. Don't fail. There's that book, The Great Root Canal cover up. So find someone in your community that has a 3D cone beam and the most up to date software and have them. It's an in-office, high, highly sensitive CT scan. And not all dentists use it. Mostly it's oral surgeons, but you need to rule out occult dental infection. I use urine mold testing. Not everybody likes it, but I have my preferred company and I screen patients with known mold exposure. To find out if they if they have mold mycotoxins in their urine. If they are constantly blowing their nose or if they have root canals in the upper jaw or if they have mold exposure in the sinuses, or if you tap on their sinuses and it's tender or you have one of those lighted gadgets where you look up the nose and you can see that it's red or purple, order a sinus CT if the patient is symptomatic and see if the sinus lining is thickened.

**[00:56:08]**

Mono, mono spot test, test, rule out mononucleosis, rule out HIV influenza. You can evaluate Lyme Borrelia Elisa with bloodwork and measuring interleukin one just isn't useful. It doesn't demonstrate the source. It just tells you, okay, interleukin one is elevated, but you still have to do all this other stuff to find out why it's elevated. Clinical approach to rule out autoimmune disease. Choose potential autoimmune tissue targets based on the history and the symptoms. So blood tests for autoimmune diseases. Most of you probably know more about this than I do. C-reactive protein citrate antinuclear antibodies, ferritin enzyme linked immunosorbent assays or Elisa testing rheumatoid factor anti cyclic anti CCP antibodies immunoglobulins and antithyroid antibodies. So if the patient has antithyroid antibodies, they can't convert T four which is a storage form into t three which is the active form. So if all they measure is. T, s, h and T, for you don't know anything. T for is a storage form. It's not particularly active. T 3 is the active form if the thyroglobulin is coated with antibodies. You the enzyme that takes the iodine off, that makes it into t 3 doesn't work and you can't get from T4 to T3. Rule out hormone imbalances so hormone imbalances can lead to fatigue. Anybody that's female that's ever dealt with PMS can tell you that.

**[00:58:11]**

So you test all of these in any patient after a traumatic brain injury because traumatic brain injuries and mild traumatic brain injuries cause reduction in pituitary regulatory hormones. So we'll talk about this in a little bit. Test salivary cortisol. Times four test thyroid TSH and anti thyroid antibodies in women test salivary and blood levels of hormones. Estrogen dominance and progesterone deficiency is what you're looking for in perimenopause, adolescence and post menopause. Testosterone deficiency in females post menopausal in men. You can test growth hormone by testing IGF one testosterone and binding Globulins Low growth hormone leads to fatigue and depression in men and leads to sleep. Disturbance and sleep disturbance leads to fatigue. So hormones imbalance consider histamine and fatigue. So the role of histamine in modulating immune support, immune response and in an inflammation, it affects the vascular system. It affects the one and the two balance. It enhances pulmonary fibrosis, affects the intestines, inhibits. Tumor development promotes damage to nervous system tissue. Histamines complicated. And I'm not going to read this slide. You'll have the slides with this presentation. There are four different histamine receptors. Role of histamine in modulating the immune response and inflammation. If you're in flames. So Histamine is the first mediator when it comes to the inflammatory cascade. Histamine initiates the inflammatory cascade, and in the brain, histamine mediates alertness. IgG antibodies to food, mold and environmental allergens form antigen antibody complexes that are taken up by macrophages.

**[01:00:31]**

So IgE is easy. One antigen, one antibody. Eat a shrimp, turn bright red and fall over. IgG have multiple sites for complexes and those complexes are taken up by the macrophages. The macrophages burst, basically releasing histamine and that stimulates systemic inflammation causing fatigue. So patients that come to you who eat bread five times a day and they're fatigued, go looking for IgG antibodies to wheat. Systemic histamine causes alertness, increases, epinephrine and norepinephrine in the CNS, leading to sleep disturbance, which leads to fatigue. What's interesting is that class C pain fibers are multimodal. They're unmyelinated, and they're sensitive to histamine, which leads to a diffuse, low grade body pain which can lead to sleep disturbance and fatigue. What's your clinical approach to histamine mediated fatigue test? Ige IgG Different laboratories. Your preference do match samples at least once, no matter how good the lab PR is or how much you've heard about it. I've been very surprised by sending match samples where one lab says it's fine and the other lab says it's not. Test hs-crp and test intestinal permeability. That's something that can be done easily these days. Traumatic brain injuries and mild traumatic brain injuries cause fatigue. The problem with TBI and mTBI from auto accidents, falls and even sports injuries is you have to ask the time between the traumatic brain injury or the mTBI and the fatigue complaint may be so great that the patient may think they're unrelated.

**[01:02:38]**

Patient says I've been fatigued for five years. What happened five years ago? Nothing. Well, I had this little fender bender. Talk to me about the fender bender. Well, I got rear ended at 30 miles an hour by a pickup truck when I was driving my. Small sedan. So they may list the TBI, mTBI as an afterthought, or they may not list it at all in the history. You have to ask. Brain injuries can lead directly to fatigue. That's usually immediately following brain injuries lead to hormone deficiencies that lead to fatigue. Because of the deficiencies in pituitary hormones, the pituitary stalk is particularly susceptible to basically whiplash. So the pituitary is here. It's on a very vascularized stalk that leads into the hypothalamus. And when and it's in this little space and when you have a head injury that stalk whips back and forth and you can have axonal injuries that impair the ability of the pituitary to produce the regulatory hormones that like TSH that run your thyroid. Brain injuries lead to sleep disturbances that lead to fatigue. I had a sleep specialist tell me that every traumatic brain injury patient has sleep apnea, so every patient who has a true concussion and remains fatigued for weeks after that concussion, that patient needs a sleep study. So TBI and mTBI history questions. Have you ever had a concussion? No. Well, nothing serious.

**[01:04:46]**

I was never unconscious. So how do you follow up on that? If the patient doesn't think they ever had a concussion, that you don't have to be unconscious to have a mild traumatic brain injury. The question to ask is what sports did you play? If they played soccer or football or even basketball, they've had head injuries. Have you ever had an auto accident? When was your accident? What kind of car were you driving? What kind of car hit you? What did you hit? Have you ever had a fall where you hit your head? What do you do for fun? That's a good question. That's part of everybody's history, right? What do you do for fun? Do you ride mountain bikes? Well, yeah. Have you ever fallen off a mountain bike? Well, duh. Yes. Have you ever ridden horses ever fall off a horse? Everybody who's ridden horses much at all has had a fall off a horse, and they forget to mention it because they were just riding a horse. And of course, they fell off. Did you ever snowboard, skateboard, snow ski or water ski? Anybody that participates in any of these sports has had mild traumatic brain injuries. And if they come in with a history of complaint of fatigue, it's worth asking. Traumatic brain injuries and fatigue. You can read these papers. What's interesting is vitamin D deficiency was found in 65%. Poor sleep quality, 54%.

**[01:06:39]**

Anxiety disorders, 36% fatigue Severity was correlated with poor sleep. That's a no brainer. You should be checking vitamin D on everybody. Traumatic brain injuries and fatigue. Just Google traumatic brain injuries and fatigue. And there are many more papers than this. Vestibular injuries and fatigue. Those of you that have heard my seminars know that this is one of my hot buttons. Vestibular Injuries cause fatigue. Vestibular injuries are often concurrent with mTBI and Tbis, but they cause distinct and separate symptoms, so. Concussion, the symptoms, thinking, emotional irritability, physical headaches, dizziness, problems with sleep, either more or less than usual. But if they have dizziness, vertigo, blurred vision, disequilibrium, they may not be dizzy, they may not have vertigo, but they can have imbalance, fatigue and falls. The problem with vestibular injuries is the patient doesn't present with a vestibular diagnosis. They won't come in 99% of the time and say I have endolymphatic hydrops. They won't say I have disequilibrium. And at the end of this next ten slides, you're going to know more about vestibular injuries than most medical physicians. You may be the only one who recognizes it because the patient just lives with the symptoms fatigue, nausea, disequilibrium, loss of balance. Visual disturbances. Vestibular injuries are really devastating because my location in space is so important that the brain has three systems of input. You've got the vestibular system, the semicircular canals in the ears, you've got the eyes and you have the mechanical receptors at C one and C two, and in the lower extremity joints.

**[01:08:55]**

All of this input needs to correlate and agree with each other, or the most primitive part of the brain has problems. That's putting it mildly. Nothing works until your brain knows where it is in space. When the vestibular system in the inner ear is injured, the brain learns to ignore the ears and depend on the eyes and mechanical receptors for information about its location in space. And that's where the trouble starts. When you depend on your eyes for balance, it creates a problem. When the eyes are processing complex visual information, they're is no horizon. Vestibular patients will say that they have difficulty in the shopping mall. I never go there. The grocery store, warehouse shopping, Costco or Sam's Club. If you're in a place where they have such things. Look at this mall. Find a horizon there. Lots of people, lots of moving information. And the symptoms may include memory loss, anxiety, discomfort, fatigue, dizziness, not so much. If they're dizzy, they know to go to a ENT, but disequilibrium, nausea and a feeling of fullness in one or both ears. And these symptoms are worse with reductions in air pressure on rainy days or at altitude. So these patients will say, I can't fly in a plane. Saccadic pursuit is when the eyes bounce instead of smoothly tracking. This is smooth produce pursuit. This is what it should do.

**[01:10:39]**

But Saccadic pursuit is when your eyes bounce and it produces fatigue and intolerance of reading computers, even watching video screens. They can't go to the movies. They have problems with traffic, computer work and reading. And the symptoms from Vestibular injuries may include memory loss, anxiety, discomfort, fatigue, dizziness, disequilibrium, nausea. The symptoms are worse with reductions in air pressure. And I've had patients who have paid for a year or two of vestibular rehab, and a neurologic chiropractor told them that the saccades were fixed, but the patient's vestibular injury was not fixed. They still had symptoms. So patients will have anxiety or panic attacks and you need to ask them when and where do they have panic attacks. If the panic attack only occurs in visually complex situations or during sleep? A vestibular injury is the most likely cause. So they go into Costco and there's no horizon anywhere. They go into the mall or they have a panic attack or anxiety during sleep. Now, why would a vestibular injury cause panic during sleep? Well, it's because during sleep, you're deprived of visual and mechanical clues for position. Proprioceptors in the upper cervical spine. And your knees and your feet depend on gravity to activate them during sleep. The brain has only the ears for information about position when your head moves and if the information from one ear conflicts with position information from the other ear and you roll over and change your position.

**[01:12:54]**

The brain notifies reticular activating formation and the sympathetic nervous system and says Help. We are falling through space. We are going to die. And the patient wakes up every 60 to 90 minutes, even on sleep medication. And we call it a panic attack. You'll have to look this up. But the eyes, the amygdala, the occipital lobe, the cerebellum and the cortex are all intimately related with visual information and proprioceptive information and Vestibular information. And it all has to coordinate. Or the amygdala freaks out. So patients have problems with cognitive function, memory sequencing. All of that depends on movement of information from short term to intermediate term to long term memory. And Vestibular injuries inhibit the movement of information from short term to long term memory. Patients specifically have trouble with sequencing, and all of these symptoms will be worse on rainy days or at altitude. So these are the history questions. Do you have difficulty with balance or coordination? Do you ever feel dizzy, nauseated, disoriented, or have a sense of disequilibrium? Do you feel anxious or uncomfortable in the mall? Do you wake up frequently during the night and they wake up every 60 to 90 minutes? That's the clue. Panic attacks. Do you have difficulty with memory or sequencing? Do you lose or forget events or portions of days feeling of fullness and one or both ears? Do sounds and noises bother you more than they used to? Can you hear your eyes blink? Do you have trouble concentrating when there's noise or motion around you? Vestibular diagnoses.



**[01:15:00]**

I encourage you to look all this up at our Advanced this year we had a FCO, VD optometry first lecture for 90 minutes on Vestibular. The vestibular ocular reflex, the interchange of information between the inner ear and the eye. Endolymphatic Hydrops or a fistula Meniere's inner ear concussion where there's actually damage to the nerve. Otolith displacement. Almost everybody's heard of the Epley maneuver. You want to rule out Ehlers-Danlos prior to performing the Epley maneuver? So evaluate the patient for Beighton score centrally mediated brain vestibular injury or a semicircular canal Dehiscence. You can look all of those up. Vestibular screening exam. I do fields of horizontal and vertical gaze. Webers or Modified Webers. I put a 128 tuning fork on the top of the head or the center of the forehead, and the patient should hear the sound equally in both ears. If there's an inner ear injury, the sound will laterally TAOS to one side. Place the tuning fork on the lateral malleolus. If there is a dehiscence, the patient will hear the tuning fork in the ear. And I forgot to finish that sentence. Air conduction. If the nerve is damaged, the sound will be aversive on one or both sides and the patient can balance on one foot with their eyes open. But when they close their eyes, they lose visual clues and they just fall over.

**[01:16:48]**

Vestibular testing. Before you send somebody to a vestibular testing lab, there is a questionnaire that you can find online. I got it from our Fcov Fellow of the College of Optometry and Visual Development. Brain Injury Vestibular System Symptom Questionnaire by VSS. They have an 18 question version and a 28. The 18 is easier if the patient actually has a vestibular injury. They'll never make it to the 28th question. You can send the patient to a vestibular testing lab. Most large metropolitan hospitals have one and it's run by an audiologist and they really need testing and expert referral to confirm the diagnosis. That means platform testing electrocochleography and then find the expert to send the patient to by asking the audiologist at the lab for doctors who order tests and are good with patients. So this is a system. So there's endolymphatic, hydrops and a fistula. That's where the little arrows are. If the oval window or the round window Meniere's affects this sac, if any of this system is open to outside air pressure, the changes in air pressure will have changed. Vestibular The input brain injury. The vestibular center in the brain can be injured. You can have a Cervicogenic vestibular injury that damages the ligaments at C one and C two. You can have damage concussion that's not compression. It's concussion damage from a blast injury or an airbag going off next to the ear.

**[01:18:49]**

That changes hearing and vestibular function. You can get a traction injury from the eighth nerve getting stretched depending on how much space there is in this car. Vestibular injury patient's condition can't be cured. It's a management problem, but the testing helps demonstrate the injury objectively just doesn't usually change the therapy. It can be managed once it's diagnosed and the patients benefit from having a diagnosis and knowing they're not crazy. The diagnosis prevents suicides. Neuro care of Vestibular injury patients. I have become a fan of neuro optometry prism lenses. Correct visual input. You need to find an optometrist that actually believes in prism glasses. I discovered that not all Covd fellow of a College of Optometry and Visual development. Not all of them are created equal. Vestibular rehab helps, but not all programs are equally effective. What I've found is you put the patient in Prism glasses for six months before I send them to vestibular rehab just so the brain can get used to it. It is cruel to put a patient with vestibular injury into vestibular rehab. Without giving them prism glasses. They don't have a way of orienting to normal if they have not been in prism glasses. So I have Meniere's in my right ear and they offered me Vestibular rehab and I'm simply unable. My work schedule does not allow me to be nauseated and motion sick three days after rehab when they want to do rehab twice a week.

**[01:20:56]**

Medication can help. When Black's nurse told me his prescription, which is two Meclizine at night, it helps him sleep one in the morning as a standard dose up to six a day on rainy days. Valium is actually the best. It's more effective, which I didn't know 25 years ago. My apologies to the doctor that had to educate me about that. It is more effective than Meclizine, but it's addictive and these days it's really hard to get anybody to prescribe it. Ssr's are not useful and that's a whole nother conversation. Vestibular support vestibular.org. And you can also google V-Day sleep with a light on so that when they wake up, the first thing they see is a horizon that is created with either furniture, pictures or a window and then sleep with pillows on their stomach, their back so that they have physical contact for proprioception. Depression may not be emotional if you are depressed and your vitamin D levels are 12, you are not depressed. You are vitamin D deficient. If you have Pyroluria and you cannot methylate folate or you cannot phosphorylate B6, you have Pyroluria. How do you find that? It's hard to diagnose with bloodwork, but if you put your urine in a glass jar and put the glass jar out in the sun and at the end of the day, if the urine is purple or black, you have Pyroluria and you take methylated folate, P 5 P magnesium and GLA.

**[01:22:48]**

Hormonal depression, estrogen dominance, testosterone deficiency in males and postmenopausal females. Lack of growth hormone in someone who either isn't sleeping. So somebody getting four hours of sleep and they're not getting any deep sleep. They're not making growth hormone. Traumatic brain injuries and sleep disturbance can all cause depression. Depression is not an SSRI deficiency. Do you hear that? Depression is not an SSRI deficiency and not all depression is serotonin based, Dopamine catecholamine based depression, fatigue and depression. Follow hysterectomy. There are some nice papers on this separated from the hormone imbalance. When you do a hysterectomy, the hormones change and they're not being followed well or corrected. So estrogen dominance, progesterone deficiency, testosterone deficiency, antidepressant medications cause fatigue and weight gain. So the solution a lot of times when somebody is depressed is to give them an additional antidepressant. When the number one side effect of most antidepressants is fatigue. So so if they come in complaining and fatigue and they're on a high dose of an antidepressant, talk to their prescribing physician about that medication or ask the patient to talk to them. Fibromyalgia is my specialty. The diagnosis includes full body pain. You can't have fibromyalgia the right shoulder, you can't have fibromyalgia of your leg. It's full body pain, all four quadrants fatigue caused by chronic non restorative sleep. They never get to deep sleep, so they don't get growth hormone.

[01:24:59]

They don't get growth hormone, they don't get muscle repair, central pain sensitization. So the thalamus goes from suppressing pain to amplifying pain. And the diagnosis used to include 11 out of 18 tender points, tender to less than 4 pounds per square inch pressure and about 2008 or 9 they removed. American College of Rheumatology removed that as a diagnostic criteria. And I asked John Russell, why did you do that? It was the only thing objective. And he said, after 25 years, we couldn't teach medical physicians to assess what 4 pounds per square inch pressure was on their thumb and we couldn't talk them into spending \$150 to buy an Algometer and it has to last more than three months so you can have situational non restorative sleep and full body pain. But once it's three months, then it becomes fibromyalgia. Fibromyalgia starts from different causes. My favorite because it's so easy for Frequency Specific Microcurrent to treat, it is spine trauma, especially the cervical spine. Organic chemical exposure, prolonged excessive stress, less sleep apnea. Anybody that doesn't make growth hormone will have full body pain fatigue and fibromyalgia. Any male with sleep apnea that is untreated fibromyalgia is the least of his worries. Food IgG sensitivities. They're not technically allergies because it's macrophage mediated and histamine that stimulates class C pain fibers, vitamin D deficiency. If you have full body pain and sleep disturbance and fatigue and your vitamin D levels are eight or Non-detectable or 12, you don't have fibromyalgia, you have a vitamin D deficiency.

[01:27:09]

Insurance companies will pay for antidepressants, but they won't pay the \$77 to test somebody's vitamin D macrophage mediated serum sickness is IgG food sensitivities, poorly managed menopause. So estrogen dominance, progesterone and testosterone deficiency and myofascial pain. There's a genetic type where they have serotonin genes or food allergy genes like gluten. There's an immunologic type from viral illnesses or immunizations, bio toxic illness, mold, Lyme, dental infections and others. And everybody that has 1 or 2 of these will have combinations of both types. They all look the same when they arrive in your office. The progression of symptoms is the same no matter what caused it. And to cure fibromyalgia you have to address what caused it. The symptoms are going to be the same, but treating the cause will lead to the cure. The treating fibromyalgia is. For our lecture? I think so. The most important thing you need to know about fibromyalgia is it's curable. Not in every case, but it is curable often enough that it cures should be the intention of treatment. So we have a fibromyalgia workshop at frequency specific comm which is available to practitioners who've taken any one of our modules, either either one of the three day or the five day modules. So go to frequency specific. Com. This is a six hour I think, workshop, eight hour workshop actually.

[01:28:52]

So pain generalizes from either spine trauma macrophages release histamine that causes pain. Organic chemical exposure leads to body pain, chronic stress thins the gut wall leads to food sensitivities, pain, sleep disturbance, Vitamin D deficiency causes pain, depression, sleep disturbance. You notice a certain theme here Stress response to pain is the same no matter what. The cause is sympathetic and adrenal upregulation elevates brain corticotropin releasing factor that increases cortisol. Increasing cortisol leads to thinning of the gut wall if the gut wall gets thin. Fibromyalgia patients have reduced quantities of branched chain amino acids, tryptophan, tyrosine, leucine, isoleucine phenylalanine that reduces serotonin. Thyroid receptors have a leucine zipper and dopamine thin guts are leaky guts that cause IgG food, allergies and IgG sensitivities Corticotropin releasing factor and cortisol calls change in digestive function because they reduce vagal tone, decrease stomach acid and enzymes that cause reflux and irritable bowel or inflammatory bowel that change in the gut PH leads to a change in bacterial flora. You notice that this is like a long story. Crf acts as a neurotransmitter. So once CRF goes up, the patient can't ever remember being well. It's selective long term memory and impaired short term memory. So if you're running away from a tiger in the woods, you don't need to remember anything except how you got away from the tiger the last time. Central pain amplification, the thalamus changes from pain suppression to pain amplification and corticotropin releasing factor.

[01:30:59]

You should read this paper by Leslie Crawford. And there are other papers by. Just wonderful endocrine assessments and descriptions of what happened in fibromyalgia patients. When Corticotropin releasing factor goes up, it decreases FSH and LH centrally. That reduces progesterone, causes estrogen dominance fatigue and PMS even in men. Corticotropin Releasing factor reduces growth hormone releasing hormone centrally. It's also impaired due to sleep disturbance because they don't get stage four sleep and most of the growth hormone is made during stage four sleep. Corticotropin Releasing factor reduces TSH and prevents TSH from rising, even though the patient is functionally hypothyroid because the elevated cortisol from the slide before reduces the T4 to T3 conversion and they have alterations in immune system functions. They don't get the flu, they don't get bacterial illnesses, but they are allergic to everything, so they have an imbalance between th one and th two. So to cure fibromyalgia you have to treat the cause and the cause is always going to be in the history or the blood work because they all look the same when they arrive in your office. So here's the closing story. Fatigue is a symptom. It's not a condition to cure fatigue. Look for the cause and then treat the cause. So I'm hoping this lecture has been helpful. And really. Taught me a lot in the process of making it. There are so many causes of fatigue that we don't even ask about. And if you want to cure fatigue, you've got to look for the cause and then treat the cause. This has been fun. Hope you've enjoyed it.

END OF TRANSCRIPT

