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Vision, Concussion And Treatment A Clinical Approach

SUMMARY KEYWORDS

concussion, symptoms, patients, type, injury, people, brain, heart rate variability, magnesium, days, vision, effect, therapy, distributor, reduce, minutes, student athlete, talked, happening, tonics

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Hi, this is Deann Fitzgerald and I'm a neuro

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optometrist practicing in Cedar Rapids, Iowa. I have a primary care practice where I see regular types of patients. And then I have two clinics, one that does more brain trauma, we do Alzheimer's, dementia, stroke, more severe therapies. And then I do have a concussion, sports vision performance. So, once again, I am delighted to be here to talk about concussion, and sort of the new things that are out there information it's ever evolving. But also to talk about what we do for treatment, we get really good results. So number one eye to brain.org is a website I have out there that would have additional information for anyone who'd like to get that and then of course my email address at the bottom I answer every email if you have any questions or concerns or anything of that nature. I'm happy to try Help you sometimes I do ask you to give me a call. So why the concern with concussions so 3.8 million sports and recreation related to head traumas a year, that's what's reported. Actually, the real number is something like 7.2. There's several people that never come in and and are accounted for with that. And what ends up happening is the most common type of concussion for our young people. 15 to 24 is actually motor vehicle accident. And then for those patients that are over the age of 65, it's falls and falls prevention. So once again, although sports related concussion, gets a lot of airtime and gets a lot of notoriety, it's not the majority of things

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that I really do. But at the same point time,

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concussion is a concussion. Although, you know, you've seen one concussion, you've seen one concussion, we're going to talk about that. So always a discussion about mild traumatic brain injury versus concussion when you do like say workman's comp or something of that nature. Once again, all concussions are a mild traumatic brain injury, but not all mild traumatic brain injuries are

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concussion, we're going to kind of go

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through that. But one of the things, there's a couple of different mechanisms out there, I think both of them hold true. However, the longer sustaining one is when, when you have that coup contrecoup kind of activity where you have that biomechanical effect, where that skull

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and that brain meet. Once again, that's

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more of a physical contusion type thing that can happen. It doesn't have to hit that it doesn't have to be that kind of hit. But what happens is the neuron when it goes into that flexion, or movement is that neurons stretches and when that neuron stretches, it becomes at risk. And so what happens then is potassium

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rushes out, calcium

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rushes in, the glutamate decreases, the blood supply decreases, the glucose decreases. So all that energy that ordinarily That brain needs to have in the brain is 3% of our body weight generally, but it sucks up 30% of our energy, that brain needs that energy to recover. And yet, that's all been reduced down. And so there's a massive release of neurotransmitters that interfere with that cell communication. So the diagnosis of a concussion is based on clinical interpretation, there is not a single pathogenic finding or symptom that will give us the location of the damage, the nature of the damage, and how the damage is affecting the brain

communication to cause these symptoms. And so once again, you've seen one concussion, it's one concussion, and things leading into that then help us to want to manage that concussion. So Berlin guidelines came out, and they meet every four to five years 2016 and the suspected concussion with one or more of the following types of things, so the broader areas, symptoms,

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and so you have a head

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You have some emotional types of things where people are more edgy. They might complain about foggy brain, how they're kind of walking through their world, but they're not everything is moving fast and they're moving slow. There are physical signs where you actually see a neuro deficit either in reaching for something or they're

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walking.

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We have definitely a balance impairment, behaviors. We talked about irritability, cognitive reduction, what happens is that prefrontal cortex gets injured and those executive functions are not working as well and might have a slowed reaction time, and certainly sleep. And so once again, we need to have a very detailed history of that concussion. And a lot of times on the sideline, your athletic trainers, and individuals are using a scat five and a KV test a king davek in order to check to see whether or not that person has a concussion.

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So kind of get into some of the

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research on that. So recovery after a while traumatic brain injury and patients presenting to trauma centers. How common are persistent injury related functional limitations following a mild traumatic brain injury versus orthopedic trauma. And so this is a great paper, you guys need to read it. But in essence, what ends up happening is 1154 patients. And what happened is 53% of those participants with mild traumatic brain injury, reported impairment 12 months post injury. So technically, in all the literature and even I said that a true concussion shouldn't be resolved. 86% of concussions shouldn't be resolved in 26 days, that's what the literature started out to say. What we're finding is that there's a large number larger number of people who have what we call persistent symptoms, and we'll kind of talk about that. And so as a result, what ends up

happening is that in our history taking, I think that has to be so important to find out you know, have you found And have you hit your head? Have you been in a car accident?

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And you have to ask five

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times people don't remember now they might be doing a better job because we get a lot more information now. But But what ends up happening is that you have to ask the patient at least five times to see if they remember whether or not they had any type of concussion. And I had a gentleman who wasn't functioning very well. I did the same thing asked him five times. And finally he said, Well, does laying down my motorcycle underneath a semi count? Yeah, that counts. Then there was a paper also Seabury, Jama in 2018. Do patients with mild traumatic brain injury receive adequate levels of follow up care? And the essence of that, please look it up and read it. But once again, what they've indicated that a large proportion of patients with mild traumatic brain injury did not receive adequate follow up care, and as a result had persistent as the 2019 paper said, Have persistent symptoms even 12 months after their injury.

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So are there some things that we can do to help predict

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how severe that concussion rehab might be. One of the things is if we've talked about it before, if they present with dizziness at the time of the injury, then they they will have a protracted recovery. And in essence, this paper in 2016 had 3000 patients. The essence of it is, is that the the more the patients report higher symptoms at the time that you see them at the ER, their retract, they're going to have a protracted recovery. And some of those higher risk are going to be your ages 13 to 18. Females seem to be higher risk. Those people that have a history of migraine when we see balance at that particular time, headaches sensitive to noise, and they're going to have fatigue. So there are things that tell us whether or not they're going to have a slower recovery. So for those patients, that once again, are recovering more quickly. They're indicating that 86% of these people are, you know, recovered from their concussion within 26 days.

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So some of the multiple factors we need to take a look at.

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So a pre injury factor is the history of a traumatic brain injury prior to this, any other

concussions. And once again, if they were an individual that played football, soccer hockey in high school, and now they're an older adult, it's pretty reasonable to believe that somewhere along the line, they probably had some sort of concussion. Once again, motor vehicle accidents very heavy. So history of the TBI females tend to be a little bit more at risk also age being younger. If people have a pre existing situation with anxiety,

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depression, migraine, once again,

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that doesn't mean that they had a pre existing condition and now this is what's causing what's going on that the literature out there some of them have tried to indicate that that's not true at all. What we're trying to indicate is that these

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people are more at risk.

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And what happens is pre injury they have been able to mitigate and get through their symptoms and then they have this concussion. And it's like throwing gasoline on an ember, it just makes that anxiety, depression, migraine come out a little bit more. And then of course, genetics, there are people that are predestined a little bit with their genetics to be more prone to not get better after a particular type of concussion, and then injury. We want to look at the symptom burden burden, not all symptoms are created equal. We have to look at the sleep issues. Neck involvement, vision changes, dizziness, as I talked about cognitive changes. We're going to talk about it 100% of people who have some sort of concussion, traumatic brain injury, or whiplash will have a prefrontal cortex problem. And then of course, that mechanism of injury. Is it a hit isn't in a car is it anticipated? Is it blindsided is an untapped anticipated? You're going to find that the people that were able to prepare a little bit they see the car in the rearview mirror just about ready to hit them in the back end, and they're able to tense up, those folks are gonna probably have a little bit different effect than the folks that have no idea it's about to happen.

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And so post injury, it really does depend

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on management. It depends on their lifestyle. If people are pre diabetic, diabetic, thyroid, pre thyroid, if they're taking certain types of medications, a lot of times when they are presented to the ER, they might just suggest rest and not have any other type of follow through. And if they're

not getting some support in some fashion early on with that concussion, they're going to have a harder time getting better. And more of our Asquith risk populations, our children and teenagers, mostly because of screen time and that brain still developing in that frontal lobe. And we want to always be able to get that individual back to school back to work before we get them back into a sport. I know that sounds very common knowledge We should do, but you can't believe how many people would want to be out of school and we can still go to the football, game and play. So the history of the traumatic brain injury is very good. The thing of it is that the myth of the number of concussions really lies, if we are able to get that patient better and resolve that concussion. There is no number really to concussion. But oftentimes, we're not helping them resolve that concussion and they go back into the game or they have a second injury. And as a result in their recovery time is worse. So logically, what ends up happening is we get damage to one one or all of the five lobes of the brain. And what ends up happening is they have different symptoms that would occur. For example, a frontal lobe, symptom might be fatigue might be executive function, per separating thought they can't get that thought out of their mind, is more of a occipital lobe would be some sort of vision app. Fact or not able to point and be able to tell where they are in space, provide a little bit also be that space type of an effect. So compounding the lack of progress in most sports related concussions. And the fact that an MRI or a CT will not show any anatomical type of changes, what ends up happening is the best research to date has found that baseline testing is at least 55%

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inaccurate. And that's an

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unfortunate type of thing. But we still need to look at all the different aspects to put the pieces to the puzzle together. So it really is a brain thing. So concussion management needs to be able to identify an optimal concussion strategy. It's gotta be multimodal, it's going to be vision, it's going to be distributor, it's going to be game, it's going to be balanced, gonna be reaction time, it's got to be sleep, cognitive issues in there, and we have to have a diagnosis that can look at objective and an accurate type of assessment. And so the wide range of treatments might be vision ocular motor training, might be vision distributor, photobiomodulation with for optometry with its decent tonics photobiomodulation laser cold laser multimodal therapy, so we got to look at the autonomics we have to look at heart rate we have to look at mood cognition balance gait,

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these manual therapies craniosacral for my clinic

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is very big dry needling, we use as well with our athletic trainers, acupuncture,

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k tape for the neck,

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but we also have to be educating these patients about diet, nutrition and lifestyle. And there are certainly other effective modalities out there that we use as well. So, in essence, the diagnosis starts with a suspicion of injury and symptom and symptom provocation. And so where I start is I do a self reporting symptom survey. So once again, without any other type of biomarkers, this ends up being a very good tool. What happens is that when they rate their symptoms, what ends up happening is this could go on up to 134 symptoms. So if you've got a patient at two shows up. And it's not unlike me to see a patient that has 65 symptoms, or that has 75 symptoms, what we got to be looking at is that not all

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symptoms are created equal. So when we look at those numbers,

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we want to look at what's kind of going on. And our majority of those, you know, 65 symptoms are 34 of them rated as a sleep problem. So we got to look at the autonomic nervous system. And what happens is that it's very common knowledge at this point in time in the literature, that when you get a concussion, traumatic brain injury or whiplash type of effect, what ends up happening is that it suddenly slams that nervous system into a fight or flight. So you have this deregulation between the sympathetic and parasympathetic system. And then everything as far as I'm concerned after that point is very much related to spacial. One of the top things that we look at as a receipted NPC. The VA may be 2015 but they're receded NPC may be far out, and that tells them where they are in space. So first of all, self reporting symptom survey is very important. To do prior to seeing them.

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And this kind of

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goes along with the guidelines and the domains of what the Zurich guidelines are, they want a symptom baseline vision screening of distributor screening, balance, and of course, a history. And so as a result, the best practices are going to be vision, distributor, balance, gait, cognition and reaction time. This really has to be a team effort. From the moment that

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student athlete is pulled off the field and assessed by the

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athletic trainer or the coach, depending upon what resources they have to go no go, we don't automatically say, gosh, you have a concussion, we say you're not in a position. This is a no go, you cannot go back into the game. So it's a really a big team effort. And this is a big area right now during education, or I'm sorry, during that baseline testing to educate both the parent and the student athlete on the concussion, and what types of things to look at. For those of you who have probably seen me lecture and other types of things. I'm really big on the six trajectories, primarily because UPMC introduced them. I do a lot of impact testing. I do a lot of cognitive testing I use now different tools. But for sports related concussion impact testing, and of course on the six trajectory model, we're looking at vision, vestibular, cervical gait, cognition, reaction time was one I added. So, really cognition. And then these add ons are cardiac autonomics. We got a look at auditory we look at metabolics and lifestyle. We look at headaches and migraines and of course that affective disorder or mood. And so a paper came out in 2018 that talks on one side, the trajectories that I've used a lot and continuing will continue to use. But there's also a coach v2, which talks about the 17 phenotypes. And once again, what they did is kind of clarify the effect of disturbances. They made it bigger than anxiety, it's more of a mood and affective disorder. They talk about headaches, not so much being a trauma, migraine. And then we've got to look at the cardiovascular we talked about that as well. autonomics. So if we broke it down into physical distributor auditory visual, and gave a grouping so that we could see that, we can see that once again, there are a lot of symptoms that we look at with concussion, and some of them more persistent than others, and some that we want to address right away. So I don't wait for a student athlete. And my student athletes are zero to 100. I don't wait for a student athlete to tell me they're not sleeping, I've got to tell you 100% are going to have a problem with that. We take a look at that. And I don't wait for a student athlete to tell me whether or not they're doing poorly in school or whatever. Once again, vision distributor, and we're looking at that cognition. So for baseline testing during that moment, with parents and athletes and coaches, we're going to educate them about the importance of that baseline testing. And now and give them reassurance about the stress and the importance about that. So they don't feel like they have to sandbag a test or not tell the truth. There's going to be things though, that I can do in my exam that I'm going to help you with yours, that will dispel them, this of what's going on and then also Give them comfort in knowing that we know what we're doing. So in the sideline testing, the scat five, plus the KT test plus the best test is 100% diagnostic of a concussion, and rest is still the cornerstone of that concussion rehab. But we cannot leave them in perpetual rest. So those four zero to three days, we're gonna want them resting. We want them hydrating, and I give every student athletes zero to 100 magnesium, and in this particular case, I might use a product called calm calm. And what happens is I have them taken about 20 minutes, 30 minutes before bedtime.

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Everybody gets this in my

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region of the world. I have talked to all of the medical practitioners and neurologists and asked him if they had any type of trepidation about wanting to do that and got an astounding No. So magnesium is it, we do passive therapy we need to reduce these symptoms. And just by putting in the rest, we're not going to be able to do that completely. So by using photo by module light therapy, some tonics cranial sacral were able to reduce their symptoms down. And after seven days, we got to get them moving with a symptom living movement. And so the thoughts that are out there is cognitive issues that linger our unresolved vision, vestibular issues, anxiety trajectory is unresolved vision, vestibular issues, and cervical issues are more prevalent. And those are unresolved vision, vestibular issues. So it's all related back to you 100% of our brains dedicated to vision in some fashion. And this is how it relates to that. There might be some extra testing obviously, I do. I use a lot of eye tracking, in particular, right eye and the reason I use ride is because it gives objective data that I can show my patients. I do a lot of cognitive testing and primarily for sports related injuries, I use impact testing, but I also use CNS vital signs. There is a product out there called brain gage which uses lateral inhibition. To check for that, and then a newer product that's out on the market, cognitive you can vary concussion uses a language based concussion test something to take a look at if you're interested in that. I do a lot with blood pressure, heart rate variability, meaning that I take their blood pressure sitting and standing depending upon right and left arm. I'll do Pulse ox to check their oxygen saturation. And I look at heart rate variability. It's a snapshot

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in time, but it allows me to

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take a look at what that patient is doing right then and there. And what ends up happening is I might do a I do a before heart rate variability I'll do an after and the heart rate variability can tell me whether or not I'm on the right page for helping that patient. I absolutely have to do reaction times. And I do those reaction times, both before to kind of demonstrate to that student athlete that they're truly having a problem and then to

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use it as a product that could release them to play or release them at least back to practice. imaging. Once again 99.9 percent of image injury imaging at say zero to seven days, I yield no type of effect with this if there's not a structural problem. However, if that student athlete is not getting better, then I'm going to be looking at a blood workup, I'm going to be looking at imaging

them, I'm going to be looking at different types of things, within three to seven days, I normally with what we do, we can normally move that student athlete into a better place. If they're not moving that quickly at their young age, then we have to take a look at why they're not. So what we kind of know is seven days of cognitive decline, it takes up to five days for the ATP, which is the gas or fuel in our brain to get back up to a normal level. So once we have a concussion within zero to three, zero to five days, that ATP production starts to come online. That's why it rest is imperative. That's why hydration. That's why we've got to be feeding ourselves a good protein, and then up to 30 days we'll have a gait disorder. So a force plate exam would be the Nice but the best on firm surface and foam would be very good. Within five to 15 minutes of the of the incident, neurodegenerative incident, the blood brain barrier opens up and the gut brain barrier opens up and it goes into survival mode. So what they're doing right now in the ER is to help with that headache. And that immediate injury situation is they're using 25 milligrams of Benadryl. They're using Pepcid AC, and they're recommending drinking Gatorade. We'll take a look at that. Once again, if we're using Benadryl, we're trying to get that histamine reaction down the Pepcid. We're trying to close off that leaky gut. And then of course, we're doing the Gatorade to get a little bit of energy with that sugar in there, but also with electrolytes, so very effective, and that's what the emergency room is using right now. The autonomic nervous system goes into fight or flight. So a lot of times these people are in sympathetic mode, and so they're not sleeping, they're agitated, they're on the edge, they got foggy brain. So if you have an athlete's Zero to 100 that has, as we talked about before and underlining an effect, like anxiety, depression. Once again, this is a slow burning Ember that they're able to keep under control and with a concussion, it throws gasoline on it. The three components, of course of the clinical exam, as we talked about before, we want to have that comprehensive, hence, history, we want to know the symptoms, we want to know their past effect with that. And during my exam, I've got to do a vision ocular motor, I do balance, I do have distributor function, we look at their mental capacity. I do a cranial exam, a brief reflex and a muscle tone and coordination range of motion. And then we put together an assessment and care plan. So the diagnosis of concussion, what are we gonna look for once again, suspicion of injury and symptom and symptom provocation. And then what we have to do is if we do have baseline testing, we can compare that oftentimes I get probably 30% of student athletes that don't have a baseline. So we have to go off with what we know. And as mentioned before, If they had dizziness at the time of the injury, they're going to have a protracted recovery, it's going to take 30 days. And in essence, unless there's some sort of speedy recovery, and we can do some stuff, generally it takes, you know, anywhere between, say, 14 to 30 days to get them back up and running, I see them immediately to assess them. And so probably the biggest change that I've made, we look at eye tracking because 100% of our brains dedicated division in some fashion. In the NFL, they use a circular pursuit to take a look at that anywhere between 10 seconds to 30 seconds to say, hey, you're a no go. It's very effective and being able to do that. Why? Because it takes a lot of real estate of our brain to do a circular pursuit, and it gives us a lot of information on the

functional exam. I want to be taking a look at their balance. I do take a look at their reaction time. But I'm also looking at heart rate variability that snapshot in time, where is their system out? Are they highly parasympathetic, which means they have a metabolic issue and they're not going to get better. In my later ones, let's say I have a patient that comes in three, four or five months later or years later, have a concussion and still having some trouble. If, if they're in high parasympathetic, a lot of times it's the metabolic system. It's our lifestyle. That could be borderline diabetic, it could be borderline thyroid, we've got to take a look 89% of people who get some sort of head trauma will eventually have some sort of thyroid dysfunction got to take a look at that. If they're in high sympathetic system, that means their brains not working. I'm going to do something else in order to help that so high parasympathetic, I'm looking more metabolics, high sympathetic, I'm looking for the brain function. So our early concussion management is we can't leave them arrest, but we got to start them in rest and we got to talk to them and educate them about what they need to be doing. They got to treat themselves like a migraine in bed by 10. Up by six, they got to be on a regimen. They need to be drinking water. They've got to have protein early in the morning. My female patients are tough because they don't start out maybe with protein so we re educate them about what they need to be Eating, we reduce their sugar, no alcohol, no tobacco, to try and do that. So within three to 10 days, we have to kind of get them moving. So we want to get them walking, we want to do a symptom limiting type of exercise walking around the block, we may want to add a little bit more cognition, I'm gonna take a look at the trajectory plate to see where they're at. But I have to tell you, in all my research, it comes down to vision distributors. And so we're looking at that I'm automatically in that acute phase of that zero to 10, zero to 21 days. Even without heart rate variability, there's a judgment there that can be said that they're in high sympathetic, they're not sleeping, they're edgy, they can't concentrate. So we have found that craniosacral along with photobiomodulation, some tonics and using compression, where they might wear a T shirt one size too small while they're in therapy with me. And once again, my therapy is a little bit different. I might see them every day or every other day in order to get that concussion better and to reestablish that education about How they're eating, how they're hydrating how they're sleeping.

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And then as I mentioned before, KD test plus a bestplaces. Cat five is one of 100% diagnostic of a concussion, a receipt of NPC indicates that we have, they don't know where they are in space, they don't know where it is in space, we have to be looking at that distributor system, we have to be looking at that brainstem area 91% of the mild traumatic brain injury, have a prefrontal cortex aspects, that means they're going to have could have a pre they get caught on it on a thought so that for separation and thought, they have executive function difficulty, a concussion plus no solution equals hysteria. But we don't need to be that way there. There are things that we can do to help patients get better. And one of the pre things that we can be

advocating for people is sports vision performance. So one of the things we want to be doing is that for a pre type of injury, we want to be advocates for sports people and for our patients to be working with us in order to get their eye movements, their eye hand coordination better, because that would help prevent a concussion or severity of that concussion. And that's a paper written by Joe Clark 2015. Now the core of sports vision performance for us as I hand performance with neurotracker. And we can talk about that later. So the key thing is I mentioned before is not all symptoms are created equal. And if you look at this chart, 100% across the board visions involved with each and every one of those problems, and headache is a domain that's over all of this. So when they present with a headache, and they present with some sort of effect, we want to be looking at that. And then the distributor system is in there as well and you can see sleep. So once again, we've got to mitigate the sleep we got to treat them like a migraine. We got to use magnesium to get them going. So how do we get them out of rest. And so once we've done that we treat them individually with that each individual is going to have their thing, but we've got to have them on a regimented scale. And we can offer up some ideas on limiting that stimulating environment. I will use tools like sunglasses by nasal occlusions, we could use a little bit of a blinder. I don't use a lot of that, because I don't want them to become dependent upon that. But I have to get them. If I see them. I usually see concussion patients within that zero to seven days. So I see him pretty quick. I'm going to give them tools in order to get them out of their symptoms. And then auditory, we have a lot of people that have a light sensitivity and sound sensitivity. We can be helping them with different types of things to mitigate that. And then we talked about the education piece about planning and pacing. Once again, we talked about sleep, getting up and eating, what types of activities can they do mindfulness types of things, some restful activities. And then as I mentioned before, we got to treat the sleep disturbance, whether it's sleep hygiene that we'll talk about or melatonin, which I don't use as much as I do the magnesium. So we want to go to bed and wake up at the same time, we want to make our bedroom haven for sleep. We want to be using magnesium and so once again that magnesium 20 minutes to 30 minutes before they go to bed. Definitely want to do that a number one, the number one supplement that athletes are deficient in is magnesium. And I just found out from one of my colleagues that insurance now is going to pay when you have a blood test to check magnesium levels. That's how important it's become, you know, they can check d3, they can check omega three, never magnesium and now they are which I think is very big. So treatment starts with symptom reduction. I had 249 concussions. We educated them about what was going on and then we did some tonics or photobiomodulation laser therapy. I did something called PMF with just pulsed electronic magnetic force. Then we've used cranial sacral or you'll see in the picture, this stillpoint and then be resting on the map for their take home that very first day. Magnesium we give them little packets to put into water we recommend they buy the gummies hydrating, I'm talking about what they should be eating for breakfast, how their day should look for the next few days to get them sleeping and the absolute number one thing that I use is Brain Tap for everyone at before bed right along with

magnesium. So therapies can blind reduced the very first day they come in zero to seven days. I do these combined therapies in the office. So we'll do light therapy, we'll do some tonics and it improves the brain healing improves cognitive function. It can help with people with Parkinson's, Alzheimer's, dementia, stroke and obviously concussions. It improves that executive function, those verbal skills, their memory improves with the PMF. It enhances that

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neuroplasticity. This can actually give some energy to the system so that we can actually do some of the things we need to do. And then absolutely, we'll look at that neck cranial sacral, dry needling, massage. chiropractors, I love their activator method within the first zero to 14 days to help with that neck and jaw. So the the the three things that we're unable to take look at efficiently and help is that the job and gets out of alignment with that hit or whiplash, their neck is out of alignment with that whiplash or injury and their first rib. So when you've got patients that are not getting better if you're not helping them move to the right kind of care with that, that can also stop us from letting them get better. So once again, calcium is a natural calcium channel blocker, and it speeds the recovery. It reduces inflammation. When we talked about five to 15 minutes of having an injury, that blood brain barrier opens up that gut brain barrier opens up and so once again in the studies, it's shown that manual cesium drops 50%. And so magnesium is crucial for repairing and growing neurons. And those low blood levels are going to make the brain slow to recover. So when we offer that up with, with the concussion, patients do much, much better. So once again, that parasympathetic sympathetic system, what do I do? I use some tonics. In this particular case, I use a ton of different types of ways, but this would be one Alpha Omega for 10 minutes, you epsilon for 10 minutes, I do have them humming, singing gargling, because I want him to get those brainstem type of exercises along with that Vegas nerve. And once again, as I mentioned before, everybody gets a Brain Tap for bedtime. Now, occasionally, I'll have different kinds of programs that are offered to that program. I will have them do a morning program. If they can't get up, we will provide for them a protocol in using that product. And that is probably one of the things other than heart rate variability that I've added to my practice that has helped me just flow off the page with patients getting better. So once again, with the rest recommendations, we want to educate the patients because we want to limit their TV computer reading cell phone, we've got to allow that increase in sleep, hydrate and eat well. And we've got to have activities that are symptom limiting. So we want them walking, we want them moving, but we don't want them moving into a difficulty with symptoms. And we're going to try and be cautious about a recovery time timeline.

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But if I'm seeing them every day or every other day for

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45 minutes to see if they can get better, they're gonna already notice what they're doing. And I've already done my baseline testings in my exam with my self reporting symptom survey. And we do that at the beginning of the exam and at the end, so they can see how much better they're getting. There can be things to quiet them, you know, audiobooks or good quiet music, meditation or mindfulness. There is an app out there called Calm very kind of confusing, but it works as well. But this is where I use Brain Tap at all. So this is why I might have them use a Brain Tap three times a day with the various programs in order to get that brain to respond a little bit better. They can do coloring, which is very inane and very comforting to some people. And like said short walks outside. So just to give an example, we don't want them to get into symptoms. So they might do a 15 minute walk, and then listen to an audiobook or relax a little bit with some inane TV, they can do 15 minutes of reading, and then 10 minutes of just mindfulness restfulness and then then they go to the product of sorting laundry. So once again, this can be sort of that target activity pattern that we can do to help patients get better. So in summary, after 10 days of treating them for they start to go into post concussion syndrome, and I apologize that shouldn't say persistent concussion syndrome symptoms. So what ends up happening is after 10 days, if they're not getting better than they're in Persistent concussion syndrome. And so what we want to do is help get them out of that. So in a nutshell, I'm going to be using calm 30 minutes before bed and I'm adding Brain Tap to that every night. And then I'm always talking to them about their diet. I want them to reduce their gluten and casein. So I want them reducing their wheat and dairy. I want them reducing their sugar, no alcohol, no tobacco, if we can

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hydrating them talking to

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them about I'm not trying to take away their coffee. But one eight ounce cup of coffee requires 16 ounces of water to neutralize the dehydrating effects of caffeine. We want to reduce their electronics as we talked before, maybe they're going to do 40 minutes of rest and then they can do 20 minutes of Facebook or 20 minutes of work or whatever they need to do on that electronics. We want to do symptom loonie exercise, so it could be walking. I don't want them on a treadmill at that point in time. If they have a stationary bike or a rower, we might do something like that, but walking would be best. And then of course, we can use sunglasses and earplugs to reduce that light and sound sensitivity for the acute phase. But I do not want them wearing that much beyond seven. Absolutely none of my patients will be wearing that beyond seven days, I might use them by nasal occlusion, that could go into a couple of weeks where you put an occlusion in the nasal side to reduce the vision noise. But at the same point time I'm wanting to

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work them out of

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that. So I'm looking at vision distributor, cervical balance and gait therapy.

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So I'm

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walking them while we're doing different types of things. I use a lot of vibration therapy because that can do a lot of gait things for me without moving them along and a lot of distributor

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and the first

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thing I want to do is to be able to reduce their symptoms with some tonics PMF craniosacral. And then my home therapies obviously, as I mentioned before, magnesium and Like said, Love, love, love Brain Tap oftentimes I tell my patients and their they remain on Brain Tap for probably six months to a year because they're

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helped that much.

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So thank you very much for listening this I hope I was able to give you some good things to start with. And I constantly and always believe this. We as therapists are building this plane as we're flying it, because this is a constant ever moving target. And we have to have good information in order to do that. It can't be one thing, doing glasses. It can't be one thing doing vestibular rehab. It has to be at all together in order to get these patients happy and healthy and having joy again. Thank you very much.